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Individual versus group thinking in elaborative thinking exercises

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INDIVIDUAL VERSUS GROUP THINKING IN ELABORATIVE THINKING EXERCISES

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CHAPTER I

INTRODUCTION

Purpose of the Study

The purpose of this study was to attempt to determine whether elaborative thinking is done better by children working in groups or by children working individually. The study is concerned with the following problems:

1. To determine the number of ideas produced by individuals on selected elaborative thinking exercises
2. To determine the number of ideas produced by groups on selected elaborative thinking exercises
3. To determine whether groups or individuals, using the same stimuli, produce larger numbers of ideas in elaborative thinking.

Definition of Terms

Several definitions of elaborative thinking are given in Chapter II of this thesis. For the purpose of this study, it will be defined as

> . . . that type of mental activity which requires the reader to go beyond the ideas on the printed page and, by a spontaneous flow of his own thoughts and ideas, give many solutions to a problem related to the selection read.[1]

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[1]Joan Derby, et al., "The Development of Thirty Self-Administering and Self-Scoring Elaborative Thinking Exercises" (unpublished Master's thesis, Boston University, School of Education, 1961), p. 2.

Team learning, as spoken of in this study, will pertain to situations where groups of two or more children are working cooperatively for the betterment of the group.

Scope of the Study

One hundred and twenty-five sixth grade children in a community suburban to Boston took part in the experiment.

CHAPTER II

REVIEW OF RESEARCH

"It is unfortunate that we are still largely in the dark ages in relation to a better understanding of mental processes."[1] Comparatively speaking, little is known about the thinking process. It is difficult, then, to come to a strict definition of thinking.

Warren defines thinking as "A determined course of ideas, symbolic in character, initiated by a problem or task and leading to a conclusion."[2] Russell says, "The whole act of thinking is characterized by organization and integration of the various parts."[3] Cleo Chrisof lists the various definitions of the thought process as an association of ideas, subvocal behavior, mental trial-and-error, and controlled association.[4] Dewey speaks in terms of the "stream of consciousness" in thinking. He says:

> There is no single and uniform power of thought, but a multitude of different ways in which specific things--things observed, remembered, heard of, read about--evoke suggestions

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[1]Donald D. Durrell, Improving Reading Instruction (New York: Harcourt Brace and World, Inc., 1956), p. 301.

[2]Howard Crosby Warren (ed.), Dictionary of Psychology (Boston: Houghton Mifflin Co., 1934), p. 279.

[3]David H. Russell, Children's Thinking (Boston: Ginn and Co., 1956), p. 8.

[4]Cleo Chrisof, "The Formulation and Elaboration of Thought Problems," American Journal of Psychology (April, 1939), 52:161-185.

> or ideas that are pertinent to a problem or question that carry the mind forward to a justifiable conclusion.[1]

Durrell and Chambers state, "There is no single definition of thinking satisfactory for research for thinking purposes. Thinking seems to embrace many types of mental tasks. . . ."[2]

Several attempts have been made to define elaborative thinking. Durrell, writing about the factors that aid comprehension and interpretation in reading, says:

> There are many significant higher mental processes to be considered in a reading program. . . . One of the more important ones is elaborative thinking which consists of such abilities as making comparisons or applications, seeing relationships between reading and other experiences, asking questions, adding illustrative incidents, discovering topics for further study, suggesting classroom or personal activities related to reading, or other evidences of pertinent associations with the material read.[3]

Summing up her research on the subject of elaborative thinking, Baumann says:

> . . . it is an ability which necessitates the use of previous experience to some present problem or situation. . . . Two aspects of the ability which have received the greatest amount of attention are the suggesting of pertinent questions and activities stimulated by reading in content areas.[4]

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[1]John Dewey, How We Think (Boston: D. C. Heath and Co., 1933), p. 55.

[2]Donald D. Durrell and J. Richard Chambers, "Research in Thinking Abilities Related to Reading," The Reading Teacher (December, 1958), 12:89.

[3]Donald D. Durrell, "Development of Comprehension and Interpretation," Reading in the Elementary School, Forty-eighth Yearbook of the National Society for the Study of Education (Chicago: University of Chicago Press, 1949), p. 202.

[4]Mayvis L. Baumann and others, "Differing Instructional Needs for Children of Similar Reading Achievement in Grades Two, Four, and Six" (unpublished Master's thesis, Boston University, School of Education, 1960), p. 22.

Chambers concludes that elaborative thinking is "an ability which necessitates the use of previous experience and the application of this experience to some present problem or situation."[1]

Hayes says, "Elaborative thinking while reading will consist of that type of thinking which goes beyond the assimilation of facts or the literal interpretation of the author's ideas."[2]

Parker includes ". . . an abundance of appropriately related ideas fluently expressed" in her definition of elaborative thinking.[3]

Aymes, writing about elaborative thinking in connection with composition, defines it as "an abundance of ideas, fluent expression, a variety of appropriate and related thoughts expressed in colorful and detailed ideas and clearness of expression."[4]

Durrell writes, "Elaborative thinking, in which the pupil associates new material with other ideas and experiences, provides the significance and usefulness of facts learned."[5]

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[1]John Richard Chambers, "The Relationships Among Measurable Mental Tasks Related to Reading" (unpublished Doctoral dissertation, Boston University, School of Education, 1956), p. 21.

[2]Mary Theresa Hayes, "The Construction of Equivalent Forms of a Test on One Aspect of Elaborative Thinking in Grades Six, Seven, and Eight" (unpublished Master's thesis, Boston University, School of Education, 1951), p. 1.

[3]Katherine Parker and others, "The Construction and Evaluation of Five Patterned Series of Lessons for Teaching Five Specific Writing Skills" (unpublished Master's thesis, Boston University, School of Education, 1959), p. 94.

[4]Alan Aymes and others, "An Evaluation of Sixth Grade Compositions to Determine Growth in Originality, Elaborative Thinking, and Vocabulary" (unpublished Master's thesis, Boston University, School of Education, 1960), p. 19.

[5]Durrell, op. cit., p. 33.

Nunes lists the nine suggestions for teaching elaborative thinking, given originally by Durrell. These are:

1. Finding topics or questions not covered by the story
2. Finding things to do about materials read
3. Thinking of people (resource persons) who have an interest in the story being read
4. Reading for similar experience
5. Finding illustrations of the author's meaning
6. Producing different endings to the story
7. Noting similarities and contrasts between stories and situations studied
8. Drawing inferences and generalizations from reading
9. Noting relations between past and present.[1]

Derby (whose definition was quoted in Chapter I) defines elaborative thinking as ". . . that type of mental activity which requires the reader to go beyond the ideas on the printed page, and by a spontaneous flow of ideas, give many solutions to a problem related to the selection read."[2]

Jenkins includes in her definition the associations of questions and the associations of activities.[3]

Durrell states, "Elaborative thinking in relation to reading encourages the child to tie his reading experience, his memories, his observations, his actions, his purposes and plans."[4]

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[1]Durrell, op. cit., as cited in Agnes Isabel Nunes and others, "A Comparison of Recall Using Factual Study Guides Versus Elaborative Thinking Study Guides in Grade Four" (unpublished Master's thesis, Boston University, School of Education, 1959), p. 10.

[2]Derby, op. cit., p. 2.

[3]Ethel Mae Jenkins, "An Evaluation of Directed Teaching and Associational Reading in Social Studies with Sixth Grade Children" (unpublished Doctoral dissertation, Boston University, School of Education, 1953).

[4]Durrell, op. cit., p. 302.

Durrell and Chambers write:

> Probably the most important (of thinking abilities) to the use of reading is elaborative thinking in its various forms: relating the content of reading to previous knowledge, illustrations and applications, opportunities for use, relationships to other fields, and various associations which integrate reading into knowledge or action.[1]

Chrisof says:

> Within the elaborative stage [of the thought process] are distinguishable three important phases, i.e., (i) the accumulation of material, (ii) validation and selection, and (iii) fusion and synthesis of selected products. . . .
> Looking back at the elaborative stage at large, we may say that the single word which seems best to express the entire procedure is 'manipulation.'[2]

The skill of elaborative thinking can and should be taught in the classroom. Judd traces the development in education from a demand of rote memorization in the traditional system to a cultivation of the higher mental processes in modern education.[3] Durrell and Chambers[4] and Wrightstone[5] also trace the development from "across the board" presentation of facts to the teaching of the skills of thinking.

Durrell writes, "At present, although there are many questions in study guides which call for elaborative thinking, the ability is

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[1]Durrell and Chambers, op. cit., p. 91.

[2]Chrisof, op. cit., pp. 174-178.

[3]Charles Hubbard Judd, Education as Cultivation of the Higher Mental Processes (New York: The Macmillan Company, 1936).

[4]Durrell and Chambers, op. cit.

[5]J. Wayne Wrightstone, Appraisal of Newer Elementary School Practices (New York: Bureau of Publications, Teachers College, Columbia University, 1938).

usually taught incidentally, if at all."[1]

Baumann says, "Scientific evidence has revealed that the skill of elaborative thinking can be successfully developed by use of directed teaching techniques."[2]

Brownrigg states, "Elaborative thinking should be stimulated so that thoughts that may arise in his [the child's] imagination can be captured."[3]

In stating the purpose of his study, Chambers wrote the following:

> For decades, educators and laymen have stressed the importance of a method of education which encourages and provides for the stimulation and knowledge of ways to develop these skills: i.e,, the skills of thinking creatively and independently.[4]

Harriman wrote, "Educators now tend to regard the thought processes as part of the total behavior of the individual. . . . It it an improvable function."[5]

According to Derby, "Elaborative thinking is an essential quality of the person with an active mind, and should be developed in the

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[1]Durrell, "Development of Comprehension and Interpretation, op. cit., p. 202.

[2]Baumann, op. cit., p. 22.

[3]Helen Rita Brownrigg, "An Evaluation of Exercises in Written Composition Planning" (unpublished Master's thesis, Boston University, School of Education, 1950), p. 2.

[4]Chambers, op. cit., p. 1.

[5]Philip L. Harriman, "Reflective Thinking and Problem Solving," in Elementary Educational Psychology, ed. Charles E. Skinner (New York: Prentice-Hall, Inc., 1950), p. 314.

child as early as possible."[1] Delaney said further on the subject, "Elaborative thinking has long been recognized as one of the objectives of educational instruction."[2] Durrell ascertains, "Elaborative thinking responds well to specific teaching."[3] Aymes states, "The teacher plays a major role in guiding the student to develop elaborative thinking."[4]

The United States President's Commission Report on Higher Education urges teachers to develop the skills of thinking. The report states, "The ability to think and reason, within the limits set by one's mental capacity, should be the distinguishing mark of an educated person."[5] Wrightstone, speaking in terms of critical thinking rather than elaborative thinking, says, "In a democracy, the school as an agency for social education has a special obligation to cultivate in children the attitudes and methods of thinking."[6] Rothenbush writes, "The school is the one institution whose chief concern is to teach people how to think."[7] Russell wrote, "Some writers on education oversimplify the

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[1]Derby, op. cit., p. 5.

[2]Margaret D. Delaney, "A Series of Exercises in Elaborative Thinking in Composition Planning" (unpublished Service Paper, Boston University, School of Education, 1950), p. 4.

[3]Durrell, Improving Reading Instruction, p. 302.

[4]Aymes, op. cit., p. 22.

[5]The United States President's Commission Report on Higher Education, Higher Education for American Democracy (New York: Harper and Brothers, 1947), Vol. IV, p. 57.

[6]Wrightstone, op. cit., p. 190.

[7]Verona F. Rothenbush, "A Plan for Teaching Pupils How to Think," Clearing House (February, 1943), 17:331.

task but make a good point when they say it is the work of the school to teach the child not what to think but how to think."[1]

Anderson says, "As a rule the best way to achieve an objective is to provide instruction to that end. This rule applies to thinking."[2] According to Judd:

> Education has not completed its task until it has given the learner not only the devices which can be effectively used in systematic thinking, but also guidance in the use of these devices and in their application to a great variety of situations.[3]

Jenkins wrote, "It is generally agreed among educators that one of the most important aims of education is the development of the powers of thought."[4] Kingsley and Garry said, "A good teacher will provide opportunity for children to learn by thinking out problems."[5] They also hold that "the ability to think . . . is improved through functions other than thinking itself."[6] Nunes concludes from her research, ". . . ability in thinking and recall can be increased through carefully planned programs."[7]

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[1]Russell, op. cit., p. 3.

[2]Howard R. Anderson (ed.), Teaching Critical Thinking in the Social Studies (Washington, D. C.: The National Council for the Social Studies, 1942), p. 41.

[3]Judd, op. cit., p. 170.

[4]Jenkins, op. cit., p. 1.

[5]Howard L. Kingsley and Ralph Garry, The Nature and Conditions of Learning (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1957), p. 428.

[6]Ibid., p. 423.

[7]Nunes, op. cit., p. 12.

The skills of thinking should be taught in connection with reading. Durrell and Chambers state:

> Apparently, thinking abilities rest upon specific instruction, incidental instruction, or fortunate environment or heredity. . . . It will probably be found that well-designed exercises in elaborative thinking in reading will produce higher permanent retention and greater availability of knowledge to new situations.[1]

Gans related the thought process to reading comprehension. "Where there is comprehension there must be thinking--to comprehend without thinking is an impossibility."[2]

Hahn wrote:

> A pupil must not only be able to read, but to read creatively in order to do good school work and also to meet life situations which depend upon the ability to perform these reading skills. Then, too, enrichment of life is enhanced by elaborative thinking.[3]

Hayes concluded from her research:

> One of the paramount functions of the school is the conscious formulation of the techniques of thinking. . . .
> Elaborative thinking while reading involves additional mental activity on the part of the reader simultaneously with the assimilation of ideas on the printed page. These abilities need specific teaching if the child is to integrate his reading with his total experiences. It is the task of the teacher to arrange situations which stimulate and provide opportunities for elaborative thinking.[4]

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[1]Durrell and Chambers, op. cit., pp. 90-91.

[2]Roma Gans, A Study of Critical Reading Comprehension in the Intermediate Grades (New York: Bureau of Publications, Teachers College, Columbia University, 1940), p. 9.

[3]Elizabeth M. Hahn, "Exercises for the Development of Elaborative Thinking in Grade Five" (unpublished Service Paper, Boston University, School of Education, 1950), pp. 1-2.

[4]Hayes, op. cit., p. 6.

She further writes:

> Encouraging children to ask questions about what they have read and to suggest topics for study related to reading should stimulate a desire for an exploratory type of learning experience which will yield satisfaction in out-of-school hours.[1]

Stauffeur says, ". . . children can be taught to read and think . . . and the decision seems to rest largely in the hands of their teachers."[2] Betts, speaking of the reading situation, claims, ". . . our pupils need help on how to think."[3] He further claims, "Contrary to popular opinion, children can be taught how to think."[4] Webb asserts that "children of elementary school age are often capable of working with abstract principles,"[5] and should be taught to do so. Dewey, too, shows the need to train children to think.[6]

A great deal has been written about associative thinking, which is akin to elaborative thinking. Durrell speaks of associative thinking in relation to reading when he says:

> Associational reading is concerned with uses, applications, comparisons, criticisms and other ideas brought to reading by the child. Such reading is in contrast to the type in which the child merely attempts to understand the given material

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[1]Hayes, op. cit., p. 9.

[2]Russell G. Stauffeur, "A Directed Reading-Thinking Plan," Education (May, 1959), 79:529.

[3]Emmett A. Betts, "Reading Is Thinking," The Reading Teacher (December, 1961), 15:179.

[4]Ibid., p. 183.

[5]Ruth K. Webb, "All Children Think and Plan," Childhood Education (March, 1947), 23:321.

[6]Dewey, op. cit., pp. 22-23.

> rather than to add to his own thoughts and interpretations.
>
> Many types of associational skills may be measured informally. Ask the children to list all the topics for special study which they can think of while reading an informational section. . . . On any of these associational tests, a record should be kept of the number of acceptable associations.[1]

Russell defines associative thinking as follows: "It is a process relying considerably upon memory, influenced by the total setting and dominant interests of the child."[2] His definition also includes ". . . those conditioned responses which are not fully automatic, the succession of ideas in a 'train of thought.'"[3] Dimnet has the same idea when he writes, ". . . the flux of our brain carries along images . . . and this process never stops."[4] Russell points out further, "A sequential pattern . . . relates to the use or application of what has been learned. . . . Association may be regarded as a theory of thinking as distinct from a theory of learning."[5] He says also, "The Gestalt school . . . has emphasized productive thinking rather than reproductive thinking."[6]

Webb says, "Thinking and reasoning are based on past experience and prior knowledge"[7] which must be used in associative thinking.

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[1]Donald D. Durrell, Improvement of Basic Reading Abilities (Yonkers-on-Hudson, N. Y.: World Book Co., 1940), p. 33.

[2]Russell, op. cit., p. 11.

[3]Ibid., p. 222.

[4]Ernest Dimnet, The Art of Thinking (New York: Simon and Schuster, 1928), p. 8.

[5]Russell, op. cit., p. 211.

[6]Ibid., p. 208.

[7]Webb, op. cit., p. 315.

Kingsley and Garry explain the "stimulus-response" psychology in associational thinking,[1] and Durrell writes in this regard:

> It is also considered evidence of good thinking if while reading or listening, a person demonstrates any of the following associational abilities: finds examples and applications of the point being considered; suggests plans or activities allied to the topic; suggests additional pertinent topics for study or consideration; shows relationships to other fields; creates or invents new combinations of ideas.[2]

Gray says:

> To be of most value to the individual, the information acquired must be utilized in the solution of problems. Furthermore, it should be associated with previous experience and reorganized into useful patterns of thought and action.[3]

Durrell and Chambers say:

> Probably we find that certain types of thinking, such as elaborative or associational thinking, have a high transfer value, that the techniques of stimulating a 'flow of ideas' in one subject transfer to other subjects with little effort.[4]

Jenkins concluded from her study that "special practice in associational reading appears to be effective" in teaching social studies.[5]

Elaborative and associative thinking have been considered part of creative writing by some authors, for example, Guilford[6] and Lenski.

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[1]Kingsley and Garry, op. cit.

[2]Donald D. Durrell, "Language and Higher Mental Processes," Review of Educational Research (April, 1943), 13:11.

[3]William S. Gray, Recent Trends in Reading, Proceedings of the Conference on Reading, Vol. I (Chicago: University of Chicago Press, 1939), p. 5.

[4]Durrell and Chambers, op. cit., p. 90.

[5]Jenkins, op. cit., p. 107.

[6]J. P. Guilford, "Traits of Creativity," Creativity and Its Cultivation, ed. Harold H. Anderson (New York: Harper and Brothers, 1959).

The latter writes, "It should be remembered that creation is a flowing of ideas. Given a stimulus, ideas come pouring from the mind. . . . Emphasis should always be placed on the stimulation of ideas."[1]

The ability to acquire the skills of elaborative thinking does not depend on a high intelligence quotient. Dimnet states in the introduction to his book, "Anyone who does it [i.e., think] need not be a genius."[2] Durrell and Chambers contend that "the ability to think appears to rest upon training rather than upon intelligence."[3]

Baumann states, "Further conclusions based on experimental studies have disclosed that intelligence has no significant effect on the ability of children to make use of this skill,"[4] that is, the skill of elaborative thinking. Chambers concluded, "Elaborative thinking evidences less relationship to intelligence than do critical or organizational thinking."[5]

Gannon ascertained that "children with high mental ability do not necessarily have high associational reading ability."[6] Jenkins points out the low correlation between elaborative thinking and intelligence.[7] Johnson says, "No significant relationship was shown between

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[1]Lois Lenski, "Helping Children to Create," Childhood Education (November, 1959), 26:101.

[2]Dimnet, op. cit., p. xi.

[3]Durrell and Chambers, op. cit., p. 90.

[4]Baumann, op. cit., pp. 22-23.

[5]Chambers, op. cit., p. 103.

[6]Eleanor Mary Gannon, "The Construction of a Test to Measure the Associational Reading Ability in the Intermediate Grades" (unpublished Master's thesis, Boston University, School of Education, 1947), p. 36.

[7]Jenkins, op. cit.

the initial test responses and intelligence quotients."[1]

Marden's study showed:

> (1) the correlation between intelligence quotients and the ability to suggest activities was positive but low . . . the ability depends more upon specific training than upon mental ability.
> (2) the correlation between intelligence quotients and the ability to suggest questions for further research was low.[2]

However, Ferris found that when dealing with creative writing, the higher intelligence quotient group in her study was favorable to the low intelligence quotient group on the basis of the number of ideas in composition at all grade levels.[3] Also, Durrell thinks, "It [elaborative thinking] is not highly correlated with intelligence, the correlations usually running below .40. Many pupils who are not especially good readers appear to acquire elaborative thinking quite easily."[4]

It may further be concluded from research that one's sex has no relationship to one's ability to do elaborative thinking. Gannon concluded,

> There is no significant sex difference in the total associational process considered, nor in the ability to

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[1]Willemae Johnson, "An Evaluation of Exercises in the Social Studies Used in the Development of Elaborative Thinking" (unpublished Master's thesis, Boston University, School of Education, 1950), p. 55.

[2]Avis G. Marden, "Associational Reading Abilities of the Seventh Grader" (unpublished Master's thesis, Boston University, School of Education, 1941), p. 216.

[3]Mary M. Ferris and others, "The Construction and Evaluation of Four Series of Lessons to Stimulate the Flow of Ideas in the Creative Writing of Fourth, Fifth, and Sixth Grade Pupils" (unpublished Master's thesis, Boston University, School of Education, 1953).

[4]Durrell, Improving Reading Instruction, p. 302.

> find topics for further study, but the boys are more adept at finding further activities than are the girls.[1]

Jenkins found, "There are no significant sex differences in associational reading abilities."[2] Marden showed that "There were no significant sex differences in the ability to suggest activities related to reading nor in the ability to raise questions for further research related to reading."[3]

Chambers found that "Elaborative thinking bears less relationship to reading ability than do the other higher mental processes,"[4] and Baumann found that "The ability to do elaborative thinking is not related to reading achievement or listening comprehension."[5]

Several studies have been conducted in connection with elaborative thinking and its associated skills. Baumann tested two hundred children in grades two, four, and six to determine the various reading needs of the children. She included elaborative thinking as a study skill in reading.[6]

Ferris worked with 285 children on the fourth, fifth, and sixth grade levels. She drew up a series of exercises to stimulate the flow of ideas in creative writing.[7]

Derby constructed a series of self-directing, self-scoring exercises which would develop skill in elaborative thinking to ascertain

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[1]Gannon, op. cit., p. 36.

[2]Jenkins, op. cit., p. 108.

[3]Marden, op. cit., p. 216.

[4]Chambers, op. cit., p. 104.

[5]Baumann, op. cit., p. 180.

[6]Ibid.

[7]Ferris, op. cit.

if there would be any improvement in this skill in the pupils taking part in elaborative thinking exercises. She found her exercises to be effective on the fourth grade level. The 398 children in her experiment worked in groups of three.[1]

Jenkins constructed exercises:

> (1) to measure the extent to which children in the sixth grade practice associational thinking while reading social studies material, and
> (2) to evaluate the effects of a planned program to develop associational reading ability with sixth grade children.[2]

Another experiment in the social studies field was that of Helseth, who conducted an investigation on the seventh and eighth grade levels to discover how much children could be taught to improve their ability to ask pertinent questions on lessons learned in United States history. She concluded:

> This investigation establishes certain definite possibilities in the development of skill in thinking more effectively by children studying United States history when they are encouraged to ask and answer their own questions. . . .
> In the fall the pupils had no questions except when the teacher demanded questions from them. . . . By the spring the children were demanding consideration of questions which had arisen in their own minds.[3]

Johnson constructed a series of eighteen lessons and tests "to evaluate the effectiveness of specific fifth grade social studies lessons in developing skills in three areas of elaborative thinking."[4] The three areas were (1) asking questions concerning selections read;

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[1]Derby, op. cit. [2]Jenkins, op. cit., p. xi.

[3]Inga Olga Helseth, Children's Thinking (New York: Bureau of Publications, Teachers College, Columbia University, 1926), p. 74.

[4]Johnson, op. cit., p. 53.

(2) developing ability in finding topics related to material read; and (3) developing ability in suggesting activities to be carried out after reading a specific topic.

Brownrigg developed and evaluated a series of exercises in composition planning. She used thought-provoking questions to help the children develop a pattern of thinking.[1] Chambers investigated the relationships among selected measurable mental processes, including elaborative thinking related to reading. He concluded, "The skill of elaborative thinking bears the least relationship to the other mental processes."[2]

Conley drew up exercises to provide opportunities to stimulate the flow of ideas in the pupil.[3] Delaney constructed sixty exercises intended to teach elaborative thinking in composition planning at the eighth grade level. Her purpose was ". . . to consider the implication of elaborative and associative thinking in improving the content in written composition."[4]

Gannon developed a test to measure the number of pertinent associations made while reading. Her test, administered to 155 pupils in grades four, five, and six, was to determine the abilities of the children to find topics for further investigation and the abilities to find activities that might be carried out.[5]

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[1]Brownrigg, op. cit. [2]Chambers, op. cit., p. 102.

[3]Richard Conley and others, "Seven Exercises Planned to Stimulate the Flow of Ideas in Creative Composition" (unpublished Master's thesis, Boston University, School of Education, 1955).

[4]Delaney, op. cit., p. 6. [5]Gannon, op. cit.

Hahn drew up exercises to develop and improve elaborative thinking by (1) raising related questions, and (2) formulating related activities. She also drew up a practicable program for teachers to teach these skills of elaborative thinking.[1] Hayes constructed a test consisting of twelve exercises to measure the ability of children in grades six, seven, and eight to suggest pertinent questions, topics for study, or possible activities related to selections read.[2]

Marden's study was designed "to measure the extent to which the 'average' seventh grader practices spontaneous associational thinking while reading in the social studies field."[3] She found that "pupils are able to improve their ability to suggest activity related to reading."[4]

The purpose of Nunes' study was "to determine which type of study guide, factual or elaborative, is the better aid to recall."[5] The result of the study, conducted with 225 children over a period of four weeks, with a recall test two weeks after the lessons were completed, was that children using factual study guides did better than those using elaborative study guides immediately after the tasks were completed. After a delay of two weeks, the difference in the amount of recall still favored the factual study guide, but to a significantly lesser degree. This led Nunes to conclude, "This may indicate that after an even longer period, the difference will be even less. If so, elaborative questions

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[1]Hahn, op. cit.

[2]Hayes, op. cit.

[3]Marden, op. cit., p. 1.

[4]Ibid., p. 216.

[5]Nunes, op. cit., p. 1.

are as good an aid to recall as factual questions."[1]

Aymes[2] analyzed the compositions written by the children in the Callahan[3] study to find out whether there had been simultaneous gains in originality, elaborative thinking, and vocabulary in composition writing ability.

The conclusions of many of the above experiments and studies are included throughout this chapter.

Durrell suggests informal observation as well as formal testing as a means for measuring ability in elaborative thinking. He writes, "Ability in elaborative thinking may be informally observed by the teacher in regular classroom discussions which call for interpretation, generalization, inference, or other types of reaction to the materials read."[4]

"Thinking," says Russell, "is a process rather than a fixed state. It involves a sequence of ideas moving from some beginning, through some sort of pattern of relationships, to some goal or conclusion."[5] Hartung sets this goal as "the ability to think reflectively in a wide variety of appropriate situations."[6]

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[1]Nunes, op. cit., p. 66.

[2]Aymes, op. cit.

[3]Frederic L. Callahan, "Construction and Evaluation of a Series of Exercises to Develop Organizational Ability in Children's Writing" (unpublished Doctoral dissertation, Boston University, School of Education, 1956).

[4]Durrell, Improving Reading Instruction, p. 121.

[5]Russell, op. cit., p. 27.

[6]Maurice L. Hartung, "Teaching Reflective Thinking in High School," The High School Journal (April, 1958), 41:320.

Kingsley and Garry appropriately sum up the subject of thinking and its need to be taught in the classroom. They write:

> Knowledge is essential to good thinking. By supplying information and fixed associations, we provide the child with equipment for dealing with problematic situations. But the child needs to be taught how to use this equipment. . . . To promote the development of the ability to think out the solutions of problems, instruction must provide first, information and memory materials, and second, training in the procedures for using effectively the factual materials so that the pupils will be able to solve their own problems and arrive at conclusions of their own.[1]

Research in the field of team learning defines groups as consisting of two or more individuals working together toward a common goal. Strang believes that a group builds up integrity and personality, and strengthens the individual's awareness of being a member interacting with others for positive purposes. She asserts that ". . . group work is planned, shared experiences which foster desirable changes in individuals as a whole."[2]

The importance of group work in the inculcating of values found in a democratic state is emphasized by Burr, Harding, and Jacobs, who believe that modern schools are responsible for teaching children to assume shared responsibilities and to carry on cooperative activities, both of which contribute to the greatest development of the individual personality and to the common group life.[3] They assert that group-

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[1]Kingsley and Garry, op. cit., p. 429.

[2]Ruth Strang, Group Work in Education (New York: Harper and Brothers, 1958), p. 5.

[3]James B. Burr, Lawry W. Harding, and Leland B. Jacobs, Student Teaching in the Elementary School (New York: Appleton-Century-Crofts, Inc., 1950).

work children not only get work done,

> . . . they also learn the meaning of shared roles of leadership, the responsibility inherent in freedom, the necessity of critical thinking in the solution of problems, and the need for the continuous evaluation of the products of group action.[1]

The importance of democratic values is further advocated by Swenson, who believes that it is encouraging to note that a definite trend away from reading skill as the primary objective of first grade work has been observed in favor of stress upon learning to live and work with other people.[2]

Certain abilities and social qualities were found to exist in group work. Brueckner and Grossnickle believe that the experience of working together with others in the study and solution of problems and of accepting responsibility for assignments by the group contribute to the development of social attributes and abilities which are fundamental to life in a democracy.[3]

Group rapport is very important in the classroom. Gray asserts that teachers should attempt to instill incentives in learning, rather than adhere to traditional methods of teaching. Not only ". . . opportunity for demonstration should be had, but methods for small voluntary

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[1]Burr, Harding, and Jacobs, op. cit., p. 253.

[2]Esther J. Swenson, "Applications of Learning Principles to the Improvement of Teaching in the Early Elementary Grades," Learning and Instruction, The Forty-ninth Yearbook of the National Society for the Study of Education, Part I (Chicago: University of Chicago Press, 1950).

[3]Leo J. Brueckner and Foster E. Grossnickle, How to Make Arithmetic Meaningful (Philadelphia: J. C. Winston Co., 1947).

groups to work together should be the goal of every teacher."[1] Thelen cites increased participation and opportunity to know one another as being important factors found in group work.[2]

The importance of the child working with a group is stressed by Gray, who believes that experience shows definitely that pupil development cannot always be achieved most effectively as the child works alone, and "Of great importance is the stimulus and added insight which results when he works cooperatively with others in achieving common goals."[3]

The importance of individual achievement when participating in group work was stressed by Klugman, who found that when children worked in groups, ". . . they earned reliably higher scores than when they worked independently."[4]

Effective ways of coping with individual differences are fundamentally the responsibility of the teacher. Some educators imply that group learning offers a sound solution to the problem. Durrell states:

> Team study seems to offer many advantages to learning, especially in view of the wide differences in ability among pupils in a classroom. It permits adjustments to team dif-

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[1]C. Delmar Gray, "Incentive for Learning," Claremont College Reading Conference, Twenty-first Yearbook (Claremont, California: Claremont College Curriculum Laboratory, 1956), p. 189.

[2]H. A. Thelen, "Experimental Methods in Classroom Leadership," Elementary School Journal (October, 1952), 53:82.

[3]William S. Gray (comp. and ed.), Classroom Techniques in Improving Reading (Chicago: The University Press, 1949), p. 23.

[4]Samuel F. Klugman, "Cooperative vs. Individual Sufficiency in Problem Solving," Journal of Educational Psychology (February, 1944), 35:91.

> ferences in level and learning rates; rapid learners may advance faster or use more difficult material; slow learners may use easier material or more detailed study guides and progress at a suitable pace.[1]

McHugh conducted a study in a suburban community of Boston in the years 1957-59. In his study, McHugh ascertained that the "motivational factor" of the child was an important aspect of the study. He found that

> . . . the motivational factor of not having to wait for others to finish before moving on to more difficult tasks stimulated children, and they advanced more rapidly than either teacher or supervisors had anticipated.[2]

Thus, the individual differences of all children are readily taken care of.

The fact that interest is heightened, comprehension increased, and enjoyment attained are believed to be attributes observed in paired teaching. Most children love to work in pairs, Durrell says, and almost any type of work becomes enhanced when grouping takes place.[3] Various types of controls have been suggested as a means to stimulate appropriate interest. With regard to the make-up of a group, Durrell believes that ". . . sometimes it is desirable to pair a rapid learner with a slow one, setting up a tutoring situation for various kinds of skills help."[4]

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[1]Donald D. Durrell and Viola A. Palos, "Pupil Study Teams in Reading," Education (May, 1956), 76:552.

[2]Walter J. McHugh, "Pupil Team Learning in Skills Subjects in Intermediate Grades" (unpublished Doctoral dissertation, Boston University, School of Education, 1960), p. 216.

[3]Durrell, Improving Reading Instruction, op. cit.

[4]Ibid., p. 129.

In a study conducted by Campanaro, it was found that the active role of a child participating in a group brought about a greater gain in learning than when that very same child had to concentrate, study, and sit by himself.[1]

In the evaluation of groups, King believes that children can work effectively under pupil guidance if they are properly briefed in their responsibilities for the group. She believes that children of equal ability participate with more verve and improve in general achievement when they work in groups of two on intensive practice work of their own developmental level. On occasion, she believes it is desirable to have the groups of two composed of a rapid learner and a slow learner.[2] Regan, also agreeing with the above, adds that groups should be composed of teams of two's in order to achieve complete success.[3] Zubinski found that boys and girls liked working in pairs. He also found that the grouping of pupils of the same sex was less productive than those of both sexes.[4]

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[1]Lena Campanaro, "Graded Lessons for the Use of Study Teams, Grade Four" (unpublished Master's thesis, Boston University, School of Education, 1956), p. 33.

[2]Muriel King, "Development and Evaluation of Lessons in Socialized Learning for Grade One" (unpublished Master's thesis, Boston University, School of Education, 1957), p. 351.

[3]John F. Regan, "Improving Recall Through Graded Study Lessons in Grade Four" (unpublished Master's thesis, Boston University, School of Education, 1957).

[4]Eugene Zubinski, "An Evaluation of the Oral and Written Recall with the Use of Grade Study Guides in Grade Five" (unpublished Master's thesis, Boston University, School of Education, 1957).

Jameson found that "children given a choice between independent work and team or small-group work, show a preference for the latter."[1]

Durrell believes that objectives have a better chance of being attained if group instruction is maintained and he asserts that:

> While the child must have practice in independent work, there are few objectives of learning in the elementary school which are not better attained through group or team work. Children may be grouped or paired by the teacher so that one child does not lean continually on others to get his work done.[2]

In the particular area of arithmetic, Grover found that teacher objectives could be adequately handled by dividing the class into groups. He believes that individualizing instruction provides the best solution for teaching arithmetic. An adroit teacher will "take pupils where he finds them, divide his class into instructional groups as needed, and teach them as seems best in the particular situation."[3] He goes on to add that the better pupils should be allowed to progress as rapidly as possible through the arithmetic curriculum.

The modern classroom provides many opportunities for cooperative planning of learning experiences. Glennon and Hunnicutt believe that the teacher's role, as the mature member of the group, extends beyond that of the pupil and includes aiding the children in making better decisions, providing learning materials of all kinds, "developing a

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[1]Vivian Jameson, "Children's Preferences for Types of Assignments" (unpublished Master's thesis, Boston University, School of Education, 1951), p. 61.

[2]Durrell, Improving Reading Instruction, p. 130.

[3]C. C. Grover, "Rate of Progress of Pupils in Arithmetic in the Elementary School," Mathematics Teacher (January, 1951), 44:9.

healthy mental and emotional situation, helping the children in learning to work together, suggesting rich and rewarding learning experiences, and helping individuals in evaluating their learnings."[1]

Brown believes that the modern teacher continually uses group work in her teaching because children learn to work with others only if they have repeated experiences in practical situations.[2]

Hockett suggests the area of character and personality development with regard to group work, and believes that school experiences should be permeated with the spirit of cooperative endeavor, in which ". . . pupils share responsibility and success."[3] Nylen asserts that ". . . group growth can provide children with the opportunity for maturing experiences" that may only be seen in the group environment. He suggests that children should be encouraged by their teacher to develop such group attributes as "initiative, evaluation, and fundamental human relation skills" necessary for group growth.[4]

The role of the teacher, according to Waite, should be that of a "pharos," a guiding beacon, and a sole member of the group. Group

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[1]Vincent J. Glennon and C. W. Hunnicutt, "Is There a Place for Cooperative (pupil-teacher) Planning in Arithmetic?" What Does Research Say About Arithmetic? (Washington, D. C.: Association for Supervision and Curriculum Development, National Education Association, 1952), p. 7.

[2]Ida Stewart Brown, "How Do We Act in Groups?" Childhood Education (December, 1950), 27:156-160.

[3]John A. Hockett, Modern Practices in the Elementary School (Boston: Ginn and Co., 1943), p. 6.

[4]Donald Nylen, "Growth in Groups," Childhood Education (November, 1950), 27:114.

situations should be enjoyable, both to the teacher as well as the children.[1] Waite believes that effective group work demands a great deal of skill, true intelligence, imagination, and great patience, and that the group can supply "a great variety of materials as well as serve the varying abilities and interests of the children."[2]

Young believes that small groups engender "a kind of trust" which comes slowly through the classroom experience. This comes about when a teacher leaves the room and, upon returning, ascertains whether a change has taken place in the atmosphere of the classroom. Young believes further that the principle underlying the trust is that children working within groups "know that it is important to know how to work effectively and trustworthily with others in their group experiences."[3]

Harris offers some valuable outcomes resulting from group experiences in the classroom:

1. There is continuous re-evaluation of the position and needs of the individual within the group.
2. There is a broader curriculum. Devices, short-cuts and "busy-work" are replaced by realistic, vital experiences of many kinds.
3. A wholesome environment is provided for a series of complete experiences. The individual becomes a part of the group on the level of participation of which he is capable.[4]

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[1]Dorothy C. Waite, "Children Like Working in Groups," Bases for Effective Learning, The Thirty-first Yearbook of the Department of Elementary School Principals of the National Education Association (Washington, D. C.: National Education Association, 1952).

[2]Ibid., p. 169.

[3]D. Young, "Everything Is Under Control: Trusting the Group for Working and Planning," Childhood Education (December, 1951), 28:157.

[4]Fred E. Harris, "Techniques for Guiding Group Exercises in the Classroom," Elementary School Journal (September, 1948), 49:32.

Durrell believes that an added advantage of grouping is its adjusting lessons to an individual's learning needs. Some demands for good grouping have been listed by him:

> 1. A teacher cannot delegate all . . . instruction to pupil teachers. Each child should have a normal share of the teacher's time.
> 2. Since there are many forms of small group instruction, the teacher should try them all and select the most successful.
> 3. There should be considerable variety in grouping. . . . Part of the advantage of small group work is in the interest which comes with novelty.[1]

Heffernan, who believes that grouping should be regarded by teachers, supervisors, and administrators as primarily an instructional problem, writes:

> Only in the class group can the child be seen and valued as a total functioning personality. Only as the child reacts to his physical and social environment can the skilled observer come to recognize the significant ways in which he differs from every other child.[2]

Hughes believes that interaction among group members is an important condition necessary for good group work, and holds that a group, to be successful, should concern itself with the ". . . problems which affect its members in some interrelated manner."[3] The attitudes of working in groups ". . . cannot be acquired without analysis and evaluation." Thus, it would seem that Hughes believes analysis of problems,

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[1]Durrell, Improving Reading Instruction, p. 134.

[2]H. W. Heffernan, "Grouping Pupils for Well-rounded Growth and Development," California Journal for Elementary Education (August, 1952), 21:42.

[3]M. M. Hughes, "Training Pupils for Successful Group Living," Elementary School Journal (April, 1950), 50:85, 453.

attitudes, and habits are necessary requirements for proper group interaction to come about.[1]

According to Thelen, "the aim of grouping should be to discover ways of grouping teachers so that each teacher is completely adequate and secure in his own subgroup."[2] With regard to problem solving, he believes that the teacher should attempt to understand the group process problem which pertains to his own particular group, and states that the reason for this action is to ascertain certain emotional needs which appear to be present in every group.[3]

McGaughey believes that group work gives a child who is backward, and wants to learn, a chance to express his views. The backward child feels more at ease in a small group than in a large one.[4]

Cantor believes that members discover their strengths and differences and consequently learn to relate to one another in attaining their preferred goals.[5] Complete agreement within this area has also been seen in Hopkins.[6]

Jenkins, Schector, and Bauer are of the opinion that group

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[1]M. M. Hughes, op. cit.

[2]H. A. Thelen, "Social Environment and Problem Solving," Progressive Education (March, 1950), 27:155.

[3]Ibid.

[4]H. McGaughey, "Cooperative Planning in the College Classroom," College English (November, 1950), 12:108-110.

[5]N. F. Cantor, "Focus and Function in Group Discussion," Teachers College Record (April, 1952), 53:375-382.

[6]Levi Thomas Hopkins, Pupil-Teacher Learning (Wilmington, Delaware: The Delaware Citizens Association, 1938).

activities are most popular in the first grade.[1] Many children enjoy projects and games undertaken together. At six, a child's behavior shows that there is still a transition period between the individualistic play of the preschool child and the team play of the middle-grade boy or girl.

Gans, Stendler, and Almy believe that planning is an integral part of the learning experience and children should have a share in it. Although participation by children is important in the learning experience, it does not follow that children should take part in all aspects of learning. They conclude that participation may affect what is learned and how well it is learned.[2]

With regard to groups being used as a cure-all for classroom ills, Moody asserts that using these groups should not be proposed as a means to the exclusion of any other techniques.[3] In this context, "groups" is intended to refer not to a class as a whole, but to the changing organization within the classroom. Frequently, teachers should check the child's work against the legitimate purposes underlying the procedure. Moody concludes that the teacher's own purposes, integrated with those of the pupil's, are of prime concern.[4]

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[1]Gladys Jenkins, Helen Schector, and William Bauer, These Are Your Children (Chicago: Scott, Foresman and Company, 1949).

[2]Roma Gans, Celia Stendler, and Millie Almy, Teaching Children (New York: World Book Co., 1952).

[3]Caesar B. Moody, "Using Groups and Committees," High School Journal (February, 1953), 36:133-138.

[4]Ibid.

Harris believes that helpers may be utilized during the silent reading or workbook practice stage within groups. One child can be helper for a group, or each child who needs help may be allowed to select another child as his personal helper. He asserts:

> It is desirable to train helpers or chairmen for their jobs and it is certainly necessary to keep an eye on how they carry on their functions. Since many children consciously imitate their teachers when placed in a teaching role, evaluation of child leadership performance sometimes leads to mollification of teacher behavior.[1]

Campanare concluded that order was brought about to an excellent degree in grouping. Pupil-teacher relationships were laudatory and there were many excellent evidences of pupils' conscientious efforts to help one another in the different groups.[2]

Lincoln and Wadleigh believe that the bright child is generally stimulated to exert himself to a greater extent than if he is in a heterogeneous group. Children learned more under the reading system of ability grouping than they did before it was practiced.[3]

That group work can develop many values has been suggested by Craig, who says that group work develops the free exchange of ideas after our great heritage. The major areas in which valuable attributes are seen lie within the areas of good thinking and proper scientific attitudes. He writes, "Group activities give the teacher the oppor-

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[1]A. Harris, How to Increase Reading Ability (New York: Longmans, Green and Company, 1956), p. 157.

[2]Campanaro, op. cit., pp. 30-31.

[3]Edward A. Lincoln and Verna L. Wadleigh,"Teacher Opinion on Ability Grouping," Journal of Educational Research (April, 1930), 21:277-282.

tunity to use the scientific method as a means of refining the methods employed by the children."[1]

Various studies have been made in group methods with regard to the social studies area. Campanaro used additional history guides which were given to 62 pupils in the fourth grade. The groups consisted of a control group of 30 pupils and an experimental group of 32 pupils. She found marked gains in both oral and written recall by those who participated in the study. Children's performance in regard to the group techniques used was to work with boys and girls in teams of two and five.[2]

Palos developed 18 graded study lessons in social studies to aid in the ability of pupils to recall. The lessons were used over a six-week period with 33 sixth grade pupils. Each lesson was graded to three levels of ability--low, medium, and high. The pupils were grouped into two's, three's, and five's. The most significant gain was observed in written recall, but there was none in oral recall. The most popular choice of pupil arrangement was teams of three, with teams of two as a close second choice.[3]

In any program of instruction, it is important to relate creative activities to a balanced program. In his study, Washburne found that

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[1]Gerald S. Craig, Science for the Elementary School Teacher (Boston: Ginn and Co., 1947), p. 46.

[2]Campanaro, op. cit., p. 40.

[3]Viola Palos, "Graded Lessons for Pupil Study Teams, Grade Six" (unpublished Master's thesis, Boston University, School of Education, 1956).

"group and creative activities are the vital, lifegiving part of the curriculum."[1] McDade concurs with Washburne, adding that ". . . the development of an individual technique is only part of the larger project of developing a balanced integration of school activities."[2]

Research has concluded that children working with partners enjoy their assignments more and, therefore, attack their subjects with more enthusiasm. Children can gain added insight, check the work of fellow members, and gain high response. According to McDade:

> . . . it too often happens that much of the work of pupils goes unchecked and even when faithfully marked, it returns to the pupil a day late, and since he is no longer interested, he loses the benefit of it. Immediate marking by properly trained pupils meets the difficulty. There is excellent evidence that pupils check as accurately as teachers.[3]

The child working as a member of a team not only learns a particular subject well, but learns well those subjects which may rest within other areas of the elementary curriculum. Studies conducted by Clapper in the area of reading found that "teamwork lends itself well to use in reading work and to many other areas in the elementary curriculum."[4]

Within the area of spelling evaluation, Baumgartner found that

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[1]Carleton W. Washburne, Adjusting the School to the Child (Yonkers-on-Hudson, New York: World Book Co., 1932), p. 8.

[2]James E. McDade, "Individual Learning in an Integrated School Program," Chicago Schools Journal (January-June, 1933), 15:59.

[3]Ibid., p. 65.

[4]Harriet Clapper and others, "The Effectiveness of Paired Learning on a Reading Program in Grades II and III" (unpublished Master's thesis, Boston University, School of Education, 1958), p. 91.

team work helped the child invaluably with his spelling. She found that the teacher could give more time to the slower pupils who were in need of guidance in spelling. It may be seen that team work adds better understanding as well as time-saving appropriateness to the teaching classroom. The group concluded that children love working together in making up stories and that they enjoy working in groups rather than working alone.[1]

Working in teams helps a child develop a systematic method for solving problems. Morrow has found that not only does the child learn how to acquire and promote ". . . social belongingness," but that in conjunction with their working in teams the child is prepared to develop an adequate thinking process that will act as an aid throughout his life.[2] Kregel believes that the "learning of the process of cooperation" cannot be achieved too soon.[3]

An excellent example of group learning in action is reported by a team of educators from Boston University who conducted a study in Dedham, Massachusetts. Durrell reports that spelling, arithmetic, reading, English, geography, literature, and science achievement improved, particularly in the sixth grade. Also, instruction improved by the use of group procedures.[4]

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[1]Barbara Baumgartner and others, "Teaching Groups in Grade Three" (unpublished Master's thesis, Boston University, 1957), p. 184.

[2]Mildred Morrow, "Beginning of Social Adjustments," Childhood Education (April, 1929), 5:424.

[3]Luvella J. Kregel, "Teaching Co-operation as a Practical Ideal," Educational Methods (January, 1930), 9:227.

[4]Donald D. Durrell and others, "Adapting Instruction to the Learning Needs of Children in the Intermediate Grades: A Summary," Journal of Education (December, 1959), 142:2-78.

CHAPTER III

PROCEDURE OF THE STUDY

The purpose of this study was an attempt to determine whether elaborative thinking is done better by children working in groups or by children working by themselves. The study is concerned with the following problems:

1. To determine the number of ideas produced by individuals on selected elaborative thinking exercises
2. To determine the number of ideas produced by groups on selected elaborative thinking exercises.
3. To determine whether groups or individuals, using the same stimuli, produce larger numbers of ideas in elaborative thinking.

In 1961 Joan Derby and several other graduate students at Boston University constructed and evaluated a set of thirty self-administering and self-scoring exercises in elaborative thinking.[1] Each member of the group concerned with the study wrote several stories with an appropriate question or direction which could not be answered from the context of the story. These exercises were typed on one side of five-by-eight-inch cards. On the reverse side of the cards, the authors listed the possible answers to the exercise so that the pupils could

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[1]Derby, et al., op. cit.

check their answers with the suggested responses and gain new ideas. Thirty-two of these stories were chosen, thirty to be used as exercises and two to be used as tests. The exercises were administered to an experimental and control group, and the responses were tabulated.

Ten of Derby's exercises were chosen to be used in this study. These ten exercises were chosen firstly, because of their appropriateness for elementary school children, in the opinion of the author of this thesis; secondly, because these exercises resulted in the greatest number of responses from the children in the Derby experiment; and thirdly, because these exercises required a wide variety of activities included in the elaborative thinking process. The Derby exercises chosen were numbers 1, 2, 4, 5, 12, 13, 16, 20, 22, and 26.

The exercises chosen were duplicated on paper. Lines were provided on the paper for the pupils to list the possible responses to encourage neatness. The lists of responses were not duplicated for the children, but were given to the teachers to be read to the class when they had completed the given exercise. It was felt that if the responses were given to the children in this study before they had completed the exercises, the results of the study would be invalidated. However, that they hear the list of responses was considered important for motivation in future exercises and to give the children an idea of the kind of responses which could have been given.

It is important to note that the responses to the stories are not considered correct or incorrect. They are merely a list of responses that can be given.

A master sheet of responses for each exercise, a set of directions for administering the material, and a schedule to follow were given to the teachers. Copies of the exercises, the master sheets of responses, and the directions to the teacher may be found in the appendix.

The exercises were planned to require about fifteen minutes: seven minutes for the children to do the exercise, and eight minutes for the teacher to read the responses, collect the papers, etc.

Each classroom worked on five exercises individually and five exercises in groups of three or less on alternate days for a period of two weeks. Each of the 125 children in the experiment had a chance to work on all ten exercises. All of the results of the study are based on comparisons of the same exercise. If classes could not be divided evenly into groups of three, the extra children were grouped in pairs. No group was greater than three.

The experiment was conducted in a community suburban to Boston. One hundred and twenty-five sixth grade children from five different classrooms took part in the experiment, which took place from January 21 through February 1, 1963.

Early in January the writer met with the director of elementary education in the cooperating community. All the materials were given to the director of elementary education, and the nature, purpose, and procedure of the study were explained to him. He, in turn, delivered the materials and gave the explanations to the teachers helping conduct the experiment.

The materials were completed and returned to the writer in early February, 1963.

CHAPTER IV

ANALYSIS OF DATA

The purpose of this study was to attempt to determine whether elaborative thinking is done better by children working in groups or by children working individually. The study is concerned with the following problems:

1. To determine the number of ideas produced by individuals on selected elaborative thinking exercises
2. To determine the number of ideas produced by groups on selected elaborative thinking exercises
3. To determine whether groups or individuals, using the same stimuli, produce larger numbers of ideas in elaborative thinking.

The responses of each child and group on the ten exercises were counted and tabulated. Since all the scores were treated as ungrouped data, an arithmetic mean on each of the ten exercises done individually and in groups was determined by the formula $M = \frac{\xi X}{N}$, where M equals the mean, ξX equals the sum of the scores, and N equals the number of cases.[1]

The standard deviation was obtained by applying the formula

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[1]James E. Wert, Charles O. Neidt, and J. Stanley Ahmann, Statistical Methods in Educational and Psychological Research (New York: Appleton-Century-Crofts, Inc., 1954), p. 24.

$$\sigma = \sqrt{\frac{\Sigma X^2}{N} - \bar{X}^2}$$, where σ is standard deviation, ΣX^2 equals the sum of the squares of the scores, $\bar{X}^2$ equals the mean squared, and N equals the number of cases.[1]

Table I shows the means (expressed by raw scores) and standard deviations of the responses on the exercises done individually.

TABLE I

CENTRAL TENDENCY AND VARIABILITY OF SCORES OF INDIVIDUALS ON EXERCISES 1 TO 10

Exercise	Number of Individuals	Range	Mean	Standard Deviation
1	71	2 - 40	10.29	6
2	49	6 - 39	15.97	7
3	73	10 - 38	22.64	5
4	50	12 - 56	24.42	12
5	69	8 - 37	20.46	8
6	48	8 - 38	15.85	7
7	73	3 - 27	12.43	7
8	52	5 - 45	10.63	12
9	72	8 - 48	22.48	11
10	48	6 - 39	14.52	6

The varying number of individuals doing each exercise is due to the fact that three classes of children worked on the odd-numbered

[1] Wert, Neidt, and Ahmann, op. cit., p. 58.

exercises and two classes of children worked on the even-numbered exercises. Some children were absent each day. The mean range, as shown in Table I, was 34.9 responses, the smallest range being 29 responses and the largest being 44. The mean number of responses on each exercise, however, tended to be toward the lower part of the range. Exercise 4 yielded the greatest mean number of responses. The standard deviations on exercises 4, 8, and 9 indicate wide variability; the remaining standard deviations show little variability.

Table II shows the means and standard deviations of the responses on the exercises done in groups.

TABLE II

CENTRAL TENDENCY AND VARIABILITY OF SCORES OF GROUPS ON EXERCISES 1 TO 10

Exercise	Number of Groups	Range	Mean	Standard Deviation
1	17	8 - 38	21.29	11
2	25	10 - 51	28.92	8
3	17	17 - 49	34.35	10
4	25	20 - 86	43.40	11
5	18	10 - 57	28.44	12
6	24	11 - 40	22.91	7
7	17	9 - 26	17.47	6
8	25	11 - 52	24.80	8
9	17	17 - 58	31.17	14
10	23	13 - 45	25.56	7

The range in the number of responses on the exercises done in groups was larger than the range on the exercises done individually, the mean range being 36.8. The mean number of responses on every exercise done in groups was also greater than the mean number of responses on the exercises done individually. As might be expected, most standard deviations (particularly exercises 1, 3, 5, 9, and 10) were larger than those obtained on individual scores.

No formula per se was given to obtain the critical ratio. Wert wrote, "When the difference between the two means is divided by the standard error of that difference, a ratio is found which is sometimes called the critical ratio."[1] Wert, Neidt, and Ahmann gave directions to find the critical ratio: ". . . obtain the ratio of the difference in the two means to the standard error of the difference."[2] Thus, the formula

$$C.R. = \frac{\bar{X}_1 - \bar{X}_2}{SE_{diff\ \bar{X}_1\ \bar{X}_2}}$$

was constructed, where C.R. is the critical ratio, $\bar{X}_1$ is the mean of group one (groups), $\bar{X}_2$ is the mean of group two (individuals) and $SE_{diff\ \bar{X}_1\ \bar{X}_2}$ is the standard error of the difference between the two means.

The standard error of the difference between the two means was obtained by applying the formula

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[1]James E. Wert, Educational Statistics (New York: McGraw-Hill Book Co., Inc., 1938), p. 145.

[2]Wert, Neidt, and Ahmann, op. cit., p. 99.

$$SE_{diff} = \sqrt{(SE_{\bar{X}_1})^2 + (SE_{\bar{X}_2})^2}$$

where SE_{diff} is the standard error of the difference, $SE_{\bar{X}_1}$ is the mean of group one (groups) and $SE_{\bar{X}_2}$ is the mean of group two (individuals).[1] The standard error of the means was determined by applying the formula

$$SE_{\bar{X}} = \frac{\sigma}{\sqrt{N}}$$

where $SE_{\bar{X}}$ is the standard error of the mean, σ is the standard deviation, and N is the number of cases.[2]

Table III shows the critical ratio of each exercise done both by children working in groups and by children working individually.

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[1] Wert, op. cit., p. 158.

[2] Ibid., p. 151.

TABLE III

CRITICAL RATIOS OF GROUPS VERSUS INDIVIDUALS
ON EXERCISES 1 TO 10

Exercise	Method	Mean	SD	SE_m	Diff.	SE_{diff}	C.R.
1	Gr.	21.29	11	2.75	11.00	3.09	3.59
	Ind.	10.29	6	.75			
2	Gr.	28.92	8	1.6	12.95	1.88	6.88
	Ind.	15.97	7	1.0			
3	Gr.	34.35	10	2.5	11.71	2.56	4.57
	Ind.	22.64	5	.55			
4	Gr.	43.40	11	2.2	18.98	2.78	6.83
	Ind.	24.42	12	1.71			
5	Gr.	28.44	12	3.0	7.98	3.16	2.53
	Ind.	20.46	8	1.0			
6	Gr.	22.91	7	1.4	7.06	1.72	4.17
	Ind.	15.85	7	1.0			
7	Gr.	17.47	6	1.5	5.04	1.69	2.98
	Ind.	12.43	7	.78			
8	Gr.	24.80	8	1.6	14.17	2.33	6.08
	Ind.	10.63	12	1.71			
9	Gr.	31.17	14	3.5	8.69	3.74	2.32
	Ind.	22.48	11	1.35			
10	Gr.	25.56	7	1.4	11.04	1.63	6.77
	Ind.	14.52	6	.86			

In all exercises, the mean number of responses on the exercises done in groups is greater than the mean number of responses on the exercises done individually. The critical ratio is always in favor of the groups.

CHAPTER V

SUMMARY AND CONCLUSIONS

The purpose of this study was to attempt to determine whether elaborative thinking is done better by children working in groups or by children working individually. The data were analyzed:

1. To determine the number of ideas produced by individuals on selected elaborative thinking exercises
2. To determine the number of ideas produced by groups on selected elaborative thinking exercises
3. To determine whether groups or individuals, using the same stimuli, produce larger numbers of ideas in elaborative thinking.

Ten elaborative thinking exercises were selected from a series of thirty such exercises drawn up by a group of graduate students at Boston University.[1] These ten exercises were administered to a group of 125 sixth grade children in a Boston suburban community, and the responses were tabulated and analyzed.

Statistical procedures used were measures of central tendency and variability and tests of significance (critical ratio) between groups and individuals.

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[1]Derby, op. cit.

The conclusion of the study is that there is a statistically significant difference in favor of the groups. The critical ratios shown in Table III of the preceding chapter indicate this.

Wert writes:

> Whenever the ratio is unity, chances are 68 per cent that the difference is too great to be the result of sampling fluctuations; whenever this ratio is two, chances are 98 per cent that the difference is too great to be the result of sampling fluctuations; whenever the ratio is three or more, it is a practical certainty that the difference is too great to be the result of sampling fluctuations.[1]

In this study, in no case was the ratio unity or smaller. In exercises 1, 2, 3, 4, 6, 7, 8, and 10 the critical ratio is greater than three. There is a highly significant difference between the individuals' and the groups' responses at the one per cent level (C.R. = 2.576) in these exercises. In the remaining two exercises (numbers 5 and 9), the critical ratios of 2.53 and 2.32, respectively, indicate a significant difference at the five per cent level (C.R. = 1.960).

It appears, therefore, in terms of simple numbers of responses on selected elaborative thinking exercises, that children working in groups are superior to children working alone. Therefore, it seems safe to recommend that elaborative thinking exercises should be done in groups rather than by individuals, and that the contacts made in groups stimulate elaborative thinking by individual members of the group.

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[1] Wert, op. cit., p. 145.

Suggestions for Further Research

As a result of this study, the following suggestions for further research occur to the author:

1. Vary the size of the groups. In this study, groups of three were used. The difference may be more or less significant if groups of two, four, five, or seven are used.
2. Conduct the same experiment with a larger population sample.
3. A more valid measure of the difference may be obtained if all thirty of the Derby exercises are used instead of the ten selected for this study.
4. A set of exercises other than the Derby exercises may be used.
5. A study could be conducted to determine, if possible, the difference in the quality of responses done by groups and individuals.
6. This experiment could be conducted at various grade levels to determine if a significant difference exists at these various levels.
7. A comparison of an individual's performance as he works alone first, and then works on the same exercise as a member of a group, could be made to determine the difference in quantity and over-all quality of his responses.

BIBLIOGRAPHY

BIBLIOGRAPHY

Anderson, Ethel Lange, et al. "The Speaking Vocabulary of 454 Third Grade Children." Unpublished Master's thesis, Boston University, School of Education, 1955.

Anderson, Howard R. Teaching Critical Thinking in Social Studies, Thirteenth Yearbook of the National Council for Social Studies. Washington, D. C.: National Council for the Social Studies, 1942.

Aymes, Alan, et al. "An Evaluation of a Series of Sixth Grade Compositions to Determine Growth in Originality, Elaborative Thinking and Vocabulary." Unpublished Master's thesis, Boston University, School of Education, 1960.

Barthelmess, Harriet M., and Phillip A. Boyer. "Evaluation of Ability Grouping," Journal of Educational Research (December, 1932), 26:284-294.

Baumann, Mayvis L., et al. "Differing Instructional Needs for Children of Similar Reading Achievement, Grades Two, Four, and Six." Unpublished Master's thesis, Boston University, School of Education, 1960.

Baumgartner, Barbara, et al. "Teaching in Groups in Grade Three." Unpublished Master's thesis, Boston University, School of Education, 1957.

Betts, Emmett A. "Reading Is Thinking," The Reading Teacher (December, 1961), 15:179-184.

Brown, Ida Stewart. "How We Act in Groups," Childhood Education (December, 1950), 27:156-160.

Brownrigg, Helen Rita. "An Evaluation of Exercises in Written Composition." Unpublished Master's thesis, Boston University, School of Education, 1950.

Brueckner, Leo J., and Foster E. Grossnickle. How to Make Arithmetic Meaningful. Philadelphia: J. C. Winston Co., 1947.

Burr, James B., Lawry W. Harding, and Leland B. Jacobs. Student Teaching in Elementary School. New York: Appleton-Century-Crofts, Inc., 1950.

Burton, William H., Roland B. Kimball, and Richard L. Wing. Education for Efficient Thinking. New York: Appleton-Century-Crofts, Inc., 1960.

Callahan, Frederic L. "Construction and Evaluation of a Series of Exercises to Develop Organizational Ability in Children's Writing." Unpublished Doctoral dissertation, Boston University, School of Education, 1959.

Campanaro, Lena. "Graded Lessons for the Use of Study Teams, Grade Four." Unpublished Master's thesis, Boston University, School of Education, 1956.

Cantor, Nathaniel F. "Focus and Function in Group Discussion," Teachers College Record (April, 1952), 53:375-382.

Chambers, John Richard. "The Relationships Among the Measurable Mental Tasks Related to Reading." Unpublished Doctoral dissertation, Boston University, School of Education, 1956.

Chrisof, Cleo. "The Formulation and Elaboration of Thought Problems," American Journal of Psychology (April, 1939), 52:161-185.

Clapper, Harriet, et al. "The Effectiveness of Paired Learning on a Reading Program in Grades Two and Three." Unpublished Master's thesis, Boston University, School of Education, 1958.

Conley, Richard, et al. "Seven Exercises Planned to Stimulate the Flow of Ideas in Creative Composition." Unpublished Master's thesis, Boston University, School of Education, 1955.

Craig, Gerald S. Science for the Elementary School Teacher. Boston: Ginn and Company, 1947.

Dawson, Mildred A. Teaching Language in the Grades. Yonkers-on-Hudson, New York: World Book Company, 1951.

Delaney, Margaret D. "A Series of Exercises in Elaborative Thinking in Composition Planning." Unpublished Service Paper, Boston University, School of Education, 1950.

Derby, Joan, et al. "The Development of Thirty Self-Administering and Self-Scoring Elaborative Thinking Exercises." Unpublished Master's thesis, Boston University, School of Education, 1961.

Dewey, John. How We Think. Boston: D. C. Heath and Company, 1933.

Dimnet, Ernest. The Art of Thinking. New York: Simon and Schuster, 1928.

Durrell, Donald D. "Development of Comprehension and Interpretation," Reading in the Elementary School, The Forty-eighth Yearbook of the National Society for the Study of Education, Part II. Chicago: University of Chicago Press, 1949.

_____. Improvement of Basic Reading Abilities. Yonkers-on-Hudson, New York: World Book Company, 1940.

_____. Improving Reading Instruction. New York: Harcourt, Brace and World, Inc., 1956.

_____. "Language and the Higher Mental Processes," Review of Educational Research (April, 1943), 13:110-114.

_____, and J. Richard Chambers. "Research in Thinking Abilities Related to Reading," The Reading Teacher (December, 1958), 12:89-91.

_____, and Viola A. Palos. "Pupil Study Teams in Reading," Education (May, 1956), 76:552-556.

_____, et al. "Adapting Instruction to the Learning Needs of Children in the Intermediate Grades," Journal of Education (December, 1959), 142:2-78.

Ferris, Mary M., et al. "The Construction and Evaluation of Four Series of Lessons to Stimulate the Flow of Ideas in the Creative Writing of Fourth, Fifth, and Sixth Grade Pupils." Unpublished Master's thesis, Boston University, School of Education, 1953.

Freeman, Kenneth, et al. Helping Children Understand Science. Philadelphia: John C. Winston and Company, 1954.

Gannon, Eleanor Mary. "The Construction of a Test to Measure the Associational Reading Ability of the Intermediate Grades." Unpublished Master's thesis, Boston University, School of Education, 1947.

Gans, Roma. A Study of Critical Reading Comprehension in the Intermediate Grades. New York: Bureau of Publications, Teachers College, Columbia University, 1940.

_____, Celia Stendler, and Millie Almy. Teaching Children. Yonkers-on-Hudson, New York: World Book Company, 1952.

Glennon, Vincent J., and C. W. Hunnicutt. "Is There a Place for Cooperative Pupil-Teacher Planning in Arithmetic?" What Does Research Say About Arithmetic? Association for Supervision and Curriculum Development. Washington, D. C.: National Education Association, 1952.

Gray, C. Delmar. "Incentive for Learning," Claremont College Reading Conference, Twenty-first Yearbook. Claremont, California: Claremont College Curriculum Laboratory, 1956.

Gray, William S. (editor). Classroom Techniques in Improving Reading. Chicago: The University Press, 1949.

_____. "Recent Trends in Reading," Proceedings of the Conference on Reading, Vol. I. Chicago: The University of Chicago Press, 1940.

Grover, C. C. "Rate of Progress of Pupils in Arithmetic in the Elementary School," The Mathematics Teacher (January, 1951), 44: 7-9.

Guilford, J. P. "Traits of Creativity," Creativity and Its Cultivation, ed. Harold H. Anderson. New York: Harper and Brothers, 1959.

Hahn, M. Elizabeth. "Exercises for the Development of Elaborative Thinking in Grade Five." Unpublished Service Paper, Boston University, School of Education, 1950.

Harris, A. How to Increase Reading Ability. New York: Longmans, Green and Company, 1956.

Harris, Fred E. "Techniques for Guiding Group Exercises in the Classroom," Elementary School Journal (September, 1948), 49:32-36.

Hartung, Maurice L. "Teaching Reflective Thinking in High School," The High School Journal (April, 1958), 41:320-324.

Hayes, Mary Theresa. "The Construction of Equivalent Forms of a Test of One Aspect of Elaborative Thinking in Grades Six, Seven, and Eight." Unpublished Master's thesis, Boston University, School of Education, 1951.

Heffernan, H. W. "Grouping Pupils for Well-Rounded Growth and Development," California Journal of Elementary Education (August, 1952), 21:42-50.

Helseth, Inga Olga. Children's Thinking. New York: Bureau of Publications, Teachers College, Columbia University, 1926.

Hockett, John A. Modern Practices in the Elementary School. Boston: Ginn and Company, 1943.

Hopkins, L. Thomas. Pupil-Teacher Learning. Wilmington, Delaware: The Delaware Citizens Association, 1938.

Hughes, Marie M. "Training Pupils for Successful Group Living," Elementary School Journal (April, 1950), 50:453-459.

Jameson, Vivian. "Children's Preference for Types of Assignments." Unpublished Master's thesis, Boston University, School of Education, 1951.

Jenkins, Ethel Mae. "An Evaluation of Directed Teaching of Associational Reading in Social Studies with Sixth Grade Children." Unpublished Doctoral dissertation, Boston University, School of Education, 1953.

Jenkins, Gladys, Helen Shector, and William Bauer. These Are Your Children. Chicago: Scott, Foresman and Company, 1949.

Johnson, Willemae. "An Evaluation of Exercises in the Social Studies Used in the Development of Elaborative Thinking." Unpublished Master's thesis, Boston University, School of Education, 1950.

Judd, Charles Hubbard. Education as Cultivation of the Higher Mental Processes. New York: The Macmillan Company, 1936.

Keesey, O. C. "How Important Is a Skills Development Program for Middle Grade Reading?" Claremont College Reading Conference, Tenth Yearbook. Claremont, California: Claremont College Library, 1945.

King, Muriel. "The Development and Evaluation of Lessons in Socialized Learning for Grade One." Unpublished Master's thesis, Boston University, School of Education, 1957.

Kingsley, Howard L., and Ralph Garry. The Nature and Conditions of Learning. Second edition; Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1959.

Klugman, Samuel F. "Co-operative versus Individual Sufficiency in Problem Solving," Journal of Educational Psychology (February, 1944), 35:91-100.

Kregel, Luvella J. "Teaching Co-operation as a Practical Ideal," Educational Methods (January, 1930), 9:227-231.

Lenski, Lois. "Helping Children to Create," Childhood Education (November, 1949), 26:101-105.

Lincoln, Edward A., and Verna L. Wadleigh. "Teacher Opinion on Ability Grouping," Journal of Educational Research (April, 1930), 21:277-282.

Marden, Avis G. "Associational Reading Abilities of the Seventh Grader." Unpublished Master's thesis, Boston University, School of Education, 1941.

McDade, James E. "Individual Learning in an Integrated School Program," Chicago Schools Journal (January-June, 1933), 15:58-67.

McHugh, Walter J. "Pupil Team Learning in Skills Subjects in Intermediate Grades." Unpublished Doctoral dissertation, Boston University, School of Education, 1960.

McGaughey, H. "Co-operative Planning in the College Classroom," College English (November, 1950), 12:108-110.

McKee, Paul. Reading and Literature in Elementary Schools. Boston: Houghton Mifflin Company, 1948.

McKim, Margaret C. Guiding Growth in Reading. New York: The Macmillan Company, 1955.

Moody, Caesar B. "Using Groups and Committees," High School Journal (February, 1953), 36:133-138.

Morrow, Mildred. "Beginning of Social Adjustment," Childhood Education (April, 1929), 5:424-427.

Nunes, Agnes Isabel, et al. "A Comparison of Recall Using Factual Study Guides Versus Elaborative Thinking Study Guides in Grade Four." Unpublished Master's thesis, Boston University, School of Education, 1959.

Nylen, Doanal. "Growth in Groups," Childhood Education (November, 1950), 27:114-118.

Palos, Viola. "Graded Lessons for Pupil Study Teams, Grade Six." Unpublished Master's thesis, Boston University, School of Education, 1956.

Parker, Catherine, et al. "The Construction and Evaluation of Five Patterned Series of Lessons for Teaching Five Specific Writing Skills." Unpublished Master's thesis, Boston University, School of Education, 1959.

Regan, John F. "Improving Recall Through Graded Study Lessons in Grade Four." Unpublished Master's thesis, Boston University, School of Education, 1957.

Rothenbush, Verona F. "A Plan for Teaching Pupils How to Think," Clearing House (February, 1943), 17:331-335.

Russell, David H. Children's Thinking. Boston: Ginn and Company, 1956.

Saucier, Weems A. Theory and Practice in the Elementary School. New York: The Macmillan Company, 1951.

Sheehy, Emma D. The Fives and Sixes Go to School. New York: Henry Holt and Company, Inc., 1954.

Skinner, Charles E. (editor). Elementary Educational Psychology. New York: Prentice-Hall, Inc., 1950.

Smith, Philip G. "The Art of Asking Questions," The Reading Teacher (September, 1961), 15:3-7.

Stauffeur, Russell G. "A Directed Reading-Teaching Plan," Education (May, 1959), 79:527-532.

Stewart, Beverly J. "The Construction and Evaluation of a Set of Exercises to Be Used by Fourth Grade Pupil Study Teams to Improve Their Ability in Solving Arithmetic Problems." Unpublished Master's thesis, Boston University, School of Education, 1957.

Strang, Ruth. Group Work in Education. New York: Harper and Brothers, 1958.

Swenson, Esther J. "Applications of Learning Principles to the Improvement of Teaching in the Early Elementary Grades," Learning and Instruction, The Forty-ninth Yearbook of the National Society for the Study of Education, Part I. Chicago: The University of Chicago Press, 1950.

Thelen, Herbert A. "Experimental Methods in Classroom Leadership," Elementary School Journal (October, 1952), 53:76-85.

_____. "Social Environment and Problem Solving," Progressive Education (March, 1950), 27:152-155.

United States President's Commission Report on Higher Education. Higher Education for American Democracy, Vols. I-IV. New York: Harper and Brothers, 1947.

Waite, Dorothy C. "Children Like Working in Groups," Bases for Effective Learning, Thirty-first Yearbook of the Department of Elementary School Principals of the National Education Association. Washington, D. C.: National Education Association, 1952.

Warren, Howard Crosby (editor). Dictionary of Psychology. Boston: Houghton Mifflin Company, 1934.

Washburne, Carleton W. Adjusting the School to the Child. Yonkers-on-Hudson, New York: World Book Company, 1932.

Webb, Ruth K. "All Children Think and Plan," Childhood Education (March, 1947), 23:315-321.

Wert, James E. Educational Statistics. New York: McGraw-Hill Book Company, Inc., 1938.

_____, Charles O. Neidt, and J. Stanley Ahmann. Statistical Methods in Educational and Psychological Research. New York: Appleton-Century-Crofts, Inc., 1954.

Wrightstone, J. Wayne. Appraisal of Newer Elementary School Practices. New York: Bureau of Publications, Teachers College, Columbia University, 1938.

Young, D. "Everything's Under Control: Trusting the Group for Working and Planning," Childhood Education (December, 1951), 28:157-161.

Zubrinski, Eugene. "An Evaluation of the Oral and Written Recall with the Use of Graded Study Guides in Grade Five." Unpublished Master's thesis, Boston University, School of Education, 1957.

APPENDIX

DIRECTIONS TO THE TEACHER

The purpose of this study is to determine whether elaborative thinking is done better by children working in groups or by children working individually.

Each exercise will require approximately fifteen minutes: seven minutes for the children to complete the exercise, and the remaining eight minutes for you to read the master sheet of possible responses, have the children count the number of their responses, collect the children's papers, etc. The children will need pencils. They will write their responses on the paper provided.

Please emphasize that the responses are neither right or wrong; there is no absolutely correct answer. We are concerned with the number of responses only. Our purpose in having you read the master sheet is to give the children an idea of the responses which have been given previously by other children. Your pupils may have others to add.

When the children work in groups, group the children in groups of three, each group chosing a secretary. It is important to our study that the children be grouped heterogeneously. Have the secretary fill in the names, date, and room number in the spaces provided. Have the secretary record the responses given by the group. In the event that the class cannot be divided evenly into groups of three, group the extra pupils in groups of two. It is important to us that no group larger than three is used. The children need not be in the same group each time they work in groups.

The children will work individually and in groups on alternate days. The schedule of administering the exercises to your room is enclosed.

We thank you, the teachers, for your co-operation in this experiment. Without your help our study would not have been possible.

DIRECTIONS TO THE CHILDREN

Working Individually:

"Children, here is a story. You are to read it and write all the answers to the question at the bottom of the story. You will write the answers on the lines on the paper, and if you don't have enough room there, you may turn the paper over and use the other side. The answers you will give cannot be wrong. I am concerned only with the number of answers you are able to think of. Put your name, the date, and our room number in the spaces provided. Are there any questions?"

After seven minutes: "Stop. Here is a list of answers given by other children to this exercise. You may have other answers. See how many you have."

Working in Groups:

"Secretaries, write the three names of your group, the date, and our room number in the spaces provided. When you are given the signal to begin, you will read the story to the group. Everyone will be telling the secretary his answers, and the secretary will be thinking of some answers too."

Other preliminary directions will be similar to the directions given to the children working individually.

After seven minutes: "Stop. Here is a list etc. ..."

NAME or NAMES _____

DATE _____ ELABORATIVE THINKING EXERCISE #1 ROOM # _____

It was a dark night. There were stars in the sky but the moon had not come up yet. The two boys were lost in the woods and they were getting cold and hungry. They had wandered away from the campsite that afternoon and could not find their way back. They sat down and were thinking about their warm blankets next to the campfire and the supper the other boys were probably eating, when through the trees they saw a light.

What could it have been?

NUMBER OF POSSIBLE RESPONSES FOR EXERCISE # 1

1. people looking for them
2. campfire
3. other boys lost
4. forest fire
5. eyes of an animal
6. forest ranger
7. hunters
8. hobo making a camp nearby
9. prisoners trying to escape
10. moon coming up
11. flashlight
12. firefly
13. piece of glass
14. spot light
15. tower light
16. light on a plane
17. lantern
18. tin plate
19. search light
20. pipe or cigarette
21. an owl
22. light on a nearby road
23. house, tent, or cabin nearby
24. something white
25. flash of lightning
26. light or lamp
27. match
28. candle
29. something reflecting
30. tinfoil
31. fireworks
32. stars
33. gold
34. silver
35. flare
36. lighthouse
37. torch
38. signal lights
39, their camp

NAME or NAMES _____

DATE _____ ROOM # _____

ELABORATIVE THINKING EXERCISE #2

"Sally," said Mrs. Johnson, "I have to go to a P. T. A. meeting this afternoon. I'm leaving you in charge of Johnny."

"Okay, Mom!" answered her daughter.

After Mrs. Johnson left, Sally went to see what Johnny, her two-year-old brother, was doing. Finding him playing with his toy trucks on the porch, she bent down and joined the play.

What are some of the many things that older brothers and sisters can do with children when they are babysitting?

NUMBER OF POSSIBLE RESPONSES FOR EXERCISE # 2

1. read a story to them
2. give them something to eat
3. take a walk
4. watch television
5. play games
6. play with toys
7. color or draw pictures
8. play ball
9. play house
10. have a nap
11. go to the store
12. play cowboys and indians
13. play with them
14. play dolls
15. play with pets
16. play hide and seek
17. take them to the park
18. sing a song
19. build blocks
20. play school
21. paint pictures
22. listen to records
23. dress up or play "pretend"
24. take them to the beach
25. play in the snow
26. make valentines
27. cut out pictures
28. swing
29. play in the sandbox
30. sail boats
31. play cops and robbers
32. play cards
33. play tag
34. do puzzles
35. listen to the radio
36. play doctor or nurse
37. play "follow the leader"
38. dance
39. play army
40. give a puppet show
41. fly kites
42. give piggy-back rides
43. jump rope
44. ride tricycles or bicycles
45. play hopscotch
46. take them to the circus or zoo
47. watch others play
48. work with clay
49. take them for a ride
50. look at magazines
51. jump in the leaves

NAME or NAMES _____

DATE _____ ELABORATIVE THINKING EXERCISE #3 ROOM # _____

One morning the family was awakened by a loud, "Meow, Meow!" Quickly Mother, Father, and each child got out of bed to look for the family kitten, Blackie, and to find out why he was crying. Surprising as it may seem, they could not find him anywhere. Still the crying continued, so they tried to follow the sound.

If Blackie were your cat where might you look for him?

POSSIBLE RESPONSES FOR EXERCISE # 3

1. under the bed
2. in a closet or cupboard
3. in a box, hamper, basket or toychest
4. behind the refrigerator
5. on top of the refrigerator
6. under a chair
7. under the table
8. under the sink
9. behind the desk
10. in the bathtub
11. under a blanket
12. in a boot or shoe
13. in a bag (paper, laundry, yarn)
14. behind the bookcase
15. behind the bureau
16. behind the television
17. in a drawer
18. behind the piano
19. in a corner
20. under the stairs
21. on the window sill
22. behind the radiator
23. behind the furnace
24. under some clothes
25. under a pillow
26. behind a curtain
27. behind a plant
28. in a cabinet
29. in back of a door
30. in the chimney
31. in the cellar
32. in the attic
33. under the house
34. under or on the porch
35. on the roof
36. under the eaves
37. in the garage
38. under or in a car
39. in a well, shed, or doghouse
40. in a doll house
41. in a pail, barrell, or trash can
42. in a pipe
43. up a tree or telephone pole
44. in the bushes
45. in a well or a hole
46. on a fence
47. in the flower garden
48. at a neighbor's house
49. in a pile of snow

NAME or NAMES _____

DATE _____ ELABORATIVE THINKING EXERCISE # 4 ROOM # _____

Nancy Carroll was enjoying her vacation at the sea shore, even though she had to take care of her little brother, Johnny. They spent most of their time at the beach -- swimming, collecting shells, and building sand castles. One day as they were playing in the sand, Nancy's shovel hit something so hard that the handle of the shovel broke off. She and Johnny both started to dig with their hands to find out what they had discovered.

What things could have been buried in the sand?

POSSIBLE RESPONSES FOR EXERCISE # 4

1. barrel
2. sunken boat
3. bone
4. large book
5. bottle
6. box
7. brick
8. can
9. piece of cement
10. chain
11. clam
12. crab
13. doorknob
14. gold or jewels
15. gun
16. piece or iron or steel
17. log or piece of wood
18. piece of metal
19. pail
20. pan
21. pipe
22. rock
23. shell
24. treasure chest
25. turtle
26. board

NAME or NAMES _____

DATE _____ ELABORATIVE THINKING EXERCISE #5 ROOM # _____

There was on old, old house, which people said was haunted. The shutters were hanging by one hinge; the door was half open; and the glass in the windows was broken. One day a woman went inside and people heard her screaming.

What do you think happened to her?

POSSIBLE RESPONSES FOR EXERCISE # 5

1. Something fell on her.
2. Someone grabbed her.
3. The door locked behind her.
4. A brick fell down the chimney.
5. Her neck got caught in a string.

SHE

6. saw a skeleton.
7. saw a mouse.
8. fell through a trap door.
9. thought she saw a ghost.
10. saw a dead body.
11. saw a bat.
12. saw a snake.
13. heard a noise.
14. saw a cat.
15. saw a spider.
16. saw a knife.
17. fell through a hole.
18. fell downstairs.
19. saw a shadow.
20. saw blood on the floor.
21. saw a face.
22. saw a gun pointed at her.
23. was strangled.
24. was afraid in the dark.
25. saw two eyes.
26. fainted.
27. was stabbed.
28. saw a witch.
29. heard a shot.
30. was bumped into.
31. broke her leg.
32. stepped on a nail.
33. tripped.
34. saw a rat.
35. heard the floor squeak.
36. saw a skunk.
37. heard an owl.
38. heard a laugh.
39. saw someone running.
40. saw a shield or armour move.
41. screamed to fool others.
42. heard a banging shutter.
43. heard a dog bark.
44. saw a face at the window.
45. slipped on a banana peel.
46. saw a wild animal.
47. saw lightning.

NAME or NAMES

DATE

ELABORATIVE THINKING EXERCISE #6

ROOM #

One day a boy started off for school. He didn't see anyone else, which was very unusual. When he got there, he was very surprised. The school had disappeared.

What do you think happened to the school?

POSSIBLE RESPONSES FOR EXERCISE # 6

1. He could have been dreaming.
2. A tornado blew it away.
3. A fire burned it.
4. It had been torn down.
5. The wind blew it away.
6. Magic made it disappear.
7. It had been moved.
8. He took the wrong road.
9. A hurricane knocked it down.
10. The boy was lost.
11. The school sank into the ground.
12. The snow had covered it.
13. The school fell down.
14. A witch had put a spell on it.
15. A giant crushed it with his feet.
16. It was bombed.
17. Lightning destroyed it.
18. The fog hid it from view.
19. Flood waters carried it away.
20. Something was the matter with his eyes.
21. He was blind.
22. There was an earthquake.
23. It exploded and blew up.
24. A tidal wave hit it.
25. Some spacemen took it.
26. A twister destroyed it.
27. It was hidden by trees.

NAME or NAMES _____

ELABORATIVE THINKING EXERCISE #7

ROOM # _____

DATE _____

Jimmy was visiting his grandmother in New York. Today was his last day to go exploring. When he went into a big department store the toy shelf caught his attention. As he touched the little toy fire engine, a big bell began buzzing in the other end of the store. People stopped to stare at him and a man with big feet came running in his direction. Jimmy dropped the fire engine and started walking toward the nearest exit.

What questions are left unanswered in this story?

POSSIBLE RESPONSES FOR EXERCISE # 7

1. Who was the man?
2. Why did the bell ring?
3. What happened to Jimmy?
4. Was the fire engine valuable?
5. Where was the exit?
6. Did he make the bell ring?
7. Why were the people staring at him?
8. Did he want the fire engine?
9. Was the bell a burgular alarm?
10. How old was Jimmy?
11. Was he going to buy the fire engine?
12. Was the man after him?
13. Was the man chasing him?
14. Was he dreaming?
15. What was the name of the store?
16. Why was he walking away?
17. Did he do anything wrong?
18. Did the man stop him?
19. Did the man take Jimmy away?
20. Why did he touch the engine?
21. Why was the man running?
22. Did the man catch him?
23. Why did he drop the engine?
24. Did he break the engine?
25. Did the man know him?
26. Was the man angry?
27. Was Jimmy's grandmother there?

NAME or NAMES _____

DATE _____ ELABORATIVE THINKING EXERCISE #8 ROOM # _____

Mike, the dog trainer at the circus was having the dogs practice jumping through hoops. The horse trainer was teaching his ponies to follow each other around the circus ring. A short distance away a little lady, dressed in pink tights, slid down the trunk of the clumsy elephant.

"My, those animals certainly are smart!" observed one man as he watched the training session.

Can you think of other things which might show the intelligence of animals?

POSSIBLE RESPONSES FOR EXERCISE # 8

1. jumping through flaming hoops
2. roller skating
3. tight-rope walking
4. begging (for food)
5. riding bicycles
6. leading blind people
7. dancing
8. doing errands
9. balancing balls on noses
10. getting newspapers
11. shaking hands
12. tracking people down
13. helping herd sheep
14. standing on hind legs
15. racing
16. counting
17. serving as watch dogs
18. riding on each other's backs
19. swinging on a trapeze
20. climbing a ladder
21. jumping rope
22. standing on stools
23. marching in a circle
24. being trained as army dogs
25. pulling sleds in the snow
26. going into space
27. serving as police dogs
28. jumping high poles or fences
29. saving people from drowning
30. rolling over
31. hunting
32. jumping off or onto chairs
33. lying or sitting on command
34. catching pennies
35. standing on head
36. pulling carts or plows
37. working out on trampolines
38. obeying when spoken to
39. rolling barrels
40. see-sawing
41. helping firemen
42. defending themselves
43. giving out peanuts
44. standing on a ball

NAME or NAMES

ELABORATIVE THINKING EXERCISE #9

ROOM #

DATE

One night during a hurricane John and his mother were alone in the house. Suddenly they heard something fall on the roof and the house became dark. He and his mother couldn't investigate until John's father came home. They waited and waited but he didn't come.

Why didn't John's father come home?

POSSIBLE RESPONSES FOR EXERCISE # 9

1. He had to work late.
2. He was in an accident.
3. He lost his keys.
4. He was taken to the hospital.
5. He took the wrong road.
6. He went over a cliff.
7. He was lost.
8. He crashed into something.
9. He fell down and broke his leg.
10. He decided to wait until the weather cleared.
11. He had to stay in a hotel overnight.
12. He had fallen into a hole.
13. He stopped to help people in trouble.
14. He hit a tree.
15. He had to walk home.
16. He was trapped in the car.
17. He had to make a detour.
18. He couldn't find his car.
19. He stopped at a friend's house.
20. A tree fell on his car.
21. The bridge was washed out.
22. Some live wires fell across the road.
23. Lightning struck his car.
24. A tree blocked the road.
25. The car wouldn't start.
26. The road was flooded.
27. It was too dark to see.
28. Someone stole his car.
29. The dam burst.
30. It was too foggy.
31. The place where he worked was on fire.
32. The road was closed.
33. His lights went out.
34. His car ran out of gas.
35. His car had a flat tire.
36. His car was stuck in the mud.
37. His car was stalled.
38. His car tipped over.
39. His car broke down.
40. His car was flooded.
41. His car went off the road.
42. His car caught on fire.

NAME or NAMES _____

DATE _____ ELABORATIVE THINKING EXERCISE #10 ROOM # _____

Joe took his pet kitten with him when he went to visit his grandfather. When it was time to go home grandfather turned to the cat and said, "Now that you've found the way, come again."
And the cat said, "I'll be delighted to!"

What would happen if suddenly pets could talk?

POSSIBLE RESPONSES FOR EXERCISE # 10

THEY COULD

1. tell us when they are hungry.
2. do errands for us.
3. go to school.
4. help us with our homework.
5. warn us when danger is near.
6. play games.
7. tell time.
8. watch T. V.
9. tell us when they want to go in or out.
10. ask for directions.
11. tell us when they are sick.
12. tell scientists information from rockets.
13. tell stories.
14. have fun with us.
15. scare people.
16. tattle-tale on people.
17. tell when someone is in trouble.
18. help invent things.
19. wake us up on time.
20. warn us of fire.
21. help the police.
22. answer our questions.
23. use the tape recorder.
24. learn foreign languages.
25. be spies.
26. be witnesses in trials.
27. work for the F. B. I.
28. help the dog catcher.
29. give commercials on T, V.
30. be on the radio.
31. sing.
32. help us earn money.
33. tease people.
34. help find hidden treasures.
35. tell us the weather.
36. take messages.
37. tell secrets.
38. coach games.
39. make speeches.
40. tell us how they feel about other animals.
41. learn how to spell.
42. enter the family conference.

SAMPLE SCHEDULE FOR ELABORATIVE THINKING EXERCISES

First Week			Second Week		
Day	Exercise	Method	Day	Exercise	Method
Mon.	1	Indiv.	Mon.	6	Group
Tues.	2	Group	Tues.	7	Indiv.
Wed.	3	Indiv.	Wed.	8	Group
Thurs.	4	Group	Thurs.	9	Indiv.
Fri.	5	Indiv.	Fri.	10	Group

Teacher: Mrs. _____
Sixth Grade
_____School