

EXPLORATORY STUDY OF EFFECTIVE THINKING, AS
RELATED TO HOME ECONOMICS EDUCATION

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RELATED TO HOME ECONOMICS EDUCATION

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TABLE OF CONTENTS

Chapter	Page
I. STATEMENT OF PROBLEM AND PROCEDURE	1
Background for Present Study.	2
Statement of Problem.	4
Definition of Terms	4
Procedure	5
II. PRESENT DAY VIEWS OF THINKING.	7
Terms Describing Thinking	7
The Thinking Process.	9
Factors Influencing Thinking.	10
Present Research Concerned with Thinking.	12
III. IDENTIFICATION OF BEHAVIORS OF THINKING.	15
Explanation of Sources of Data.	16
Presentation and Comparison of Behaviors.	20
Compilation of Possible Important Behaviors of Thinking.	23
IV. EXPLORING TECHNIQUES FOR EVALUATING IMPORTANT BEHAVIORS OF THINKING.	29
Identification of Behaviors Measured by WGCTA	29
A Comparison of Behaviors	32
Analyzation of WGCTA Scores	36
Teacher Ratings	42
Student Conferences	44
Comparison of WGCTA, Teacher, and Student Ratings	47
Summary	49
V. SUMMARY AND CONCLUSIONS.	51
SELECTED BIBLIOGRAPHY	55
APPENDIX.	58

LIST OF TABLES

Table	Page
I. Elements of Thinking as Identified by Leaders in the Field of Education	21
II. Elements of Thinking as Identified by Home Economics Educators.	22
III. Behaviors of Thinking.	24
IV. Possible Important Behaviors of Effective Thinking	27
V. Major Behaviors Measured by WGCTA.	33
VI. Identification of Common Behaviors of Thinking	34
VII. Classification of Levels of Thinking	37
VIII. WGCTA Scores Made By 24 Home Economics Education Seniors.	37
IX. Changes in Levels of Thinking Made By 24 Home Economics Education Seniors.	39
X. Average Scores and Percentages on Individual Tests of 24 Seniors.	41
XI. Teacher Ratings of Student Thinking Behaviors.	43
XII. Student Ratings of Thinking Behaviors.	46
XIII. WGCTA, Teacher, and Student Ratings.	59

LIST OF FIGURES

Figure	Page
1. WGCTA, Teacher, and Student Ratings of Individual Subjects	48

CHAPTER I

STATEMENT OF PROBLEM AND PROCEDURE

The development of the ability to think effectively is surely a central purpose though not the sole purpose of all education in a democracy.¹ Based on this belief, this study is an attempt to explore possible behaviors involved in thinking.

Democracy is based on the assumption that the individuals within it are capable of thinking and will do so to the best of their ability. The individual citizen is frequently confronted with controversial ideas from which he must choose. He is constantly faced with new problems to be solved and his ability to make wise decisions determines the strength of the democracy.

American educators have long recognized the development of the individual's ability to think effectively as a desirable and important educational objective. However, the conscious effort made to realize this goal has been limited. Present day educational trends reveal that this objective is presently receiving new emphasis.

The assimilation of knowledge is not sufficient for effective citizenship in today's world. As the volume of knowledge has increased rapidly, it has become impossible for a student to store in his memory all the pertinent facts needed for daily living. Too, students are

¹Educational Policies Commission, "The Central Purpose of American Education," National Education Association Journal, September, 1961, pp. 13-16.

involved in a society in which there is rapid and unpredictable change. They must be prepared to solve problems which are yet unknown.

In 1961, the Educational Policies Commission of the NEA stated:

The purpose which runs through and strengthens all other educational purposes - the common thread of education - is the development of the ability to think. This is the central purpose to which the school must be oriented if it is to accomplish either its traditional tasks or those newly accentuated by recent changes in the world.²

Home economics educators have a dual responsibility in the development of the individual's ability to think effectively. First, they must guide students, the future teachers of home economics, in the development of their own individual abilities to think effectively. Second, they must help these future teachers recognize and meet the challenge of furthering the development of thinking in their own students.

The students who are now in secondary school will, in a very short time, be the leaders of our democracy. They will be making decisions which effect not only the immediate members of their families but the world-wide community as well. Unless the school helps to develop their individual ability to think effectively, it is doubtful that this ability will be achieved to the maximum extent by all students.

Background For Present Study

In recognition of the importance of developing each individual's ability to think effectively, a national group of home economics educators met in April of 1959. They discussed possibilities of a co-operative study concerned with critical thinking in home economics education. In December of the same year, some of the members of the group decided to

²Ibid., p. 16.

explore independently the Watson-Glaser Critical Thinking Appraisal. (This is a standardized instrument designed to measure ability to think critically. It is referred to hereafter as WGCTA.) These explorations were an attempt to determine if WGCTA might be one means of evaluating critical thinking within the area of home economics education.

In 1960, some of the members of the staff of the Home Economics Education Department at Oklahoma State University sponsored a study concerned with evaluation of growth in critical thinking.³ It involved the use of the WGCTA to determine if this instrument measured student growth which occurred during the course, "Methods of Teaching Homemaking". The WGCTA was administered at the beginning of the course and again at the end of the course, eighteen weeks later. The findings based on the pretest and post-test scores indicated no significant gain or loss in ability to think critically during this length of time.

Additional data were collected by Hedger during 1961. At that time the WGCTA was administered when the students began their professional home economics education courses and again when they finished their professional block. The minimum length of time involved three or four semesters. Even though the testing covered a longer length of time, the scores again indicated no significant gain or loss in ability to think effectively.

As a result of these investigations, the need for clarification of critical thinking as related to home economics education was recognized. This is the background from which the present study developed.

³Emma Catherine Lawson and June Cozine, "A Pilot Study to Determine if the Watson-Glaser Critical Thinking Appraisal can be used to Measure the Growth (in Critical Thinking in Particular) Which Occurs in the Course, Methods of Teaching Homemaking," (typed material, Department of Home Economics Education, Oklahoma State University, 1960).

Statement of Problem

This study is an attempt to identify some important behaviors of effective thinking as related to home economics education and to explore the extent to which the Watson-Glaser Critical Thinking Appraisal evaluates these behaviors.

There were two general objectives for the study. The first one was to identify important behaviors involved in thinking related to home economics education. The second objective was to determine the extent to which the Watson-Glaser Critical Thinking Appraisal evaluates these behaviors.

The achievement of the second objective included four more specific objectives; namely:

1. To review behaviors that WGCTA measures.
2. To compare these behaviors with those identified as important in home economics education.
3. To determine what insight can be gained by analyzing WGCTA scores.
4. To compare WGCTA ratings with teacher and student ratings.

Definition of Terms

The following general terms have been used throughout the study and have been interpreted to have the following meanings.

EFFECTIVE THINKING - the mental process of arriving at decision from indecision by means of a thorough examination of relevant evidence and relationships.

EDUCATION - the reconstruction of experiences which brings about changes in behaviors.

EDUCATORS - leaders in the field of education.

HOME ECONOMICS - "The field of knowledge and service primarily concerned with strengthening family life . . ." ⁴

HOME ECONOMICS EDUCATION - those college courses on an undergraduate level which are concerned with the professional preparation of home economics teachers.

HOME ECONOMICS EDUCATORS - leaders in the field of home economics education.

Procedure

The initial step in the study was to identify the problem. A review of literature and research related to thinking was then made. This served as a basis for gaining a background for the study and knowledge of what has been done and is being done in the study of thinking. This review was also the means for obtaining viewpoints of home economics educators and other educators regarding important behaviors involved in the nature of thinking. These viewpoints in turn provided the basis for identifying important behaviors of thinking in home economics education.

The WGCTA and various articles concerned with the use and analysis of it were reviewed to identify the behaviors measured. The behaviors measured by WGCTA were compared to behaviors identified as important in home economics education in order to determine their consistency.

The WGCTA Form Am was administered to a total of twenty-four subjects at two different periods. The scores made on this instrument were analyzed in view of changes which took place between the first and second testing and possible strengths and weaknesses of the group.

A teacher rating device was developed on the basis of behaviors

⁴Dorothy Scott, et al., Home Economics, New Directions (Washington, 1959), p. 4.

of effective thinking identified from the viewpoints of home economics educators and other educators. The college supervisors in home economics education rated the subjects they had supervised during student teaching as to their tendency to think effectively.

Conferences were held with the individual students who took the WGCTA. During these conferences an attempt was made to briefly discuss effective thinking in terms of possible behaviors. Also an effort was made to obtain the students' opinion concerning their tendencies to think effectively, the possible growth in their ability to think effectively and their possible strengths and weaknesses in this area.

The data, which were then analyzed and arranged in written form, served as a basis for the conclusions drawn and recommendations made.

CHAPTER II

PRESENT DAY VIEWS OF THINKING

Psychologists, parents, teachers, and others, view thinking from different points of view. Thus, the term may be interpreted in many different ways. This is an attempt to bring together some of the present ideas of thinking in order to establish the framework upon which this study is based.

Terms Describing Thinking

Some of the confusion surrounding thinking is due to the various descriptive terms that have been used to define it. Problem-solving is one such term that is used frequently in the area of home economics. The close association of problem-solving and thinking is indicated by the following definition. "Thinking is finding for oneself the best answer to a problem."⁵ More recently a group of home economic educators have viewed problem-solving as only one aspect of thinking intelligently. They further feel that problem-solving involves certain specific abilities defined as, recognizing and defining problems, selecting pertinent information, recognizing unstated assumptions, inventing and evaluating hypotheses, and drawing and judging valid conclusions.⁶ Problem-solving

⁵Ivol Spafford, Fundamentals in Teaching Home Economics (New York, 1942), p. 146.

⁶Home (Learning) Experiences in the Home Economics Program, Department of Home Economics Education in cooperation with the State of Minnesota Department of Education (University of Minnesota), p. 18.

has been a term in the home economics vocabulary for some time and is still being used.

Decision-making is another term related to thinking that is also commonly used in home economics and particularly in regard to the study of management. Two leaders in this area have likened decision-making to genuine choice making, and have further defined it as a process which involves "seeking alternatives, thinking through the consequences of these alternatives, and selecting one of the alternatives".⁷

Critical thinking is at present a widely used descriptive term of thinking. Peterson closely relates critical thinking to problem-solving by defining the former as "the process by which problems are solved effectively and satisfactorily for the individuals involved".⁸ Other home economics educators have defined critical thinking as "that type of thinking which involves critical appraisal of solutions . . .".⁹ Russell has said that critical thinking "is a logical examination of data which avoids fallacies and judgments on an emotional basis only".¹⁰ This term tends to emphasize judgment or evaluation concerned with the reliability of a solution.

Creative thinking is another of the more recent terms used to describe thinking. It has been defined as "that type of thinking that

⁷Irma H. Gross and Elizabeth Walbert Crandall, Management for Modern Families (New York, 1954), p. 20.

⁸Bernadine H. Peterson, "Problem Solving in Home Economics," Journal of Home Economics, LV (March, 1963), p. 179.

⁹Mary Elizabeth Moore and Letitia Walsh, "Facts Versus Feelings in Family Life Education," Illinois Teacher of Home Economics, VI (September, 1962), p. 8.

¹⁰David Russell, "Higher Mental Processes," Encyclopedia of Educational Research, ed. Chester Harris (3rd ed., New York, 1960), p. 651.

is associated with the occurrence of new relationships discovered by an individual; new hunches or insights into the inner relations or arrangements of a problem situation".¹¹ Here, the emphasis appears to be on originality or the creation of something new. Since this activity would usually, if not necessarily, involve an act of judgment, creative thinking and critical thinking would also seem to be closely related.

Regardless of the various terms used, the mental process used apparently remains the same. Thus, writers using different terms seem to refer to the same basic process with major differences being the emphasis within that process.

In view of the various terms frequently used to describe thinking, the writer prefers the term, effective thinking. This term too is presently being widely used. It has been used in the title of one of the recent books, Education for Effective Thinking, which has been referred to by home economics educators and others.¹² The definition used for the term throughout this study is the one given in Chapter I. This is believed to be a comprehensive term which emphasizes "high quality" thinking to meet specific situations. It is viewed as being representative of such terms as problem-solving, decision-making, critical thinking, and creative thinking.

The Thinking Process

From all indications, thinking is a complex mental process. It appears that the basic behaviors of this process are limited and that a

¹¹Moore and Walsh, p. 8.

¹²Wm. A. Burton, R. B. Kimball, and R. L. Wing, Education for Effective Thinking (New York, 1960).

basic thinking process does occur. However, the elements of thinking (experience, knowledge, readiness, etc.) are many. Furthermore, each individual problem is unique due to differences in the situation and the individual involved. Thus, the variation of the basic behaviors within the basic process seem unlimited. Russell states it this way. "Thinking 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."¹³

It would seem that one must indeed be cautious in referring to the steps of thinking or the order in which these steps occur. The process of thinking appears to be a subtle one, the pattern of which can and does shift rapidly and unpredictably. Although behaviors have been identified for purposes of analysis, in reality it is believed that thinking is a continuous and unified process. Effective thinking frequently includes errors and guesses and refuses to be reduced to a formula.

Factors Influencing Thinking

Of interest to educators is the relationship of one's ability to think to various other factors. Three factors which appear to be related to and which seem to influence thinking ability are intelligence, subject matter knowledge, and attitudes.

Intelligence has been frequently regarded by many as synonymous to thinking. However, research fails to find support for this idea. Glaser did a comprehensive experiment concerned with proposals for teaching critical thinking. He attempted to develop techniques for stimulating

¹³David Russell, Children's Thinking (Boston, 1956), p. 27.

growth in critical thinking, to find ways of evaluating this growth and to determine relationships existing between critical thinking and other factors. He reported only moderate positive correlation between intelligence and ability to think effectively.¹⁴ Other investigators have reported positive but even lower correlations. Thus intelligence seems to be considered by various workers in the field to be only one of the factors in the ability to think. Studies have also indicated that most people do not think to their maximum capacity.

The findings from several studies have shown that knowledge within a particular field is conducive, if not necessary for quality thinking in that field. A study concerned with the problem-solving processes of college students was done by Bloom and Broder. They found that:

In this general area the outstanding difference between the successful and the nonsuccessful problem-solvers was not, as might have been expected, a difference in the amount of relevant knowledge possessed by the two groups. The major difference was in the extent to which the two groups could bring the relevant knowledge they possessed to bear on the problem. Often the nonsuccessful students had within their grasp all the background and technical information necessary for the solution of a problem but were unable to apply the knowledge to the problem.¹⁵

Thus, it is indicated that knowledge in a subject matter field is important in the ability to do effective thinking but in no way does it assure that the knowledge will be effectively applied to a specific problem.

Attitudes may well be a greater factor in effective thinking than has generally been realized. Bloom and Broder in the study previously referred to found significant differences in attitudes between good and

¹⁴E. M. Glaser, An Experiment in the Development of Critical Thinking (New York, 1949).

¹⁵Benjamin S. Bloom and Lois J. Broder, Problem-Solving Processes of College Students (Chicago, 1950), p. 27.

poor problem solvers. One difference was their general attitude toward the solution.¹⁶ Dewey seemed to feel that an attitude of suspended judgment might well be the difference between good and bad thinking. He stated that "reflective thinking . . . means judgment suspended during further inquiry, and suspense is likely to be somewhat painful."¹⁷ Burton, in attempting to stress the importance of attitudes in thinking, has listed those which he considers necessary for good thinking as including ". . . intellectual curiosity, intellectual honesty, objectivity, intelligent skepticism, open-mindedness, conviction of cause-and-effect relationships, disposition to be systematic, flexibility, persistence, and decisiveness".¹⁸ Teachers can likely do much to promote critical thinking by recognizing the influence of attitudes on thinking and helping students develop those most conducive to effective thinking.

Present Research Concerned with Thinking

Thinking was first identified as a purely logical process. This idea is no longer prevalent. Thinking has also been approached from a philosophical viewpoint which relied on theory unsupported by sound research. Such approaches may well represent the ideal rather than the actual behaviors involved. The general approach for the study of thinking has now become one which emphasizes the actual process of thinking, rather than the product.

Three long term studies concerned with the process of thinking, and currently in progress, are of special interest. A Cognition Project is

¹⁶Ibid., pp. 30-31.

¹⁷John Dewey, How We Think (Boston, 1910), pp. 12-13.

¹⁸Burton, Kimball and Wing, p. 268.

in process at Harvard University. Here an attempt is being made to describe the actual behavior that occurs when an organism takes advantage of past learning in attempting to deal with and master present new problems.¹⁹

The development of inquiry skills of fifth grade children is the point of emphasis in studies in Inquiry Training at the University of Illinois. Preliminary analysis of results of three pilot studies suggest:

. . . inquiry skills cannot be successfully taught to this age group as an isolated content area. The major focus in elementary science education should remain the content rather than the methods of science. Inquiry training and abundant opportunity to attain new concepts through inquiry, however, seem to produce increments in the understanding of content as well as an important new grasp of the scientific method and proficiency in its use.²⁰

The Illinois Critical Thinking Project is one of the more recent large scale attempts to teach critical thinking. Instructional materials were developed and designed to develop critical thinking abilities. Teachers were taught how to use these. The results include, wide differences among students of different teachers with respect to improvement in critical thinking. Due to the lack of technique for describing and measuring what the teachers actually did, the experimenters refrained from conclusions. A method of categorizing the logical operations of thinking as it occurs in the classroom has now been devised. An attempt is to be made to see if change in critical thinking can be associated with changes in logical character of classroom behavior.²¹

¹⁹Jerome Bruner, "Learning and Thinking," Harvard Educational Review, XXIX (Spring, 1959), pp. 184-192.

²⁰Richard Suchman, "Inquiry Training in the Elementary Schools," Science Teacher, November, 1960, p. 47.

²¹B. Othanel Smith, "Critical Thinking," American Association of Colleges for Teacher Education 13th Yearbook (1960), pp. 84-96.

As a result of such studies educators can expect to gain new information about thinking. This information should test present theories of thinking and/or help to develop new ones. Tyler has stated:

The role of basic research in education, as in other professional fields, is to develop and test theories. Theory, then, provides a basis for explaining what is going on in education and furnishes a sensible guide for the invention of more effective educational practices and the construction of helpful materials.²²

Research in the area of thinking as well as in other areas of education can be expected to continually furnish new knowledge. This knowledge can help educators better understand their goals as well as their achievement toward these goals. In the meantime, it is necessary that the best possible use be made of knowledge now available.

²²Ralph Tyler, "Specific Contributions of Research to Education," Theory Into Practice, I (April, 1962), p. 80.

CHAPTER III

IDENTIFICATION OF BEHAVIORS OF THINKING

Many educators have come to accept the behaviors exhibited as the most reliable guide for determining the extent to which actual learning has taken place. Behaviors help to clarify objectives. They also serve as a basis for evaluating the extent to which specific objectives are actually being achieved. According to French:

The more specific we can be about behaviors we desire as results of teaching, the more probable it is that we have made it possible for teachers to identify some evidence, either direct or indirect, of behavioral competence in students.²³

Therefore, it would seem that by identifying specific behaviors involved in the process of thinking, teachers would be better able to help students in developing the ability to do effective thinking. This chapter is an attempt to identify the specific behaviors involved in effective thinking as viewed by a selected group of educators.

The procedure for identifying important behaviors of thinking as related to home economics education was to review and analyze relevant literature. As this analyzation was coming to a conclusion, the writer discovered that a comparable procedure had been used by Ennis as the first step in the development of a concept of critical thinking.²⁴ Thus, the writer was encouraged as to the reliability of this procedure.

²³Will French, ed., Behavioral Goals of General Education In High School (New York, 1957), p. 36.

²⁴Robert Ennis, "A Concept of Critical Thinking," Harvard Educational Review, XXXII (Winter, 1962), pp. 81-111.

Explanation of Sources For Identifying Behaviors

In determining sources to be used, leaders in the field of education were selected whose ideas have been widely used by home economists, as well as other professional groups, who have attempted to explore the area of thinking. The following is an identification and brief explanation of each educational source which was selected for analysis as to possible behaviors involved in thinking.

The intellectual abilities and skills listed by Bloom are in a taxonomy in which a group of educators classify educational objectives in the form of expected student behaviors. There is an effort made to arrange behaviors in the order of simple to most complex with the behaviors being placed in the most complex class appropriate.²⁵

The behaviors listed by Bloom and Broder are from an exploratory investigation of problem-solving processes of college students. The authors studied the process of thinking by a means of introspection in which students attempted to think aloud as they solved test items. The statements of the students were recorded and later analyzed to identify characteristics of the "thinking process".²⁶

The behaviors given by Burton are from a recent book, the major aim of which ". . . is to give teachers an introduction to what it means 'to think' and to some of the processes through which the thinking of students may be improved." An attempt is also made to describe the thinking process, giving due reference to logic, and to discuss thinking in various

²⁵Benjamin S. Bloom, ed., Taxonomy of Educational Objectives (New York, 1956).

²⁶Bloom and Broder.

curricular areas with emphasis on "everyday thinking".²⁷

The behaviors given by Dressel and Mayhew are from the report of the Cooperative Study of Evaluation in General Education sponsored by the American Council of Education. It represents work of leading educators and the classroom teachers of nineteen schools. The portion referred to was the basis for the Test of Critical Thinking, an instrument presently available for use in studying group changes.²⁸

The steps in problem solving identified by Russell are from a book which is specifically concerned with children's thinking. However, the content is broadly applicable to the general study of thinking regardless of the age level involved. One purpose of this book, especially appropriate to this study was ". . . to present a possible structure, especially from a developmental view, for the psychology of thinking. . . ." ²⁹

The aspects of thinking as identified by Smith and Tyler are from the Eight Year Study of Evaluation sponsored by the Progressive Education Association with thirty cooperating schools. This was one of the first attempts to reduce educational objectives into actual behaviors. Leaders of this group were some of the first to work with home economists as they initiated studies in this area.³⁰

These sources not only represent ideas of recognized leaders in the field of education, but for the most part also represent the ideas of

²⁷Burton, Kimball, and Wing, pp. viii-ix.

²⁸Paul L. Dressel and Lewis B. Mayhew, General Education: Explorations in Evaluation (Washington, 1954), pp. 174-207.

²⁹Russell, Children's Thinking, p. v.

³⁰E. Smith and R. Tyler, Adventures in American Education: Appraising and Recording Student Progress (New York, 1942).

many professional individuals working together as groups.

The ideas from the education sources cited have been equally applicable to all subject matter areas. The home economics education sources selected, represent the ideas of various home economists as they have attempted to adapt the basic ideas of these educators to the specific field of home economics.

The authors of three of the major textbooks used for the professional preparation of teachers are among the home economists who have expressed their views as to the aspects involved in thinking. These professional home economics educators are Hall and Paolucci,³¹ Spafford,³² and Williamson and Lyle.³³ The publishing dates of these books represent the present and past two decades. It is interesting to note that the terms used for thinking are, beginning with the oldest book, sound thinking, problem-solving, and critical thinking. The major concern of each of these texts is suggested methods of teaching.

Gross and Crandall are leading authorities in home management, a specific area within home economics which is greatly involved in the area of thinking. To many home economists, management and decision-making are other terms used to define thinking. These authors have identified the steps of decision-making as an integral part of the large over-all mental process of management.³⁴

³¹Olive A. Hall and Beatrice Paolucci, Teaching Home Economics (New York, 1961), pp. 232-240.

³²Spafford, pp. 146-147.

³³Maude Williamson and Mary Stewart Lyle, Homemaking Education in the High School (New York, 1954), p. 129.

³⁴Gross and Crandall, pp. 16-20.

The other three home economics sources represent the ideas of many professional home economists involved in group work concerned with thinking. The views of home economics educators involved in a state project on the secondary education level are expressed in A Guide for Planning the Homemaking Program for Maine Schools.³⁵ Views on a national, professional level are expressed in a pamphlet, concerned with Teaching Processes of Thinking in Homemaking Education.³⁶ The Home Economics Education Branch of the United States Office of Education has published a series of four pamphlets designed to assist educators in utilizing the research approach in improving school practices in homemaking programs.³⁷ Research is seen by many home economists as one other term for thinking with emphasis upon scientific methods and thoroughness. Thus, this reference has been included as an indirect source of behaviors of thinking. In each of these three references, the major emphasis concerning the thinking process is from the viewpoint of possible methods for teaching others.

The education and home economics sources combined represent the ideas of many educators as to aspects of thinking that are basic to all subject matter areas and the adaptation of these basic ideas to a specific subject matter field by home economists.

³⁵A Guide for Planning the Homemaking Program for Maine Schools, Department of Education, Division of Vocational Education (Augusta, 1959).

³⁶Elizabeth Simpson and Louise Lemmon, Teaching Processes of Thinking in Homemaking Education, Department of Home Economics, National Education Association (Washington, 1959).

³⁷Selma Lippeatt, Adventuring in Research to Improve School Practices in Homemaking Programs - An Individual Approach, United States Department of Health, Education, and Welfare (Washington, 1956).

Presentation and Comparison of Behaviors

From the review of selected literature, elements involved in thinking, as identified by the various sources were placed in table form. The elements of thinking as seen by the educators are listed in Table I, page 21. Home economics education sources are listed in Table II, page 22. By this means a framework was obtained for comparing the various views. The listings represent direct quotes with the exception of statements by Smith and Tyler which have been condensed for the purpose of brevity.

As can be seen by viewing Table I, most of the educators have approached the thinking process from the viewpoint of behaviors and abilities. One exception is Russell who identified instead, the possible steps of thinking. Some of the educators refer to more general abilities while others refer to more specific behaviors.

In Table II, it can be seen that home economics educators have emphasized the steps within the thinking process. One exception is the identification of processes of thinking from the pamphlet published by the Department of Home Economics of the National Education Association. These processes of thinking refer indirectly to behaviors of thinking. It is interesting to note that though the combined sources contain different descriptive terms for thinking and vary in the degree of detail concerning the steps in the thinking process, still there appears to be close agreement as to actual aspects of thinking.

Perhaps the greatest difference between Table I and Table II is the viewpoint from which thinking is approached. The education sources selected are primarily concerned with exploring the thinking process and its characteristics. Most of the home economics education sources have

TABLE I

ELEMENTS OF THINKING AS IDENTIFIED BY LEADERS IN THE FIELD OF EDUCATION

ELOOM ³⁸ Intellectual Abilities and Skills	ELOOM & BRODER ³⁹ Differences Found in Problem- Solving Processes	BURTON et al. ⁴⁰ Behaviors of Effective Thinking	DRESSSEL AND MAYHEW ⁴¹ Brief List of Critical Thinking Abilities	RUSSELL ⁴² Steps which may Occur in the Thinking Process	SMITH AND TYLER ⁴³ Aspects and Behaviors of Thinking
COMPREHENSION ... refers to the type of understanding or apprehension such that the individual knows what is being communicated and can make use of the material or idea . . .	UNDERSTANDING OF THE NATURE OF THE PROBLEM Ability to start the problem (comprehension of directions) Ability to understand the specific problem presented	Recognizes and defines problems, identifies issues Formulates, extends and verifies feasible hypotheses	The ability to define a problem The ability to select pertinent information for the solution of a problem	The child's environment stimulates mental activity The orientation or initial direction of the thinking is established	INTERPRETATION OF DATA Perceiving relationships in data Recognizing limitations of data
APPLICATION The use of abstractions in particular and concrete situations	UNDERSTANDING OF THE IDEAS CONTAINED IN THE PROBLEM Ability to bring relevant knowledge to bear on the problem Ability to comprehend the ideas in the form presented in the problem	Collects, selects, or selectively recalls relevant data, differentiates between reliable and unreliable sources, between factual and nonfactual sources	The ability to recognize stated and unstated assumptions The ability to formulate and select relevant and promising hypotheses	The search for related materials take place There is a patterning of various ideas into some hypothesis or tentative conclusion	APPLICATION OF PRINCIPLES OF SCIENCE Selecting probable explanation or prediction applicable to the situation Justifying the explanation through the use of science principles and sound reasoning
ANALYSIS The breakdown of a communication into its constituent elements or parts such that the relative hierarchy of ideas is made clear and/or the relationship between the ideas expressed are made explicit	GENERAL APPROACH TO THE SOLUTION OF PROBLEMS Extent of thought about the problem Care and system in thinking about the problem Ability to follow through on a process of reasoning	Recognizes reliable experiments Draws reasonable inferences regarding cause and effect, logical implication, valid generalization, reliable prediction and accurate description	The ability to draw conclusions validly and to judge the validity of inferences	The deliberative, or critical, part of the thinking process is developed The concluding stage of the thinking process takes place when the hypothesis selected above is subjected to the test of use	APPLICATION OF PRINCIPLES OF LOGICAL REASONING Examining logical structure of argument and applying principles of logical reasoning Distinguishing between logical and illogical conclusions Isolating significant elements Recognizing application of logical principles
SYNTHESIS The putting together of elements and parts so as to form a whole	ATTITUDE TOWARD THE SOLUTION OF PROBLEMS Attitude toward reasoning Confidence in ability to solve problems Introduction of personal considerations into problem-solving	Recognizes and evaluates implicit assumptions, uses postulational arguments logically, recognizes relevant value systems and uses them reasonably Recognizes errors and fallacies Comes to decisions or conclusions, tests them, applies them to pertinent situations Applies semantic principles to language employed			NATURE OF PROOF Disposition to analyze proofs critically Recognizing basic assumptions Recognizing need for further data Determining validity of assumptions Recognizing fruitful ways for further study Accepting or rejecting assumptions tentatively Recognizing need for reconsideration with new data
EVALUATION Judgments about the value of materials and methods for given purposes					

³⁸Eloom, ed., pp. 204-207.

³⁹Eloom and Broder, pp. 106-109.

⁴⁰Burton, Kimbell, and King, pp. 267-268.

⁴¹Dressel and Mayhew, pp. 179-180.

⁴²Russell, *Children's Thinking*, pp. 15-16.

⁴³Smith and Tyler, pp. 38-129.

TABLE II

ELEMENTS OF THINKING AS IDENTIFIED BY HOME ECONOMICS EDUCATORS

HALL AND PAOLUCCI ⁴⁴	SPAFFORD ⁴⁵	WILLIAMSON AND LYLE ⁴⁶	OFFICE OF HOME ECONOMICS EDUCATION NEA ⁴⁷	GROSS AND CRANDALL ⁴⁸	MAINE ⁴⁹	H.E.E. BRANCH OF U. S. OFFICE OF EDUCATION ⁵⁰
Steps Involved in Critical Thinking	Basic Steps Involved in Sound Thinking	Steps in Problem-Solving	Processes of Thinking Which may be Taught in Homemaking Classes	Steps in Mental Process of Management	Steps in Problem-Solving	Research Approach for Improvement of School Practices
Identifying and defining the central issues	Recognizing and defining the problem	The problem is met and recognized as such	Comprehending and using language for discriminating communication	Planning	The problem is met and recognized as such	Identify the problem area
Recognizing the underlying assumptions and forming hypotheses	Proposing a solution	A decision is made to solve the problem	Thinking sequentially	Controlling the elements of the plan while carrying it through	A decision is made to try to solve the problem	Clarify the specific problem within the problem area . . .
Selecting and organizing relevant facts and evaluating the evidence	Gathering relevant information	The conditions are analyzed	Clarifying values	Evaluating results preparatory to future planning	The problem is defined and analyzed and goals are decided upon	Decide upon a possible solution and state the hypotheses to be tested
Drawing warranted conclusions	Examining and testing data	All available facts relating to the problem are gathered	Identifying and using facts		The teacher and pupils plan together how the goals can be accomplished	Plan how to test the hypothesis and keep records of what happens . . .
	Accepting an answer	These facts are evaluated and those which are considered irrelevant are discarded	Making comparisons	(Steps of Decision Making - the Basis for each step in Mental Process of Management)	A tentative solution is tried	Collect evidence as study progresses
		A tentative or trial solution is found	Perceiving relationships	Seeking alternatives	Test solution	Evaluate results and draw conclusions or inferences
		This solution is tested to see if it works	Drawing inferences	Thinking through the consequence of these alternatives	Summarize results and draw conclusions	Retest
		If it does not, the facts are reevaluated; other possible solutions are looked for; and a second solution is found and checked	Reaching warranted conclusions	Selecting one of these alternatives	Generalize and apply to other situations	
			Applying conclusions to other situations			

⁴⁴Hall and Paolucci, pp. 233-235.

⁴⁵Spafford, p. 147.

⁴⁶Williamson and Lyle, p. 129.

⁴⁷Simpson and Lemmon.

⁴⁸Gross and Crandall, pp. 16-20.

⁴⁹A Guide for Planning the Homemaking Program for Maine Schools, pp. 20-22.

⁵⁰Lippeatt.

approached thinking from the standpoint of helping teachers teach students to think. They have dealt with the process of thinking as a basis for possible methods of teaching others.

Since the elements of thinking as listed by educators and home economics educators have not been approached from the same point of view, complete uniformity is unlikely. However, in spite of the differences from which the elements of thinking were approached and in the terms used, there is much consistency among the sources listed as to behaviors that are important in the thinking process. For example, eleven of the thirteen references refer directly or indirectly to the importance of comprehending the problem. In view of the evidence presented in Tables I and II there would seem to be much more similarity than differences in the breakdown of elements involved in the thinking process.

Compilation of Possible Important Behaviors of Thinking

Tables I and II served as a framework for listing and analyzing elements of thinking as seen by six education sources and seven home economics education sources. Then an attempt was made to identify common elements which were characteristic of the viewpoints represented, in order to compile a list of important behaviors of thinking in home economics education.

The initial attempt resulted in very general behaviors. These were major behaviors identified by practically all of the sources in Tables I and II and were comparable to the large headings used for classification of behaviors in Table III. It was believed that the major behaviors identified were too general to be of help and that more specific behaviors were needed to clarify the process of thinking.

TABLE III
BEHAVIORS OF THINKING

COMPREHENDS PROBLEM

- A. REALIZES THAT A PROBLEM SEEMS TO NEED SOLVING
- B. ANALYZES NATURE OF THE PROBLEM
 - 1. Identifies what and/or who is involved in problem
 - 2. Comprehends 'setting' of problem
 - 3. Recognizes types of knowledge needed for solving
 - 4. Determines whether or not one is capable of solving the problem
- C. DEFINES PROBLEM WITH PRECISION
 - 1. Makes sure that key words are defined
 - 2. Recognizes central issues and main arguments even if obscured by details
 - 3. Subdivides compound problem into major parts
 - 4. Redefines problem by stating in own words

PLANNING FOR SOLUTION OF PROBLEM

- A. RECOGNIZES KEY ASSUMPTIONS
- B. IDENTIFIES POSSIBLE SOLUTIONS
 - 1. Produces sufficient hypotheses based on analysis of problem
 - 2. Recognizes that hypotheses may require modification in light of new data
- C. DRAWS REASONABLE INFERENCES
 - 1. Estimates consequences of possible solutions
 - 2. Is sensitive to the inability to accurately infer consequences
 - 3. Distinguishes among degrees of probability for which a consequence may or may not occur
- D. FORMULATES USEFUL HYPOTHESES
 - 1. States hypotheses so that test is possible
 - 2. States hypotheses that is compatible with existing knowledge
 - 3. States hypotheses that is relevant to present problems

SELECTS PERTINENT INFORMATION

- A. COLLECTS RELIABLE DATA
 - 1. Gathers available data related to problem
 - 2. Obtains data via different methods according to the nature of the problem
 - 3. Comprehends accurately various types of data
 - 4. Appraises data as to its reliability
 - 5. Accurately perceives relationships
 - 6. Discards irrelevant data
- B. INTERPRETS DATA IN LIGHT OF ORIGINAL HYPOTHESES
 - 1. Determines whether or not data supports hypotheses
 - 2. Judges weight of data
 - 3. Determines when data is sufficient
 - 4. Recognizes the limitations of data

TABLE III (CONTINUED)

MAKES DECISIONS REGARDING EXTENT THAT PROBLEM HAS BEEN SOLVED

- A. EVALUATES REASONING
 - 1. Evaluates bias and emotional factors in thinking of self and others
 - 2. Accurately applies logical process of deduction
 - 3. Accurately applies logical process of induction
 - 4. Recognizes errors and fallacies in reasoning
- B. TESTS HYPOTHESES
 - 1. Recognizes the importance of testing conclusions accurately against reality
 - 2. Evaluates appropriateness of various means of testing for present problem
 - 3. Recognizes tenativeness of conclusions and/or proof
- C. DRAWS VALID CONCLUSIONS
 - 1. Draws conclusions supported by sound inquiry
 - 2. Draws conclusions in accord with knowledge in a given field
- D. APPLIES CONCLUSIONS TO APPROPRIATE OR PERTINENT SITUATION
 - 1. Grasps general principles involved
 - 2. Can apply principles to other appropriate situations

The next step was an attempt to classify the more specific behaviors suggested by the various sources using the original general behaviors for classification purposes. The results of this step are shown in Table III. Then an attempt was made to use the behaviors in Table III as a basis for an instrument for rating actual student behaviors. As the instrument progressed, it became evident that the behaviors were too detailed and specific for this purpose. It was felt that while these behaviors might occur in the process of effective thinking, they could not be considered as essential to this process.

A further attempt was then made to eliminate the behaviors to possible essential behaviors involved in effective thinking. The results of this step are listed in Table IV, page 27, and are identified as "Possible Important Behaviors of Thinking". It was believed that these behaviors were basic to effective thinking regardless of the particular problem or situation and yet specific enough to help clarify the process of thinking.

The possible important behaviors of thinking were used in creating a student rating device. The four college supervisors, who used this device in connection with this study were asked to indicate the degree to which the behaviors were consistent with their own concept of thinking and the important behaviors involved. They were requested to indicate their opinion by choosing the appropriate response of "Completely", "To great extent", "To some extent", "To small extent", or "To no extent". Two of the supervisors chose a response of "Completely", one chose "To great extent", and one chose "To some extent". Though this was a very small sample, it was believed that it was one indication that professional home economics educators could agree to some extent that the

TABLE IV

POSSIBLE IMPORTANT BEHAVIORS OF EFFECTIVE THINKING

COMPREHENSION OF PROBLEMS

- Is sensitive to problem situations
- Defines problems accurately by defining key terms and issues
- Identifies central ideas and values involved
- Evaluates problem carefully before deciding to attempt solution

PLANNING FOR SOLUTION OF PROBLEMS

- Evaluates and makes use of present knowledge and resources in view of problem to be solved
- Identifies a number of possible solutions to problem
- Attempts to see possible and probable consequences of various solutions
- Recognizes assumptions
- Selects tentative solution which seems the most reasonable

SELECTION OF PERTINENT INFORMATION

- Recognizes the need for reliable evidence and facts
- Is adept in finding and organizing reliable data
- Is able to see data in relationship to original problem discarding that which is irrelevant
- Uses good judgment in evaluating data as to its sufficiency, reliability, and importance to original problem
- Is constantly aware of the limitations of data

DECIDING EXTENT TO WHICH PROBLEMS HAVE BEEN SOLVED

- Appraises the weight of data in light of tentative solutions and judges whether or not evidence supports this solution
- Recognizes various means of reliable testing of solution
- Draws reasonable conclusions based on sound inquiry and/or testing
- Recognizes the tentativeness of conclusions and proof
- Can and does apply general principles and conclusions to other appropriate situations

behaviors identified were important in the process of effective thinking.

In view of the many unknown characteristics of thinking, Table IV is not designed to be a complete or comprehensive list of behaviors of thinking. However, it does represent the writer's efforts to synthesize the views of others as to possible important behaviors that are involved in effective thinking.

CHAPTER IV

EXPLORING TECHNIQUES FOR EVALUATING IMPORTANT BEHAVIORS OF THINKING

The WGCTA has been recognized in the area of education as a standardized instrument and has been used extensively. According to Burton, the WGCTA is likely the most widely used test of critical thinking.⁵¹ One of the major objectives of this study was to explore the extent to which WGCTA evaluates important behaviors of thinking as identified. The achievement of this objective was attempted through, (1) identifying behaviors measured by WGCTA, (2) comparing behaviors measured by WGCTA with behaviors identified in the previous chapter, (3) analyzing WGCTA scores made by home economics education students, and (4) comparing WGCTA ratings with teacher and student ratings.

Identification of Behaviors Measured by WGCTA

The procedure used to become familiar with and to determine behaviors measured by the WGCTA was to study the instrument and the accompanying manual, to personally take the test, and to review literature which was concerned with its appraisal.

Identifying the nature of that which is to be evaluated and the behaviors involved therein is an essential and fundamental step in any process of evaluation. Watson's and Glaser's concept of critical thinking

⁵¹Burton, p. 439.

is presented in the test manual from which the following is taken.

Ability to think critically involves three things: (a) An attitude of wanting to have supporting evidence for opinions or conclusions before assuming them to be true. (b) Knowledge of the methods of logical inquiry which help determine the weight of different kinds of evidence and which help one to reach warranted conclusions. (c) Skill in employing the above attitude and knowledge. Briefly, a critical thinker effectively examines beliefs or proposals in the light of supporting evidence, of the relevant facts in the case, instead of jumping prematurely to a conclusion.⁵²

This concept of thinking seems to be in harmony with the ideas presented in Chapter II in that it includes the types of behavior described as basic to thinking.

According to the authors, the WGCTA is ". . . designed to provide problems and situations which require the application of some of the important abilities involved in critical thinking."⁵³ An attempt has been made to base the test items on problems and data which a citizen in a democracy might encounter in his daily life. The instrument is designed for use on a high school or college level and provides considerable normative data for either level. It contains ninety-nine test items. It is simple to administer and though no time limit is mandatory, it can be completed in less than forty minutes by most persons of secondary education level. It is simple to score by hand or by machine.

Originally the test was available in two forms, Am and Bm, which were judged by the test authors to be equated. At the time of this study, Form Bm was unavailable because of revision, thus Form Am was used and is referred to throughout the study.

⁵²Goodwin Watson and Edward M. Glaser, Watson-Glaser Critical Thinking Appraisal Manual (New York, 1952), p. 8.

⁵³Ibid., p. 1.

The WGCTA is made up of five subtests. Test 1: Inference includes twenty items. According to the authors it is "designed to sample ability to discriminate among degrees of truth or falsity or probability of certain inferences drawn from given facts of data".⁵⁴ In the test directions, an inference is defined as "a conclusion which a person draws from certain observed or supported facts". The exercises within this test begin with a statement of fact which is to be regarded as true. Possible inferences then follow which are to be judged as definitely true, probably true, insufficient data, probably false or definitely false.

Test 2: Recognition of Assumptions includes sixteen items. In the words of the test authors it is "designed to sample ability to recognize unstated assumptions in given assertions or propositions".⁵⁵ For subjects taking the test an assumption is defined as ". . . something supposed or taken for granted". A statement is made and then followed by proposed assumptions. The subject is to determine whether or not the proposed assumption is necessarily taken for granted in the original statement.

Test 3: Deduction includes twenty-five items. It is "designed to sample ability to reason deductively from given premises; to recognize the relation of implication between propositions; to determine whether what seems an implication or necessary inference between one proposition and another is indeed such".⁵⁶ The test items consist of two statements that are followed by proposed conclusions. The subjects are to determine

⁵⁴Ibid.

⁵⁵Ibid.

⁵⁶Ibid.

whether or not the conclusions necessarily follow from the statements given. Though approximately one-half of the statements are of a false nature, subjects are asked to consider them as true without exception.

Test 4: Interpretation includes twenty-four items. It is "designed to sample ability to weigh evidence and to distinguish between unwarranted generalizations and probable inferences which, though not conclusive or necessary, are warranted beyond a reasonable doubt".⁵⁷ Each test item consists of a short paragraph which is followed by proposed conclusions.

Test 5: Evaluation of Arguments consists of fourteen items. It is "designed to sample ability to distinguish between arguments which are strong and important to the question at issue and those which are weak and unimportant or irrelevant".⁵⁸ Subjects are asked to assume each argument as true.

A summary of the major behaviors of critical thinking measured by WGCTA are presented in Table V, page 33. It will be well to note once again that this instrument is an attempt to measure some of the important abilities involved in critical thinking.

A Comparison of Behaviors

A comparison of behaviors as identified and measured by WGCTA and those considered important in home economics education is presented in Table VI, page 34. From the data presented in this table it can be seen that the two lists have some behaviors in common. However, WGCTA does not attempt to measure all of the behaviors considered important in home

⁵⁷Ibid.

⁵⁸Ibid.

economics education. Perhaps one explanation for the differences of behaviors is a difference of emphasis within the thinking process. The WGCTA is primarily concerned with critical thinking abilities. Here the emphasis is on the evaluation or judgment of solutions that have been made. Thus, the behaviors which WGCTA attempts to measure emphasize the abilities needed to judge the extent to which a problem has been solved.

TABLE V
MAJOR BEHAVIORS MEASURED BY WGCTA

Sub-test	Behaviors Measured
Test 1: Inference	Ability to judge truth or falsity of inference drawn from given data
Test 2: Recognition of Assumptions	Ability to recognize unstated assumptions
Test 3: Deduction	Ability to reason deductively from given premises or to recognize necessary conclusions. Also the ability to see logical relationships between propositions
Test 4: Interpretation	Ability to distinguish between warranted and unwarranted generalizations and conclusions
Test 5: Evaluation of Arguments	Ability to distinguish between strong and weak arguments

Home economics educators are interested in the ability to select or devise solutions and solve problems in addition to evaluating solutions. Therefore, the important behaviors of thinking as related to home economics education are concerned with the entire process of thinking. These include the identification of problems, the gathering of data and consequently the finding of a solution. As can be seen in Table VI the

TABLE VI
IDENTIFICATION OF COMMON BEHAVIORS OF THINKING

Important Behaviors of Thinking as Related to Home Economics	Behaviors Measured by WGCTA
COMPREHENSION OF PROBLEMS	
<ul style="list-style-type: none"> Is sensitive to problem situations Defines problems accurately by defining key terms and issues Identifies central ideas and values involved Evaluates problem carefully before deciding to attempt solution 	
PLANNING FOR SOLUTION OF PROBLEMS	
<ul style="list-style-type: none"> Evaluates and makes use of present knowledge and resources in view of problem to be solved Identifies a number of possible solutions to a problem Attempts to see possible and probable consequences of various solutions Recognizes assumptions Selects tentative solution which seems the most reasonable 	<ul style="list-style-type: none"> Judges truth or falsity of inferences drawn from given data (Test 1) Recognizes unstated assumptions (Test 2) Sees logical relationships between propositions (Test 3)
SELECTION OF PERTINENT INFORMATION	
<ul style="list-style-type: none"> Recognizes the need for reliable evidence and facts Is adept in finding and organizing reliable data Is able to see data in relationship to original problem discarding that which is irrelevant Uses good judgment in evaluating data as to its sufficiency, reliability, and importance to original problem Is constantly aware of the limitations of data 	<ul style="list-style-type: none"> Sees logical relationships between propositions (Test 3)
DECIDING EXTENT TO WHICH PROBLEMS HAVE BEEN SOLVED	
<ul style="list-style-type: none"> Appraises the weight of data in light of tentative solutions and judges whether or not evidence supports this solution Recognizes various means of reliable testing of solution Draws reasonable conclusions based on sound inquiry and/or testing Recognizes the tentativeness of conclusions and proof Can and does apply general principles and conclusions to other appropriate situations 	<ul style="list-style-type: none"> Distinguishes between strong and weak arguments (Test 5) Reasons deductively from given premises or recognizes necessary conclusions (Test 3) Distinguishes between warranted and unwarranted generalizations and conclusions (Test 4) Sees logical relationships between propositions (Test 3)

majority of WGCTA behaviors are included in the home economics education behaviors labeled as "Deciding Extent to Which Problems Have Been Solved". In comparison, WGCTA measured none of the behaviors included by home economics educators in the "Comprehension of Problems" and very few of those included in the "Selection of Information".

Among the literature concerned with appraising the WGCTA is a study by Ennis,⁵⁹ who has extensively explored the thinking process and also worked with others who are leaders in this area. The objective of his study was to consider the validity of the WGCTA from a logical point of view. He noted the following as possible weaknesses of the WGCTA. In Test 1: Inference, students are given very little description of the situation and are asked to use common knowledge "which practically every person knows." Yet a fine degree of discrimination is required in the final answer. The fine discrimination required seems to be in contradiction to the amount of information given. Ennis also notes that the chronic doubter, one who never has sufficient evidence to draw conclusions, has good chances for satisfactory scores, particularly on Test 3: Deduction, and Test 4: Interpretation. Test 3 has eighteen out of twenty-five correct negative answers while Test 4 has nineteen out of twenty-four correct negative answers. One other criticism refers to Test 5: Evaluation of Arguments. In this test, subjects are asked to disassociate values from critical thinking but Ennis notes that these answers will necessarily vary with different value systems and that subjects are forced to use a value system in making their choice.

In analyzing the validity of the WGCTA it seems reasonable to

⁵⁹Robert H. Ennis, "An Appraisal of the Watson-Glaser Critical Thinking Appraisal," Journal of Educational Research, LII (December, 1958), pp. 155-158.

further question the realistic nature of thinking, when for the purpose of present decisions, one must necessarily assume as true that which one ordinarily assumes to be false. This is a requirement of students in Test 3: Deduction and Test 4: Evaluation of Arguments.

In conclusion, the behaviors which WGCTA attempts to measure are among those that were identified as being "Possible Important Behaviors of Effective Thinking in Home Economics Education". However, some of the behaviors identified as important in relation to home economics education are not included among those which the WGCTA attempts to measure. Thinking is a very complex process and it is improbable and perhaps unnecessary that any one instrument can or should measure the entire process. It would seem more important to expect and recognize the limitations of an available instrument such as the WGCTA.

Analyzation of WGCTA Scores

Subjects for this section of the study were twenty-four senior home economics education students enrolled in professional home economics education courses at Oklahoma State University during the spring of 1962. These twenty-four students had completed their student teaching and were at the end of their professional education block at the time the final data were obtained.

The WGCTA was administered to the subjects at the beginning and at the end of their professional education courses. An attempt was then made to identify general trends as to (1) changes which occurred between the times of testing and (2) possible strengths or weaknesses. The scores may be found in the Appendix, page 59.

General Test. Upon recommendation of the authors of the WGCTA and

in view of the small sample, the raw scores were converted into percentiles, by using the scale presented in the test manual. The bases for the percentiles were derived from college norms. These, in turn, are based on scores made by 1940 college freshmen in a large Eastern University. For further interpretation, the authors have suggested a five-level classification. This classification is presented in Table VII, and is used in further interpreting the findings of the study.

TABLE VII
CLASSIFICATION OF LEVELS OF THINKING

WGCTA Percentiles	Levels of Thinking
94 and over	I: Very High
70 - 93	II: High
32 - 69	III: Average
8 - 31	IV: Low
1 - 7	V: Very Low

The distribution of the subjects at the time of the first and second testing is presented in Table VIII, WGCTA Scores Made By 24 Home Economics Education Seniors. It can be seen that at the time of the first testing,

TABLE VIII
WGCTA SCORES MADE BY 24 HOME ECONOMICS EDUCATION SENIORS

Levels of Thinking	Distribution of Subjects	
	First Test	Second Test
I: Very High	2	3
II: High	6	5
III: Average	5	10
IV: Low	8	6
V: Very Low	3	0
Total	24	24

one-third of the students rated "Low" and that almost one-half of the students rated lower than "Average". However, at the time of the second testing, only one-fourth of the students rated lower than "Average". Thus, the greatest change in scores appeared in the "Average", "Low", and "Very Low" ratings where there was greater opportunity for students to improve their ratings.

Changes in scores significant enough to shift subjects from one level to another are tabulated in Table IX, page 39. By viewing this table, it can be seen that fifty percent of the students changed their "Level of Thinking" while the other fifty percent remained in the same level as at the time of the first testing. Although scores indicate that a total of twelve students had changes to different levels of thinking, one-third of these changes were negative. In other words, of those who changed their "Level of Thinking" two-thirds increased while one-third decreased.

The implication would seem to be that the thinking abilities of these students were less than when previously tested. It is difficult to believe that healthy individuals participating in the intellectual activities of university life would actually decrease in their ability to think effectively. In view of this belief, plus the fact that the changes in scores are very small, it seems reasonable to question the effectiveness of the WGCTA as an instrument precise enough to measure small changes in ability to think effectively.

Although the number of subjects in this study was small, the data concerning WGCTA scores are somewhat strengthened when compared with the findings of the study done by Lawson and Cozine. This study was based on two testings of WGCTA with an eighteen week interval between testings.

TABLE IX

CHANGES IN LEVELS OF THINKING MADE BY 24 HOME ECONOMICS EDUCATION SENIORS

Positive Changes		Negative Changes		No Change	
Levels of Thinking	Distribution of Subjects	Levels of Thinking	Distribution of Subjects	Levels of Thinking	Distribution of Subjects
II: High to I: Very High	1	II: High to III: Average	3	I: Very High	2
IV: Low to III: Average	3	III: Average to IV: Low	1	II: High	2
IV: Low to II: High	1			III: Average	3
V: Very Low to III: Average	2			IV: Low	5
				V: Very Low	-
Total	<u>8</u>	Total	<u>4</u>	Total	<u>12</u>

The following is a quote from the report of the study:

To determine the significance of the difference between the first and second administrations of the Watson-Glaser test, the "t" test was used. A critical ratio (or "t" score) of 0.96 was obtained. For significance at the 5% level, a "t" score as large as 2.03 would have been necessary. Therefore, this test indicates that there was no significant difference between the means obtained in the administration of the test the two times, indicating no particular gain or loss in thinking ability over the four-month period.⁶⁰

Data collected by Hedger involving two testings of the WGCTA with the second test given at longer intervals of time resulted in similar data.

In summary, an analysis of scores made by subjects on WGCTA at two times of testing show a small improvement in percentile scores and in distribution of subjects as to their level of thinking ability. Though changes in levels took place for one-half of the students tested, one-fourth of these changes were negative as to both percentile scores and level of thinking ability. Thus, changes were small and not always in a positive direction.

Individual Tests. In analyzing the scores made on sub-tests it was hoped to gain insight as to the behaviors involved where greatest change in scores took place and where students as a group rated highest and lowest.

Average scores on sub-tests at the time of the first and second testings and the percentage of these scores to possible scores are presented in Table X, page 41. By comparing the percentage of average scores to possible scores, the reader will note that the largest positive change in scores occurred between testings in Test 3: Deduction. This test emphasizes the behaviors of ability to see logical relationships

⁶⁰Lawson and Cozine, p. 6.

and to reason deductively. This might be an indication that greater improvement had been made by subjects in relation to this particular aspect of thinking. However, more data would be necessary before this conclusion could be drawn.

TABLE X
AVERAGE SCORES AND PERCENTAGES ON INDIVIDUAL
TESTS OF 24 SENIORS

Sub-test	No. of Items	1st Test Average		2nd Test Average	
		(score)	(per cent)	(score)	(per cent)
Test 1: Inference	20	11.8	59.2	12.4	62.1
Test 2: Recognition of Assumptions	16	11.4	71.4	12.4	77.3
Test 3: Deduction	25	17.7	70.7	20.8	79.2
Test 4: Interpretation	24	15.9	66.3	16.4	68.2
Test 5: Evaluation of Arguments	14	11.3	80.7	10.3	73.8

The students, as a group, rated highest on Test 2: Recognition of Assumptions and Test 3: Deduction at the time of the second testing. Behaviors in Test 2 involve recognition of unstated assumptions. The lowest rating was on Test 1: Inference which involves judging truth and falsity of inferences drawn from given data. These ratings could be indications of possible strengths and weaknesses of the group as a whole. However, further evidence is needed before such conclusions are made.

It is interesting to note that in his appraisal, Ennis strongly criticized Test 1: Inference for demanding fine discrimination in view of the amount of information given. Test 2 was not criticized. Tests

3 and 4 were criticized for the large proportion of correct negative answers. Test 5 was criticized for requiring the use of a value system in making decisions while students were asked to disassociate values from critical thinking.

Teacher Ratings

Teachers have a unique opportunity to observe the classroom behavior of students. It was believed that they would be one good source for evaluating the student's tendency to think effectively in a classroom situation. Thus, an attempt was made to compare the objective rating of the WCCTA as to the ability of the subjects to think effectively with a subjective rating obtained from a teacher. The college supervisor of the subject during the student teaching experience was chosen as the source of this evaluation.

The instrument for obtaining teacher ratings was developed on the basis of the possible important behaviors of effective thinking as identified in Chapter III. A copy of this instrument may be found in the Appendix, page 59. The teachers were asked to rate each student as to his performance in the comprehension of problems, the planning for solution of problems, the selection of pertinent information and deciding extent to which problems have been solved. In addition, teachers were asked to rate each student as to their general tendency to think effectively. The college supervisor was also asked to indicate the degree to which the device was consistent with her own concept of thinking and the important behaviors involved. The results of this question were given in Chapter III.

Each supervisor was responsible for a different number of students.

The number of students per supervisor varied from two to ten. The rating occurred about six weeks after the completion of the student teaching experience. However, at the time of the rating, supervisors still had classroom contact with the students.

A summary of the ratings given by the teachers are presented in Table XI. From the data presented in this table it can be seen that there is little indication that the group as a whole is a great deal stronger in one aspect of thinking than another. However, students were

TABLE XI
TEACHER RATINGS OF STUDENT THINKING BEHAVIORS

Distribution of Subjects According To Various Aspects of Thinking	Classification of Ratings				
	I: Very High	II: High	III: Average	IV: Low	V: Very Low
1: Comprehension of Problems	4	9	8	1	2
2: Planning for Solution of Problems	5	12	3	2	2
3: Selection of Pertinent Information	5	8	7	2	2
4: Deciding Extent to Which Problems Have Been Solved	3	11	7	1	2
5: Over-all Tendency to Think Effectively	5	11	5	1	2

rated slightly higher as to the tendency to plan for the effective solution of problems than on any other of the aspects of thinking. This rating is consistent with the information in Table X where the largest positive change between testings occurred on Test 3: Deduction which emphasizes the ability to see logical relationships and to reason

deductively. It is also consistent with the high average score at the time of the second testing which was made on Test 2: Recognition of Assumptions. However, the teacher rating is inconsistent with the low average score made at the time of the second testing on Test 1: Inference. The reader will remember that this study is based upon the belief that the behaviors required in each of these three tests are important in the ability to plan for effective solutions (Table V). The criticism of Ennis for Test 1: Inference as to the demand for fine discrimination in view of a small amount of information could lend insight into this apparent inconsistency.

The actual ratings given by the teachers are presented in the Appendix Table XIII, page 59. From these ratings, it can be seen that ratings for individual students varied little on the various aspects of thinking. Of the twenty-four subjects rated, thirteen were given the same rating for each part of the instrument. Of the other nine, ratings on different behaviors varied no more than one level. This could be an indication that ability in one aspect of thinking often equals the ability in other aspects of thinking. However, it could also be an indication of a lack of preciseness in the instrument used.

Student Conferences

Self-evaluation by the students as to their tendency to think effectively may give the teacher and student insight into individual strengths and weaknesses and needs in the area of thinking. It may also serve as motivation to improve thinking ability. Through student conferences, an attempt was made to see how subjective student self-ratings would compare with subjective teacher ratings and objective WGCTA

ratings. There was also an attempt to determine whether or not students had opinions as to their thinking tendencies.

At the time the WGCTA was given, individual appointments were held with each subject for the purpose of giving and explaining their test scores. This was an attempt to help create a meaningful learning experience which would increase the challenge of the tests for the subjects involved. The conferences involved only the individual subject and the writer and were approximately fifteen minutes in length.

At the time of the second testing, each student was given the results of the test taken and these results were compared with results of the first testing. In addition, an attempt was made to informally and briefly discuss effective thinking. This was done in terms of possible important behaviors involved and the place of subject matter, knowledge, and attitudes. Then an effort was made to obtain general opinions of the students as to how they viewed their tendency to think effectively and their possible strengths and weaknesses. Also, they were asked whether they believed growth had taken place in their ability to think effectively during the period they were taking professional courses.

Of the twenty-four subjects, all but one believed they had very definitely grown in their ability to think effectively between the first and second testing of WGCTA. Several subjects mentioned that they believed their greatest growth had been in the area of attitudes conducive to effective thinking.

Attitudes were also mentioned most often as the aspect of thinking in which they felt most confident or which was their greatest strength. (Eighteen of the twenty-four subjects expressed this opinion.) Two subjects identified their strengths as being able to recognize problems

and two felt that planning for solutions was their strong point, while two were reluctant to identify any strengths.

Weaknesses were identified most often with one or more of the major behaviors. Drawing valid conclusions was identified as being a weakness for nine of the twenty-four subjects, while planning for effective solutions was mentioned by six as being a weakness. Weaknesses mentioned by fewer students included; evaluating data, recognizing problems, and poor attitudes. Two students did not believe that they knew their weaknesses.

The self ratings of the subjects as to their tendency to think effectively may be found in the Appendix Table XIII, page 59. A summary of the ratings is presented in Table XII. Many of the students were reluctant to rate themselves as high or average but expressed belief that they rated between these two levels. Thus, a category, high average, has been included for the student ratings.

TABLE XII
STUDENT RATINGS OF THINKING BEHAVIORS

Classification of Ratings	Distribution of Subjects
I: Very High	1
II: High	3
High Average	9
III: Average	11
IV: Low	0
V: Very Low	0

It can be seen from the data presented in Table XII that no student rated himself below average in tendency to think effectively, while a large majority rated themselves as average or high average. It will be well to keep in mind that this was a very general approximation on the part of the students.

Results of the conferences with students would indicate that students are concerned as to their thinking effectiveness. It is also indicated that students do have views as to their strengths and weaknesses. It is to be expected that the ability of students to accurately self-evaluate themselves will vary with the individuals.

Comparison of WGCTA, Teacher and Student Ratings

A comparison of WGCTA, teacher, and student ratings is presented by means of Figure 1, page 48, which presents the three ratings for each individual subject. In order to make this comparison, the supervisors' rating, "General Tendency to Think Effectively" was used. It is assumed that this rating was the most representative of the general thinking behavior observed by the supervisors.

In comparing teacher ratings to WGCTA and student ratings it can be seen that as a group, the teachers have rated the subjects higher than either the WGCTA or the students themselves did. Teacher ratings are the same as or are higher than either of the other ratings for fifteen of the twenty-four subjects.

In contrast with teacher ratings, WGCTA ratings are lower than either teacher or students ratings. WGCTA ratings were lower than either of the other ratings for ten of the twenty-four subjects. WGCTA ratings were higher than either of the other ratings for only three subjects

Levels of Thinking
I: Very High

II: High

High Average

III: Average

IV: Low

V: Very Low

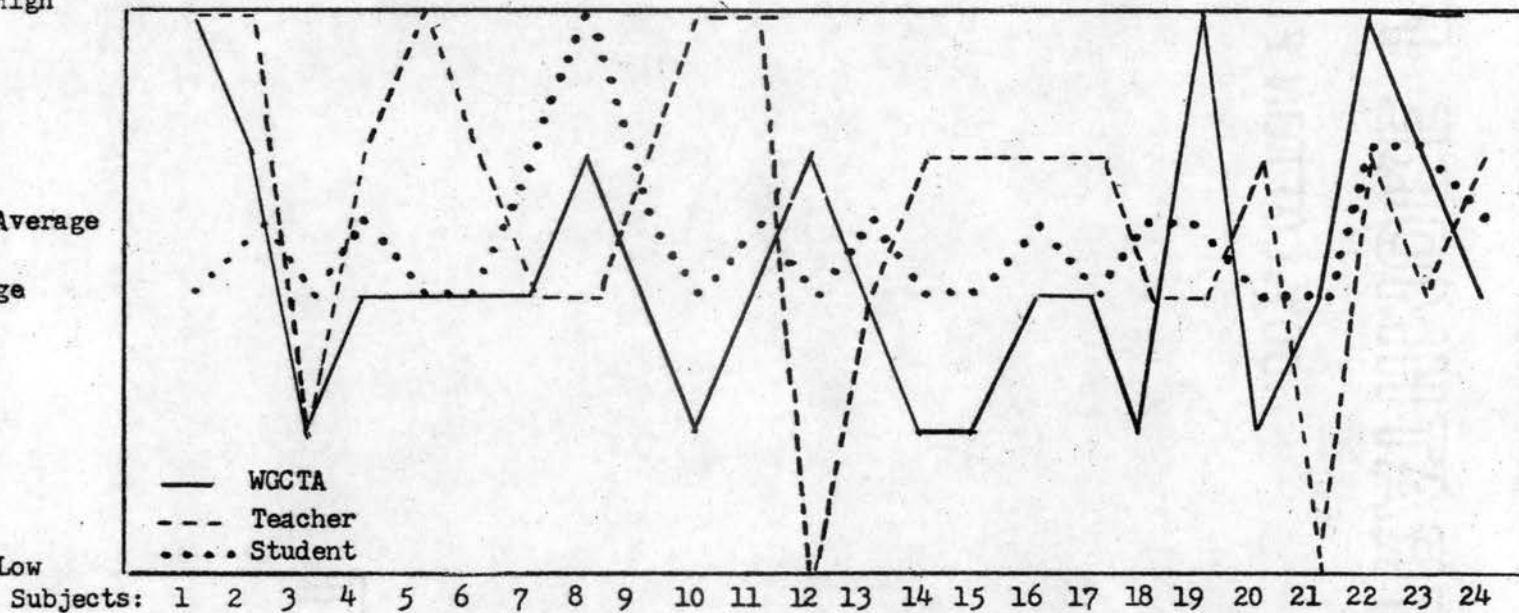


Figure 1. WGCTA, Teacher and Student Ratings of Individual Subjects

while eleven ratings were the same as or in between the other two ratings.

In comparing student ratings with WGCTA and teacher ratings it will be noted that they form the "happy medium" between WGCTA and teacher ratings. Two of the twenty-four students rated themselves lower than either teachers or WGCTA while four rated themselves higher than either teachers or WGCTA. Of the total subjects involved, three-fourths of them rated themselves the same as did WGCTA or their supervisors or somewhere between these two ratings. Ten of the twenty-four subjects gave themselves ratings which fell between the teacher and WGCTA ratings.

As to consistency of the three ratings, of the twenty-four subjects none received completely consistent ratings. Eleven received ratings differing one level or less while eleven received ratings differing two levels or less. Two subjects received ratings differing three levels or less. This degree of consistency might be helpful in giving a very general insight as to students' ability to think, as to possible low, average, or high ability.

Since one-half of the ratings differ no more than one level of thinking and an equal number differ only two levels, it can be concluded that there is a very general consistency between WGCTA, teacher, and student ratings.

Summary

The WGCTA is made up of test items based on problems a citizen in a democracy might frequently encounter. It is a test adaptable for high school and college use with norms available for each group. It is made up of five sub-tests which attempt to measure different behaviors. The validity of the test has been questioned from the standpoint of the

degree of discrimination required in comparison with information given, the number of correct negative answers as compared with the number of correct positive answers, the necessity of using a value system in making final choices, and the necessity of assuming as true, ideas that are ordinarily believed to be false.

The behaviors measured by WGCTA are among those identified as being possible important behaviors of effective thinking in home economics education. However, some of the possible important behaviors identified in this study are not included in the WGCTA.

The WGCTA was administered to home economics education students at the beginning and end of their professional studies. The changes in scores were very small and not always in a positive direction.

Teacher ratings showed a slight definite strength on the part of the subjects' ability to plan for effective solutions as one aspect within the thinking process.

Student self-ratings presented attitudes as a possible strength while the ability to draw valid conclusions was the most frequently mentioned weakness. A majority of students rated themselves average or slightly above average as to their tendency to think effectively.

In comparing WGCTA with the teacher and student ratings, for a majority of students, teacher ratings were somewhat higher than either WGCTA or student ratings while WGCTA ratings were for the most part lower than the other two ratings. The majority of student ratings fell somewhere between WGCTA and teacher ratings. However, there is a degree of consistency among the ratings, though the consistency is of a very general nature.

CHAPTER V

SUMMARY AND CONCLUSIONS

The ability of individuals to think effectively according to their ability determines the strength of our democratic society and constitutes the major goal of all education. The general purpose of this study was to identify important behaviors of thinking as related to home economics education and to explore the extent to which WGCTA evaluates these behaviors.

The major objectives for the study were:

- I. To identify important behaviors involved in thinking related to home economics education.
- II. To determine the extent to which the Watson-Glaser Critical Thinking Appraisal evaluates these behaviors.

The specific objectives involved in achieving the second objective were:

1. To review behaviors that WGCTA measures.
2. To compare these behaviors with those identified as important in home economics education.
3. To determine what insight can be gained by analyzing WGCTA scores.
4. To compare WGCTA ratings with teacher and student ratings.

In order to achieve these objectives, literature was reviewed and ideas of educators and home economics educators were obtained concerning aspects of thinking. From these various viewpoints, behaviors of thinking were synthesized (Table IV).

The WGCTA was reviewed to identify behaviors measured by this instrument. These behaviors were compared with those synthesized by the writer from the viewpoints of educators and home economics educators to determine the consistency of these behaviors. The WGCTA was administered to twenty-four home economics education students at the beginning and once again at the end of their professional courses. The scores made by the subjects at the two testings were analyzed as to changes occurring between testings and possible strengths and weaknesses of the students' thinking abilities.

A teacher rating device was developed on the basis of the behaviors identified by the writer. This instrument was used by college supervisors to rate the subjects as to tendencies to think effectively.

Conferences were held with the individual subjects and student ratings were obtained as to the ability of the subjects to think effectively and as to possible growth, strengths and weaknesses in this area.

An attempt was made to determine the degree of consistency among WGCTA, teacher and student ratings.

The study was an exploratory one in which the techniques were not validated and the number of subjects was small. With these limitations in mind, the following possible tentative conclusions related to the objectives are presented:

1. Some important behaviors of thinking as related to home economics education have been identified. These are listed under the following general headings: Comprehension of Problems, Planning for Solution of Problems, Selection of Pertinent Information, and Deciding the Extent to Which Problems Have Been Solved.

2. The WGCTA evaluates only some of the behaviors seen by home economics educators and others as important to the ability to think effectively.
3. It is questionable, from the analysis of the data, whether or not the WGCTA accurately measured fine growth.
4. There was a very general type of consistency among WGCTA, teacher, and student ratings as to the ability of the subjects to think effectively.

To strengthen other similar or related studies, the following suggestions are offered. An enlargement of the number of subjects would allow for a more detailed analysis and the use of statistics, thus increasing the validity of the findings.

The device used and the procedure for obtaining teacher ratings could be further refined. One of the major concerns expressed by the supervisors was their inability to judge and rate the thinking behaviors defined by the instrument. The teachers seemed to feel the task a very difficult one to do with reasonable accuracy. The device was presented to the supervisors some time after they had observed students doing student teaching. Some of the supervisors suggested that the instrument could have been more accurately used had it been available at the time of actual observation of the subjects. Two of the teachers also expressed concern as to whether they really understood the instrument, thus suggesting that the instrument might be simplified and accompanied by more specific explanation for greater accuracy. It is believed that further refining and testing of the rating device would further validate the findings.

It is also believed that findings would be more valid if the same person was responsible for student conferences, teacher ratings, and

helping students achieve the objective of more effective thinking.

It is believed that this study and the objectives involved are a primary step to further exploration in the area of thinking in relation to home economics education. Other possible research which would be related to, and for which this study might be helpful includes:

1. An instrument designed to measure the possible important behaviors of thinking as related to home economics education.
2. Direct contact with professional home economics educators to obtain specific viewpoints concerning important behaviors of thinking.
3. A study to determine the degree of agreement among home economics educators as to important behaviors of thinking.
4. A refined device to obtain teacher ratings of students' tendency to think effectively.
5. A refined technique to obtain students' opinions as to their ability to think effectively.
6. A study involving teacher, student, and WGCTA ratings in an attempt to determine the extent of growth in ability to think effectively for a specified time interval.
7. Attempts to determine methods and techniques of teaching which encourage growth in ability to think effectively.

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A P P E N D I X

TABLE XIII
WGCTA, TEACHER, AND STUDENT RATINGS

Subjects	WGCTA Scores - 1st Test									WGCTA Scores - 2nd Test									Teacher Ratings					
	Maximum Score	1: Inference	2: Recognition of Assumptions	3: Deduction	4: Interpretation	5: Evaluation of Arguments	Total Test Score	Percentile Rank	WGCTA Rating	Maximum Score	1: Inference	2: Recognition of Assumptions	3: Deduction	4: Interpretation	5: Evaluation of Arguments	Total Test Score	Percentile Rank	WGCTA Rating	1: Comprehension of Problem	2: Planning for Solution of Problem	3: Selection of Pertinent Information	4: Deciding Extent to Which Problems Have Been Solved	Over-all Tendency to Think Effectively	Student Self-Ratings
1	20	13	15	23	19	14	84	97	I	20	14	15	24	20	13	86	99	I	II	I	I	II	I	II
2	20	14	12	20	13	13	72	57	III	20	15	15	25	14	10	79	86	II	I	I	I	II	I	III*
3	20	13	8	17	13	11	62	20	IV	20	10	12	16	18	8	64	26	IV	IV	IV	IV	IV	IV	III
4	20	10	13	17	13	11	64	26	IV	20	14	14	24	12	9	73	61	III	II	II	II	II	II	III*
5	20	14	10	11	10	8	53	5	V	20	12	13	21	19	9	74	66	III	I	I	I	I	I	III
6	20	10	9	15	19	11	64	26	IV	20	13	11	19	16	11	70	49	III	III	II	III	II	II	III
7	20	11	9	21	20	14	75	71	II	20	14	3	23	20	11	71	53	III	III	II	III	III	III	II
8	20	16	13	16	22	11	78	84	II	20	16	15	19	20	11	81	93	II	II	III	III	III	III	I
9	20	14	13	19	13	12	71	53	III	20	12	14	19	13	12	70	49	III	III	II	II	II	II	III*
10	20	11	12	18	18	10	69	45	III	20	14	11	16	12	11	64	26	IV	I	I	I	I	I	III
11	20	12	13	15	18	12	70	49	III	20	16	13	14	18	12	73	61	III	I	I	I	I	I	III*
12	20	10	7	17	14	9	57	9	IV	20	12	14	23	17	10	76	76	II	V	V	V	V	V	III
13	20	12	14	16	16	10	68	41	III	20	14	13	20	15	10	72	57	III	III	III	III	III	III	III
14	20	11	6	16	14	11	60	15	IV	20	10	7	18	18	11	64	26	IV	II	II	II	II	II	III
15	20	9	11	18	15	10	63	23	IV	20	8	11	20	8	10	57	9	IV	II	II	III	III	II	III
16	20	13	13	24	16	13	79	88	II	20	12	13	19	14	12	70	49	III	II	II	II	II	II	III*
17	20	9	11	15	19	11	65	30	IV	20	12	14	15	16	11	68	41	III	II	II	II	II	II	III
18	20	9	9	16	15	10	59	13	IV	20	10	10	16	17	10	63	23	IV	II	II	III	III	III	III*
19	20	14	15	19	16	14	78	80	II	20	14	16	21	19	12	82	95	I	III	III	III	III	III	III*
20	20	9	13	16	16	11	65	30	IV	20	7	14	16	18	10	65	30	IV	III	II	II	II	II	III
21	20	6	6	9	11	7	39	1	V	20	12	9	22	14	10	67	37	III	V	V	V	V	V	III
22	20	15	15	22	20	13	85	98	I	20	15	14	25	23	11	88	99*	I	III	II	II	II	II	III
23	20	15	12	23	16	11	77	80	II	20	12	15	23	16	11	77	80	II	III	IV	IV	III	III	III
24	20	14	15	19	16	14	78	85	II	20	10	11	17	16	3	67	37	III	II	II	II	II	II	III*

*Denotes rating of High Average.

TEACHER RATING OF STUDENT'S THINKING BEHAVIORS IN
HOME ECONOMICS EDUCATION

Name of Student _____ Name of Rater _____

EXPLANATION:

The following device is a part of a study attempting to explore possible interpretations of scores made on the Watson-Glaser Critical Thinking Appraisal. The purpose of this device is to obtain the college supervisor's subjective rating of the student's tendency to think effectively. This is to be compared with results of the Watson-Glaser Test.

All papers will be considered confidential. No names will be identified in the study. The ratings may be returned at your convenience.

Your help will be sincerely appreciated.

DIRECTIONS:

The following device identifies behaviors which are felt to be important in effective thinking. It is hoped that a careful estimate of the extent to which the student usually performs these behaviors in appropriate situations will give an index of her tendency to think effectively. These ratings should represent your best estimate of the student's typical behavior as you have observed it within Home Economics Education and general situations.

<p>I. BEHAVIORS OF THINKING</p> <p>Rate each of the four aspects of thinking evaluating the student's typical behavior as compared to the behaviors identified. Check the over-all quality of behaviors by placing a check in the appropriate place.</p>	Excellent	Superior	Average	Somewhat	Unsatisfactory	Very	Unsatisfactory
<p>COMPREHENSION OF PROBLEMS</p>							
<p>Is sensitive to problem situations; defines problems accurately by defining key terms and issues; identifies central ideas and values involved; evaluates problem carefully before deciding to attempt a solution.</p>							
<p>PLANNING FOR SOLUTION OF PROBLEMS</p>							
<p>Evaluates and makes use of present knowledge and resources in view of problem to be solved; identifies a number of possible solutions to problem; attempts to see possible and probable consequences of various solutions; recognizes</p>							

TEACHER RATING OF STUDENT'S THINKING BEHAVIORS IN
HOME ECONOMICS EDUCATION (CONTINUED)

	Excellent	Superior	Average	Somewhat	Unsatisfactory	Very	Unsatisfactory
assumptions (that part of problem which is taken for granted and which may be stated or implied); selects tentative solution (hypothesis) which seems the most reasonable.							
SELECTION OF PERTINENT INFORMATION							
Recognizes the need for reliable evidence and facts; is adept in finding and organizing reliable data; is able to see data in relationship to original problem, discarding that which is irrelevant; uses good judgment in evaluating data as to its sufficiency, reliability, and importance to original problem; is constantly aware of the limitations of data.							
DECIDING EXTENT TO WHICH PROBLEMS HAVE BEEN SOLVED							
Appraises the weight of data in light of tentative solutions (hypothesis) and judges whether or not evidence supports this solution; recognizes various means of reliable testing of solution; draws reasonable conclusions based on sound inquiry and/or testing; recognizes the tentativeness of conclusions and proof; can and does apply general principles and conclusions to other appropriate situations.							
II. GENERAL TENDENCY TO THINK EFFECTIVELY							
It is felt that the tendency to do effective thinking is more than the sum total of the preceding behaviors. Though it is felt these behaviors are important, other factors which seem to be involved include sufficient knowledge of subject matter and attitudes conducive to effective thinking, such as intellectual curiosity, open-mindedness, desire to do effective thinking and suspended judgment.							
On the basis of your observations, how would you rate this student in her total tendency to think effectively?							

TEACHER RATING OF STUDENT'S THINKING BEHAVIORS IN
HOME ECONOMICS EDUCATION (CONTINUED)

III. COLLEGE SUPERVISOR'S OPINION

This part of device need be checked only one time by each rater. Please circle the appropriate response.

To what degree do you feel thinking as presented in the above device is consistent with your own concept of thinking and the important behaviors involved?

Completely

To great extent

To some extent

To small extent

To no extent

VITA

Betty Sue Hall

Candidate for the Degree of

Master of Science

Thesis: EXPLORATORY STUDY OF EFFECTIVE THINKING AS RELATED TO HOME
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