USING THE CREATIVE STRENGTHS OF A LEARNING DISABLED CHILD TO INCREASE EVALUATIVE EFFORT AND ACADEMIC ACHIEVEMENT

Dissertation for the Degree of Ph. D.

MICHIGAN STATE UNIVERSITY

NANCY ALLAN CARLSON

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presented by

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has been accepted towards fulfillment
of the requirements for

Ph.D. degree in Education

Major professor

Date 4-30-74

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ABSTRACT

USING THE CREATIVE STRENGTHS OF A LEARNING DISABLED CHILD TO INCREASE EVALUATIVE EFFORT AND ACADEMIC ACHIEVEMENT

By

Nancy Allan Carlson

In the field of learning disabilities, the philosophy of treatment has primarily been based on a deficit model. In this dissertation an alternative treatment model with a focus on the learner's strengths and not weaknesses has been explored. This exploratory study focuses on the intensive look at a specific program planned, implemented and evaluated with a young learning disabled child. By focusing on strengths in creative thinking abilities and activating evaluative effort on the part of the child, this child was expected to show gains in specific behaviors related to academic and social performance.

Procedures of the Study

The intensive design which was followed in this study was diagrammed in terms of the multiple baseline-successive treatments model. In the three baseline periods, alternate or the same forms of fifteen research instruments were used to measure 34 research variables. The objectives to be met in using these research instruments were: (1) to evaluate change in academic achievement, (2) to confirm a profile of

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creative strengths (creative positives), and (3) to evaluate change in evaluative effort of the child. Thirty research questions were stated to assist in decision-making relating to the above objectives.

The two successive treatment programs were described in detail with exemplars and flow charts included to aid the description. In the first treatment the goal was to create an environment that would stimulate creative thinking abilities in the child; in the second treatment, the goal was to set an environment which allowed utilization of these creative thinking abilities to activate evaluative effort on the part of the child.

The rationale and procedures for administering, scoring and analyzing the measures were detailed to allow for later discussion relating to the usefulness of these measures in a diagnostic battery which might be used with a learning disabled child.

Findings of the Study

Of the ten measures used in this study to assess change in academic achievement, five gave results indicating a change in a positive direction--i.e., improvement; three gave results indicating no change in performance, and with two, the child was performing at competency level on the pre test.

It was possible to create a profile of creative positives (creative strengths) by using the figural and verbal standardized measures of creativity selected for this study. This profile was substantiated by the findings related to the child's verbal responses throughout, particularly the number of clarifying questions asked and

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clarifying comments offered, both seemingly related to creative behaviors. The profile for this child thus obtained was: Fluency, a dependable strength; Elaboration, a dependable strength; Originality, a strength occasionally; and Flexibility, seldom a strength.

The measures used to assess evaluative effort on the part of the child seemed to indicate a rather substantial change in her behavior. She asked for less external evaluation or judgement, she strayed from the task less often, the nature of her comments became more goal-directed and she seemed to have perceptions that were similar to the experimenter's.

For a diagnostic battery that is to be used to plan and evaluate a treatment program, the most appropriate measures are those that give more information regarding academically and socially relevant tasks (particularly criterion measures) and that can be used over time. The creativity measures in this study provided useful information regarding creative thinking abilities and were fun to administer and to take. The verbal Response Form used in this study was the most useful as it provided information regarding the frequency, magnitude and variability of the child's verbal behaviors throughout the entire course of the study. It is, however, exceedingly time consuming to classify and analyze, but the patience and concern of the researcher will be rewarded. Tape recording and transcribing all sessions provided a permanent and complete record and was an invaluable tool in analysis of the data.

This learning disabled child's extreme variability in behavior at the beginning of the study decreased over time. The type of

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behavior that she could be expected to exhibit became much more predictable and appropriate during the course of the study.

Other characteristics of this learning disabled child's behavior are described: a rigid "learning set" or inability to be flexible; a tendency toward elaboration, fluency, and originality; involvement in the process of evaluation; ability to comprehend and use objectives and criterion-referenced standards of behavior.

Suggestions for future learning disability research include: research that focuses on a learner's strengths and not weaknesses; research that focuses on employing the child's evaluative abilities; research that would explore different treatment models than the traditional remediation model; research that focuses on the diagnostic and treatment usefulness of current assessment tools; and research that follows the intensive design or the careful observation and detailed and descriptive analysis of the performance of one individual.

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USING THE CREATIVE STRENGTHS OF A LEARNING DISABLED CHILD TO INCREASE EVALUATIVE EFFORT AND ACADEMIC ACHIEVEMENT

By

Nancy Allan Carlson

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Elementary and Special Education

1974

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With Deepest Appreciation

Fran knew, as I learned, that all of us represent ourselves to others in different ways. Some of us are articulate with words, others are expressive in a non-verbal way--through the medium of art or music or movement or just human awareness. Fran believed in this implicity, and what is more important, she communicated that belief to others. For me, it was the final touch I needed to begin what I hope will be a life-long effort to try to allow children to be recognized and appreciated when they attempt to communicate what is unique about themselves.

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ACKNOWLEDGMENTS

"A journey of a thousand miles must begin with a single step."

Lau Tzu

There are many people to whom a debt of gratitude is owed for allowing that single step to be taken. It is humanly and conceptually impossible to prioritize these marvelous human beings, since many "categories" overlap. Let me, therefore, acknowledge and thank each of them to the best of my ability and give special thanks:

To Christine, the child in this study, who represents life and beauty in very exceptional ways.

To her parents, Amanda and Bill, whose wisdom, warmth, and enthusiasm allow their children and all those around them to benefit.

To Abby, her sister, a child who is growing and learning from so many rich experiences.

To Frank Bruno, my advisor, who has spent many, many hours helping to organize and conceptualize this undertaking, and who has spent years helping me develop sensitivity and awareness of others.

To many other professional colleagues and friends who helped in unique and understanding ways. Foremost among those who deserve special recognition are: Lou Alonso, Perry Lanier, Larry Alexander, J. Edwin Keller, Chuck Mange, Ted Ward, Joe Levine and Bill Sweetland.

To Lin Horenstein, Cindy Lafkas and Mac Marzke, three close friends who contributed in many helpful ways.

To E. Paul Torrance, without whom this undertaking would have had significantly less credibility.

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And, of course, to all those terribly important "significant others" who, over the years, have given to me faith, understanding and latitude to grow and learn--not the least of whom are my parents, my sisters and brother and my own two marvelous sons, who have shown fortitude well beyond their years.

"You have touched me and I have grown."

Author unknown

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CHAPTER I

THE PROBLEM

Need

In the field generally known as "learning disabilities," some very interesting and seemingly paradoxical questions are beginning to emerge. In an effort to help children achieve maximum potential, regular and special educators are developing and using a wide range of diagnostic and remedial measures, often with dissimilar results.

One of the underlying philosophies of remediation often heard or read about is "teach through the strengths to remediate deficits" (Kirk and Kirk, 1971). Deficits are argued to be measurable and countable, with available instruments. Strengths--for the most part--appear to be those abilities that are not diagnosed as deficits. And yet, even with the loose definition of "strengths," in practice, there is not a reliable, practical way to isolate and teach through the strengths. In fact, strengths are often forgotten in the maximal effort to remediate deficits.

A few individuals have recently been working with some more unusual measures to tap strengths. E. Paul Torrance and his associates have spent several years developing procedures to enhance the cognitive processes of divergent production, and instruments to measure creative thinking abilities. Renzulli, working with disadvantaged youngsters (1973) and Frierson (1973) at the Nashville Learning Center, have

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suggested a few procedures to encourage creativity and divergent thinking processes. The assumption these researchers make is that creativity is a strength. Torrance, Renzulli and Frierson all feel their findings regarding the creative process have implications for certain children with learning disabilities.

It was not just in an attempt to identify strengths that this exploratory study was undertaken, it is because deficit-centered remediation programs that are based solely on "getting the child up to norms," have a built-in capacity to ultimately be self-defeating. Even in a warm atmosphere, a child may experience the frustration of being viewed as "different"--in the negative sense of the word. As Guilford (1967) says:

> The child is faced with norms: height norms, weight norms, I.Q. norms, age-grade norms, and aptitude achievement norms. Too much attention to norms arouses fear of being different, which is too readily interpreted as being abnormal. There is often a general pressuring of school children toward mediocrity. Each child is expected to be "well-rounded" and "well-adjusted," where adjustment probably means conformity to someone's ideal personality pattern, a pattern that would minimize individuality and independence of thought and values (p. 334).

When Torrance (1970a) suggests what he considers essential requirements for an instructional program, he states:

> (we must) respect each child's individuality and aid him in achieving a healthy, strong sense of identity...reject the assumption that giving attention to deficiencies motivates proper behavior and instead accept the more realistic belief that giving attention to successful behavior motivates attainment of potentialities...recognize that each person is unique and has particular strengths that must be valued...accept the fact that our strength is in our diversity (p. 206).

In seeking an area in which to find strengths, the choice of divergent productive thinking was not an arbitrary one. Development

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of divergent thinking and production abilities is seldom encouraged in today's schools, (Williams, 1972) and almost never is employed with children who have learning problems. The need can be seen, not just on an individual basis, but as a far greater need for society in general. As Toynbee (1964) says in an article entitled "Is America Neglecting Her Creative Minority?":

> To give a fair chance to potential creativity is a matter of life or death for any society. This is all-important because the outstanding creative ability of a fairly small percentage of the population is mankind's ultimate asset, and the only one with which only man has been endowed (p. 4).

McCandless (1967) supports this by stating: "In summary, the field of creativity seems to be well worth studying. Any method whereby the innovator and originator...can be identified and guided is well worth employing and certainly deserves study" (p. 333).

But creativity doesn't just appear in blazing lights on a child's forehead, it must be sought out. A deliberate attempt must be made to find it. Most deliberate attempts in today's remediation programs are to find and assess certain "splinter skills" in the psychomotor area and in the cognitive area of convergent production. Other possible goals of a treatment program, such as social competence, independence, self-sufficiency and effective thinking and feeling, are by-passed in favor of objectives which are easier to define and evaluate by the remediator or person administering the treatment.

But what if the <u>child</u> were to be the evaluator? Guilford (1971) mentions that evaluation is often part of the process of divergent thinking. Wouldn't the goals of social competence, independence and so forth better be served by teaching a child to evaluate his own work?

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A learning disabled child is seldom given this opportunity. In fact, learning disability programs often have dependent learners as their end products (Thompson, 1968). If a child is to be an effective learner in our society, he must learn the process of evaluation to better enable him to take responsibility for his own academic and social behavior. There is, therefore, a need to systematically teach a child to evaluate his own work.

Even if one agrees that deficit-centered remediation isn't the whole answer, and that it is meritorious to consider developing or enhancing creative potential and evaluative effort, there still exist some problems. The field of learning disabilities has emerged so quickly that there is now a huge body of information which has yet to be organized in a meaningful manner. The tendency in special education is away from the etiological or causative model, but educators and allied professionals have not yet gained sufficient expertise to employ the diagnostic/prescriptive model from a standpoint of total individualization. Sapir and Nitzburg (1973) state it thus:

> We do not believe it is possible to isolate learning problems from every other aspect of the growing child. The separation of diagnosis from treatment and the isolation of each area of remediation limit the possibility of helping the child.... (The child specialist) must understand the child's feelings as well as his thinking processes and also how to analyze a cognitive task, determine a child's learning style and relate it to the child's personality and temperament.

If fragmenting one child into diagnostic pieces is educationally frustrating, what of the problems of arbitrarily grouping many children with similar educational labels? With an increasing emphasis on individualizing instruction in today's schools, and especially with

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respect to children with learning problems, there is a need for research that is concerned with the study of an individual, rather than the study of a group of individuals. In an analysis of this same need in counseling research (logically equatable with research on children with learning problems) Thoreson (1972) states:

> What remains missing in counseling research is careful observation and critical description of individual performance. Somehow this kind of scientific behavior has been bypassed (pp. 2-3).

And again he advocates:

> The counseling researcher in particular must be concerned with creating knowledge about treatment effects with particular individuals. The primary concern...is not with populations but with particular individuals with certain kinds of problems (p. 11).

The medical profession is no longer totally responsible for the diagnostic/remediation program assigned to a learning disabled child. Regular and special classroom teachers and resource teachers are becoming increasingly involved in planning treatment programs. These teachers appear eager to learn a process whereby they can help a learning disabled child succeed in all areas of school learning. Their major responsibility, however, continues to be in the areas of academic achievement. The process described in this study does focus on improving certain academic skills as well as the evaluative effort of the child in question. That it does so by focusing on the creative thinking abilities is a unique aspect of this study.

In many communities, a teacher may be assisted by additional personnel who are qualified to give sophisticated batteries of intelligence, personality and interest tests. Nevertheless, it would be

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comforting to know that one person, a teacher, could if necessary obtain sufficient information to capably organize a treatment program for certain types of children. To do so, a teacher would have to have as much information as possible. The processes and procedures in this study are teacher/child oriented. The selection and description are based on the belief that the teacher is indeed a critical variable.

The above statements emphasize the need for descriptively articulating and evaluating a diagnostic/treatment program that is based on a learner's creative strengths and evaluative effort, while acknowledging and accommodating for the learner's deficits.

Klees and Leebrun (1972) advocated the "need for in-depth study of the cases of clever but dyslexic children, making new hypotheses for research" (p. 14). That is precisely what this study is.

Purpose

This exploratory study seeks to identify a diagnostic battery which will provide sufficient information to plan an academic treatment program for a learning disabled child with an emphasis on the learner's strengths rather than weaknesses. In this study, the first of two consecutive treatment programs had as its goal setting an environment that stimulated the child's creative thinking abilities. These abilities would then be analyzed to develop a creativity profile or index of the child's creative strengths. The second treatment program had as its goal setting an environment which allowed utilization of creative thinking abilities to activate evaluative effort on the part of the child. The intent is to find out what effects these two programs have

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Research Questions

Many research problems emerge from a careful analysis of the explicit need to better serve a learning disabled child in today's society. One problem has to do with what actually happens when one attempts to "teach for creativity" with a learning disabled child. In other words, what effects will "teaching for creativity" have on the academic achievement, creative thinking abilities and evaluative abilities of a learning disabled child?

The above problem is broken down into broad research questions on the following pages. These research questions are further broken down and restated in measurable terms in Chapter III. Specific measurement devices and procedures to evaluate academic achievement, creative thinking abilities and evaluative effort will be detailed both in Chapter III and in the Appendix.

Although the effects of the two treatment programs will be analyzed in terms of the research instruments chosen to measure change in academic achievement, creative thinking abilities and evaluation by child, it seems important to keep in mind the purpose and goals of this study. Any changes in performance reported in Chapter IV are analyzed also in terms of the research instruments chosen to analyze them--in other words, the diagnostic battery. This discussion section is an attempt to look closely at the question: which of the research instruments were particularly useful for diagnostic purposes in this study?

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Secondly, the effects of the two treatments differ. How they differ is analyzed again in terms of the research instruments but in light of the specific treatment program: Did the first treatment program enable the experimenter to develop a profile of a learning disabled child's strengths in creative thinking? Did the second treatment program allow utilization of the child's creative strengths to activate evaluative effort on the part of the child?

Academic achievement in early school learning can reasonably be assessed by measuring pre and post test performance in reading and visual-motor intergration. Therefore, three overall research questions relating to these areas of academic achievement were analyzed. They are:

Research Question: Is there a difference in performance on selected standardized measures of reading achievement?

Parallel forms of two standardized measures of reading achievement were administered and analyzed to help answer this question. The two measures are: 1) The Gates MacGinitie Reading Tests (Gates and MacGinitie, 1964) Primary A, Form 1 and 2 (Vocabulary and Comprehension) and 2) The Durrell Analysis of Reading Difficulty, New Edition (Durrell, 1955).

Research Question: Is there a difference in performance on informal or criterion measures of reading achievement?

Selected procedures from an informal reading assessment were administered under replicable conditions. The focus was on sight word recognition (Dolch, 1960) and listening comprehension.

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Research Question: Is there a difference in performance on measures of visual-motor performance, both formal and informal?

One formal and one informal measure of visual-motor performance were administered three times under standardized and/or replicable conditions. Scores and data regarding performance on the Developmental Test of Visual-Motor Integration (Beery and Buktenica, 1967) provided information regarding change in performance in copying symbolic forms. An informal measure of handwriting and phrase copying was included to give information on change in performance in areas such as visual-motor sequencing, structure of symbolic forms, perception of size, spatial relationships and organizational abilities.

To answer the broad question of what effect does teaching for creativity have on creative thinking abilities, it was necessary to analyze these abilities in terms of the four cognitive-intellective aspects generally recognized in the area of creativity (Torrance, 1966; Williams, 1972). These are fluency, flexibility, originality and elaboration. Further specification of these abilities appears in the definitions section of this chapter.

Three figural (or non-verbal) measures of creativity and six verbal measures of creativity were selected according to the following criteria:

Criteria 1.1

Criteria for Selecting Creativity Measures

1. Availability: Most measures are not locally available. Because of the necessary time framework, only those measures

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that could be examined first-hand (and also satisfied all other criteria) were used.

2. Ability to be given by a teacher: The results of Torrance's research (1970b) suggest that his measures can be given by teachers who become familiar with testing and scoring procedures. Any measure which purports to measure creativity (such as the Rorschach) but cannot be given by a teacher, has been eliminated.

3. Acceptable reliability and validity: A few measures suggested satisfied the first two criteria, but were in field-test versions and therefore did not have satisfactory referrents.

4. Suitability for a young child: Most measures, (including the majority of Guilford's measures) are suitable for 5th grade through adults. Very few exist that are applicable to young children who cannot read or write.

5. Pre/post measures possible: At least two forms of the same measure were necessary for evaluation purposes.

The measures of creativity were selected and administered in order to help answer the following broad research question:

Research Question: On standardized measures of creativity, are the scores themselves of diagnostic value relative to learning style?

To answer this question it was necessary to choose a variety of measures in the hope of finding which were the most helpful in ascertaining the strengths of a learning disabled child. All of the measures

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were expected to yield some information which would contribute to a diagnostic profile of learner strengths.

The three figural and five of the verbal tasks specified below provided information regarding the cognitive-intellective aspects of creative thinking abilities measured in terms of fluency, flexibility, originality and elaboration. The sixth verbal task (Imaginative Stories) has a different scoring guide (Yamamoto, 1961). A detailed description of the measures, instructions to administer, scoring procedures, and other information can be found in Chapter III and in the Appendix.

The following measures were chosen from Torrance's extensive work (1964, 1966):

Figural: Picture Construction, Incomplete Figures, Circles and Squares.

Verbal: Ask and Guess (three parts), Unusual Uses, Product Improvement, Imaginative Stories.

The second treatment program was designed to stimulate evaluative effort on the part of the child. Two recording/classification systems were developed to enable the following research question to be answered:

Research Question: Is there an effect on the child's ability to evaluate her own performance relative to specific academic tasks?

The first system chosen was a simple one which focused on the verbal responses of the child to the tasks presented throughout the entire study. An example of the thinking behind this procedure is: if the child begins to internalize the concept of evaluation in terms

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of the part she is expected to do, it seems reasonable to assume that she will ask for and expect less external evaluation of her work. If, on the other hand, she becomes confused with the complexity of the evaluative effort, she might cease all attempts at responding or ask for more, instead of less, external evaluation. It seems important to find out how a learning disabled child will verbally respond to experimental attempts to increase her evaluative effort.

A non-verbal scheme was also designed which gave a measure of congruence between how the experimenter and the child felt the task had been performed. This non-verbal evaluation was occasionally supplemented by direct questions (i.e., "How do you feel you did on that task?").

Theory

Theories in the behavioral fields tend to be extremely broad and difficult to operationalize. In addition, the theories upon which this study is built are many. For exemplification, however, the reader is encouraged to read Chapter II: Review of Related Literature, with particular attention to the first two sections. These sections are devoted to building support for the idea of teaching for creativity while intensively and descriptively studying this process, particularly with a learning disabled child.

There is, however, some background or knowledge to which the reader must have access, prior to reading and/or understanding this study. The background relates to definitions and assumptions upon which this exploratory study is based. The definitions are intended

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to be operational, but even more than that, they provide the basis for measurement and discussion of the creative thinking process. The assumptions are taken from several broad theories, and form the basis for a belief system held by many practitioners in the fields of the behavioral sciences.

Definitions

The following terms occur with some regularity. Each definition provided is that which is meant in terms of this study, and is not meant to be a universal or unanimously accepted definition. The definitions related to creativity have a process orientation. Whenever possible, the source to whom the definition can be traced will be cited. The words in parentheses will be used synonymously in this paper.

Learning Disabilities: A learning disability refers to one or more significant deficits in essential learning processes requiring special educational techniques for its remediation. Children with learning disabilities generally demonstrate a discrepancy between expected and actual achievement in one or more areas, such as spoken, read, or written language, mathematics, and spatial orientation. The learning disability referred to is not primarily the result of sensory, motor, intellectual, or emotional handicap, or lack of opportunity to learn. Deficits are to be defined in terms of accepted diagnostic procedures in education and psychology. Essential learning processes are those currently referred to in behavioral science as perception, integration, and expression, either verbal or non-verbal. Special education techniques for remediation require educational planning based on the diagnostic procedures and findings. (Quoted from Lerner, 1971, p. 299, based on definition provided by the National Advisory Committee on Handicapped Children, U. S. Department of Health, Education, and Welfare, 1968.)

The Intensive Design: According to Thoreson (1972), in the intensive design, the conception of individual variability is the major distinction between individual and group designs. The purpose of using this design is to determine more effective ways of helping individuals change. The basis for research is careful observation and critical description to be used in

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conjunction with systematic, planned intervention if appropriate. In this design, experimental control is used to examine variability, altering certain conditions to see if change occurs. The subject serves as his own control.

Thoreson (1972) lists seven advantages for the researcher interested in understanding the behavior of individuals:

1. The specific actions of the individual subject are the unit of focus rather than average comparisons between groups of individuals.

2. The frequency, magnitude, and/or variability of the individual's actions can be examined continuously during each phase and between phases of the investigation. Such an examination is possible because of the descriptive data orientation of intensive designs.

3. The individual subject serves as his own control in that the magnitude and duration of change is compared to his own baseline of actions. In this way past experience and individual differences are fully controlled.

4. Experimental control of variables is greatly facilitated thereby reducing the need for statistical control through complex inferential procedures.

5. The effects of treatments administered simultaneously on one or more client behaviors (dependent variables) can be examined over time for a particular individual by using multiple baseline and other procedures.

6. The clinician can determine the extent of relevant changes in client actions continuously during treatment and alter treatment if necessary based on the data provided.

7. An intimate method for controlled inquiry of covert (internal) behavior of individuals is provided. Such a design is extremely well suited to the concerns of humanists (pp. 12-13).

Convergent-Productive Thinking (convergent thinking): This kind of thinking specifies the ability to generate a response from cognized, stored information where emphasis is placed and rewards given for the production of the one best or conventional solution. Production is confined to the one right answer or solution from a very data-rich input (Williams, 1972, pp. 67-68).

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Divergent-Productive Thinking (creative thinking, divergent thinking): Divergent-productive thinking is the ability to scan stored information by searching for many possible solutions; the ability to think in different ways, and to go off in new and untested directions by deferring judgment while generating many likely responses or solutions.

Specific types of Divergent-Productive Thinking:

Fluent Thinking (fluency): A quantitative flow which emphasizes a high rate of ideas within one class.

Ideational fluency

generation of a quantity of ideas, words, titles, responses, phrases, sentences, uses, consequences, productions, drawings, pictures, designs, verbal responses, or other sense stimuli.

Associational fluency

completion of relationships; generation of synonyms, analogies, or similarities; problems of likeness.

Expressional fluency

new ideas to fit a system or structure; organization of ideas into systems or logical theories, sentences, verbal ideas, question responses, etc.

Flexible Thinking (flexibility): A quantitive flow which emphasizes a variety of ideas across different classes.

Spontaneous flexibility

variance of kinds of responses into classes; number of considerations of properties, attributes, or inherent characteristics of a problem or product; number of shifts of category responses or versatility.

Original Thinking (originality): A qualitative idea or response marked by unusual, remote, clever, uncommon, infrequent, or novel associations:

verbal, figural, symbolic transformations as uncommon, objective unusualness; statistically infrequent; subjective choices as clever, far-fetched, novel, different from the standard or norm.

Elaborative thinking (elaboration): A quantitative number of embellishments added on to make one's own ideas or ideas from others more interesting, exciting, or beautiful:

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production or detailed steps; number of implications or consequences; adding on to make more intricate or complex (Williams, 1972, pp. 68-70).

Evaluation: The ability to make choices by goodness, suitability, or adequacy; determination of choice; ability to determine if produced solution fits the problem or search model; setting some standard (criteria) for judging.

Activities that:

raise pertinent questions; seek improvements to things, social customs, institutions, or behavior; note deficiencies or defects in objects, ideas, or people; evaluate implications; observe imperfections or inadequacies; promote constructive discontent; promote criitcal-mindedness; facilitate purposeful judgment; cause decision-making (Williams, 1972, p. 70).

Creativity: A process of becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies, and so on: identifying the difficulty; searching for solutions, making guesses, or formulating hypotheses about the deficiencies: testing and retesting these hypotheses and possibly modifying and retesting them; and finally communicating the results (Torrance, 1966, p. 6).

Note: This definition is found in all of E. Paul Torrance's work. It forms the basis for the measures of creativity chosen for this study and the teaching strategies which he advocates. It is a global process definition and as such, subsumes the evaluative procedures by which creativity is actually measured (i.e., fluency, flexibility, originality and elaboration). Proper recognition of this definition which Torrance consistently uses must be made to understand the rationale behind this study.

Teaching for Creativity: This is a process which consists of three interactive components activating one another:

1. An environment which is structured for openness, i.e., learner-responsive and non-threatening.

2. A teacher who values these qualities and is: knowledgeable, responsive, aware, sensitive, open, flexible, spontaneous, original, receptive and intuitive.

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3. A learner who is responsive, curious, capable of attending and expressive verbally and/or non-verbally.

The products of this interactive process are evaluated according to the criteria suggested under "Divergent-Productive Thinking" and "Evaluation" above. Teaching for Creativity in this study includes definite teaching strategies which can cause a child to become more independent, self-sufficient and generally a more effective thinking and feeling human being (Williams, 1972).

Creative Positives (Creative strengths): In terms of the four aspects of creativity used to describe and measure creative thinking abilities in this study (i.e., fluency, flexibibility, originality and elaboration), a creative positive means a score which seems to stand out as being much higher than at least one other score.

For example, if the scores on one standardized measure were:

Fluency	21
Flexibility	2
Originality	3
Elaboration	35

All other scoring procedures taken into consideration, Fluency and Elaboration can be considered creative positives for this study.

"All other scoring procedures..." was included in the above statement, because there are instances when a ceiling is reached. For example, a child cannot get a higher score than two for originality on certain of the measures. Originality may sometimes be a creative positive, even though the originality score is low on that measure.

This idea for scoring and profiling creative strengths came from a telephone conversation with E. Paul Torrance (1974) and is used with appreciation. Torrance himself has used the term "creative

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positives" to describe certain behaviors or abilities in regard to the disadvantaged (1970a). He offers no absolute guidelines, but suggests that examiners and scorers of his measures be very familiar with the concept of "creative strengths" (1966).

Assumptions

The general areas of "Creativity" and "Learning Disabilities" each are considered to be controversial (Yamamoto, 1971; Jones, 1971). Therefore, in addition to the specific operational definitions just stated for purposes of this exploratory study, certain assumptions need to be more clearly stated:

1. Within the population of children currently called learning disabled, there exist large differences, both inter-child and intra-child.

2. Creativity tests measure something different than what intelligence tests measure, but both measure the more generic parts of the nature of intelligence or intellect.

3. All children have some creative potential. Like other normally distributed variables, there is probably a continuum of such ability and some limits to the potential.

4. The profile yielded by the scores on standardized measures of creative thinking may help to determine available strengths in the area of divergent thinking.

5. The more fluent and flexible a child is in his thinking, the more alternatives he would have to draw upon, and for a learning disabled child that would be a great strength.

6. Even young children are capable of adequately evaluating their own academic and creative work, and probably do so often outside the classroom. Within the classroom, little motivation to do so is provided, and the response is seldom rewarded if it occurs.

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Limitations

The parameters of this exploratory study are such that there do exist a few limitations. These limitations, briefly stated, are as follows:

1. Not all the available instruments for measurement purposes were used. Even after the selection criteria had been imposed, (i.e., availability, ability to be given by a teacher, acceptable reliability and validity, suitability for a young child, and alternate forms) there still exist some instruments that were not used. However, a representative sample was chosen.

2. Measures representing academic achievement have been confined to instruments used to evaluate reading and visual-motor performance. Since the treatment procedures are language dependent, the decision was made to eliminate instruments in other areas such as mathematics.

3. Time became a limitation. If more time had been available, some of the covert "pressure" would have been reduced, the treatment periods could have been extended, more rest periods might have been included, and above all, the subject sample size might have been enlarged.

4. The materials used in the treatment phases were limited. The imposed selection criteria for these materials were considered to be the same as those which would be imposed on a classroom teacher (i.e., must be inexpensive, must be relatively easily available, must be varied, etc.). Therefore, even though there might be elaborate and expensive instructional materials available through other sources, they were not used; thus, perhaps, limiting the outcome.

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Overview

In the chapters that follow, an attempt has been made to explore some interesting aspects of dealing with a child who has learning problems. In Chapter II: Review of Related Literature, the supporting literature upon which this study is based is reviewed. Because of the diverse issues and complex interrelationships involved in this study, this chapter is extensive. It is also definitive.

In Chapter III: Design of the Study, the important methodological aspects of this study are presented and the research questions found in Chapter I are restated in measurable form. Several figures are presented which schematically represent the processes and procedures involved in the study.

Those research questions which were answered empirically, are restated with the data in Chapter IV: Analysis of Results. Chapter IV also contains a Discussion of Results section, which summarizes the findings related to the research questions in each of the three areas.

Chapter V contains an extensive discussion section relating to the purposes of this study and implications for future research.

The theory and belief behind this study is exciting. Chapter II, therefore, should be of more than passing interest to the reader.

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CHAPTER II

REVIEW OF RELATED LITERATURE

In this chapter a story is told. The story is about the thinking behind this study and the resources, human and written, which were drawn upon to better focus on the intensive study of a learning disabled child. Existing programs for helping children with school learning problems are not as successful as they could be. That is already known. What is not known presently is how exactly treatment programs could be made more successful. One potentially successful program is explored in this chapter.

The literature which was influential in shaping this study can be organized into six major categories with a few sub-categories. These are: (1) The Issue of Teaching for Creativity with a Learning Disabled Child, (2) The Intensive Design, (3) The Diagnostic Value of Creativity Measures, (4) The Measurement of Academic Achievement, (5) Evaluation by the Individual, and (6) Teaching for Creativity.

Interwoven among the thoughts of the experts and the studies supporting their thinking are the beliefs of the people who concur with the necessity of beginning on a course of study and action which may have implications for future programs.

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The Issue of Teaching for Creativity with A Learning Disabled Child

The nature of the phrase "learning disabled child" asks us to assume a learning problem exists in a particular child and implies (not always correctly) that something is going to be done about it. Salomon (1971) presents four models, or approaches if you wish, to specific treatmentswhich can be undertaken. These models differ from each other in terms of the assumptions underlying them; but this does not imply that they are mutually exclusive. The value of the models does not lie in their neatness, but rather in their ability to help us generate treatments based on defendable rationales. Salomon's four models for treatment are:

1. The Remedial Approach.

   This first of the four models is the most commonly practiced one. In remedial programs and special classes,

   > the assumption we make is that some important ingredient of knowledge is deficient or missing, and no progress in learning can be expected unless the deficiency is overcome.
   >
   > Underlying this approach is a hierarchical conception of knowledge, of learning and consequently of instruction. It is closely associated with the work of Gagne, Ausubel and others (p. 3).

Salomon goes on to state:

> For Gagne, instruction is the piecemeal addition of knowledge. Knowledge becomes organized into increasingly more complex hierarchies of capabilities. Through his method of task analysis he defines an objective and then asks: what is it that the learner needs to master prior to that, and in what order should it be given to him, so that there will be maximum vertical transfer? The basic element in this approach is that the learner begins as a blank slate: what is learned is an imprint of cumulative effects that experiences make

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upon it (Shulman, 1970). Learning is basically connective and cumulative. As Gagne puts it: "The child progresses from one point to the next.... He learns an ordered set of capabilities which build upon each other in a progressive fashion" (Gagne, 1968, p. 181) (taken from Solomon, pp. 3-4).

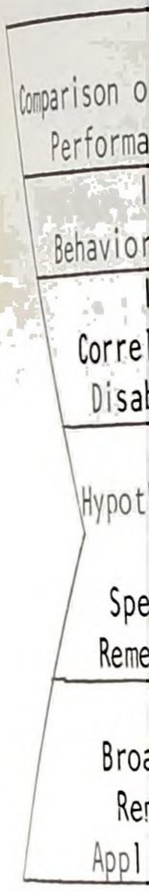
Since learning is an accumulation of experiences, the development of a task-specific capability becomes mainly a question of time. Aptitude therefore, is the amount of time required by the learner to attain mastery of a learning task. Salomon further states:

> Thus, the provisions made for individual differences are mainly concerned with amount of time devoted to instruction, the number of "fillers" needed and the quantity of repetition.... In short, instructional treatments differ from each other in terms of time, specificity, repetitions, etc., but not in terms of modalities, content structure or method of presentation. The treatment designed for the low aptituder, i.e., the one with deficient subordinate task-specific mastery, is a remedial one. It makes up for these deficiencies and thus ought to bring the low aptituder to the level of the high aptituder (p. 5).

In the field of learning disabilities, the Bateman Model of the Diagnostic-Remedial Process is very closely allied to the above. Bateman (1971) states:

> The diagnostic process is conceived here as a successive narrowing of the disability area examined until the exact problem can be pinpointed and a diagnostic-remedial hypothesis formulated which is internally consistent and well-supported by objective data. An hypothesis, so stated, leads directly to remedial planning. The remedial process is the inverse of the diagnostic process in that the initial focus is narrowed to the primary area of the disability and then gradually broadens (p. 297).

This view of the Diagnostic-Remedial Process is schematically represented on the following page:



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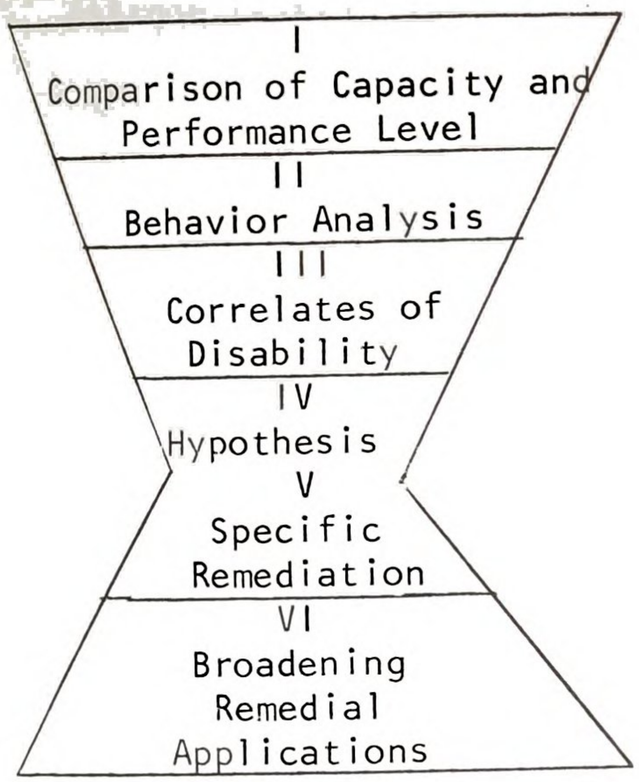
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I. Determination that a problem exists.

II. Behavior analysis of problem area.

III. Diagnostic testing of possible correlated or underlying disability areas.

IV. Formulation of a diagnostic hypothesis which leads directly to remediation.

V. Specific remediation directed to primary disability area as formulated in the diagnostic hypothesis.

VI. Broadening scope of remediation to include related disability areas.

Figure 2.1.--Bateman Model.

Other models in the field of learning disabilities closely conform to the remedial approach. As common as this approach undoubtedly is, in the majority of cases it has been unsuccessful. As Mann and Phillips (1967) say:

> The basic assumption underlying the development and utilization of fractional appraches is that human behavior may be successfully separated, as it were, into specific entities, units, or functions; these being essentially independent and capable of being individually evaluated and/or exercised. Advocates of fractional approaches appear to be proceeding as if this assumption were a fully demonstrated verity (p. 23).

In this and other articles (Mann, 1969-70), Mann's critical comments include references to the approaches advocated by Bateman, Lindsley, Kirk, Frostig, Ayres and others. In this article Mann

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implies that the research evidence to date does not justify a strong remediation position. Siegel, in 1968, stated the same thing perhaps more forcefully:

> Enthusiasm, while generally serving as a positive force, can sometimes be misleading (often, quite unintentionally). In the current scientific aura which has gripped education, there has emerged a penchant for finding answers--and we seek them with a vengeance! In this mood, it is quite easy to fall into the trap of believing that a particular approach offers more than it is capable of delivering. For example, The Illinois Test of Psycholiguistic Abilities and The Frostig Program for the Development of Visual Perception have remediation as well as diagnostic guidelines. But learning disability proponents often carry this diagnostic remediation duo to an extreme, claiming--or perhaps implying--that for every learning disability, there is a known remedy. The error is obvious. It is only 1968 and we do not yet have all the answers. Certainly, at times, children still fail, even under most favorable educational circumstances (Miller, 1965). Then, too, this preoccupation with scientific programing ignores such variables as motivation, personality, stamina, and values; moreover, it makes no provision for the possibility that teaching (and even learning) may be very much of an art (p. 435).

There are those who feel that 1968 is not that far removed from 1974.

2. <u>The Inducement Model</u>

Unlike the previous model, this approach is neither very common, nor is it extensively studied. It appears to apply to those cases in which one desires to induce specific thought processes, problem solving or epistemic behavior.

Salomon describes this model:

> (it) is derived from the work done with uncertainty (Berlyne), mismatches (Hunt), disequilibrim (Piaget), or surprise (Charlesworth). The basic element in all these lines of research is that adaptive learning is propelled by disturbances, i.e., by a failure to assimilate new information into existing structures (p. 6).

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The most important difference between this approach and the first is that in this approach the emphasis is on incompatibility as a stimulator of thinking, which in turn, leads to adaptive learning (Gagne, 1968).

Two dimensions of incompatibility (amount and saliency) are involved. Amount has to do with the uncertainty or number of incompatible responses, saliency with the degree (or how large) the uncertainty. Individuals differ along these two dimensions, and researchers differ in their views as to what implications for treatment are involved. Salomon feels, however, that if learning is connected to thinking about relations, manipulations of objects, sensing incongruities, etc., and if we want this to occur in learners who do not do so spontaneously, then they

> should be forced to do so by providing them with stimuli which cannot be handled otherwise.... To arouse mental processes in unstimulated learners would not call for oversimplified treatments but rather for ones in which disequilibrium, uncertainty, surprise, etc., are the most salient features (p. 9).

This approach is therefore at odds with the current vogue of programmed instruction, small sequential steps, success experiences, etc., that share the treatment spotlight at present.

Salomon found his hypotheses to be substantiated when working with disadvantaged children. When the stimulus situation was complex, or unusual, disadvantaged children exhibited as much reflective behavior as advantaged.

After discussing other relevant studies, Salomon concludes:

> Thus low scorers, rigid or conceptually simple Ss can be expected to indulge in thinking when uncertainty is relatively

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> low, but when it is very salient, important or dramatic. High scorers, open minded, sensitive or conceptually complex Ss profit most when uncertainty is higher, but its salience lower (p. 11).

The Inducement model closely resembles what Torrance (1969) and others have called creative thinking behavior:

> Creative behavior occurs in the process of becoming sensitive to or aware of problems, deficiencies, gaps in knowledge, missing elements, disharmonies, and so on; bringing together in new relationships available information; defining the difficulty or identifying the missing elements; serching for solutions, making guesses, or formulating hypotheses about problems or deficiencies; testing and retesting them; perfecting them; and finally communicating the results (p. vii).

Taylor (1962) mentions that the way one deals with information may be much more important than sheer information itself. That is, learning may depend more upon the attitude with which you approach taking in information rather than just in the phenomena of storage and retrieval in a memory system. For someone who experiences difficulty in retrieving information, this could be a helpful insight.

3. <u>The Preferential Model</u>

When an instructional treatment is designed to match certain students' capabilities it can try to make up for deficiencies (the first model) or force the student to think (the second model). It may, however, also try to capitalize on what the student is already doing. Thus, it exploits available strong points in the student's characteristics. This, of course, becomes possible only if there are at least two alternative modes, methods, or modalities through which the same objectives can be attained. Such is not implied in the first model.

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Results obtained with treatments based only on the visual or verbal modality were disappointing. Salomon explains...

> The reason may well be that a preferential approach, in which one capitalized on the stronger aptitudes, specific aptitudes or task specific capabilities are poor predictors.
>
> To be able to capitalize on and make use of an existing aptitude it needs to be general enough so that the learner can use it in processing the new information. If it is not general verbal or visual ability, but more task specific, there is little you can capitalize on. Rather, a more stable attribute, perhaps even a "style" may appear to be more helpful in the present case.
>
> ...There are a few additional studies, all of which show that when the treatments are expected to capitalize on the learner's strong sides, these need to be some relatively general attributes (pp. 12-13).

One such relatively general attribute may be the creative thinking ability. As Torrance (1966) suggests:

> Since abilities constitute, at least to some extent, the basis of needs and motivations, knowledge about a person's creative thinking abilities frequently provides clues about differential preferences for ways of learning (p. 9).

Salomon thinks this model may be quite important when it comes to culturally deprived children. He states:

> We are quick to identify their weaknesses and try to provide remedies. We are not so quick in finding what they can do and use then the preferential model to play to their stronger points (p. 13).

In the field of learning disabilities, there are several writers who mention using the strengths of children with learning problems. Kirk and Kirk (1971) comment briefly on utilizing strengths in the process of remediation. They list a few specific examples "wherein strengths are used to modify weaknesses." One such example is given:

> If the child can repeat sentences but is unable to spontaneously express ideas, the teacher uses the ability to repeat in

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> developing the ability to express, such as showing the child a ball and saying "This is a ball. Say, 'this is a ball.'" When the child responds, the teacher says, "What is this?" and expects the child to respond, "This is a ball" (pp. 123-4).

It may be that Kirk's conception of strengths, especially as illustrated in the above example, does not conform to the "general ability" felt by Salomon to be necessary to capitalize on. It may also be that the question "What is a strength?" will become increasingly important in any treatment procedure, regardless of the philosophy.

De Hirsch, Janski and Langford (1966) noted an interesting facet of their two year study of children with reading problems. They were able to see certain consistencies in the subject's approach, or continuities in behavioral "styles" over the two year period the first and second graders were studied. Their "Group III" consisted of youngsters they saw as "happy-go-lucky, but disorganized and distractible." They felt that defining such "styles" may be the key point in planning a remediation program.

4. The Compensatory Model

The distinguishing feature here is that treatments try to compensate for each learner's deficiency by providing the mode of presentation that the learner cannot provide for himself.

Research on mediated compensatory supports can be found in the literature. Stolurow's (1964) summary of one such study is interesting: "The best sequence (i.e., the better structured one) did for the poorest ability group what the highest ability group could do for themselves, regardless of sequence" (p. 351).

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In this model one makes treatments provide those bits of information, techniques, images or formulations which some learners cannot provide for themselves. However, to compensate, the deficiency needs to be quite specific. Thus, unlike the preferential model, the present one can be based on measures of specific aptitudes only.

In terms of treatments for learning disabilities, a case in point might be giving a tape recorder to an advanced student with poor fine-motor coordination who cannot take an exam within the time limit in any other way. A good compensatory strategy, no doubt, but quite specific.

Kirk and Kirk's (1971) comments on this issue are interesting, especially in regard to their statements about compensation:

> There has been some controversy as to whether to utilize a child's assets or train his deficits. It appears that much of this controversy is more apparent than real for it is not an either/or question. It is necessary to use the assets and also train the deficits. Current thinking today does not hold that deficits are innate and unalterable. If they were, then, we could rely solely on assets. But on the assumption that most learning disabilities can be ameliorated, it is advisable to develop abilities which are not functioning adequately. Disregarding a deficit and developing other abilities to take its place is compensation. If a child is deaf and his deafness cannot be cured, the child is educated through other sense modalities. This is compensation (p. 121).

Both Salomon and the Kirks appear to agree that disregarding a deficit and providing an alternative mode, form, or technique can be considered compensation. They appear to disagree on the value of using this approach. Since the Kirks assume most learning disabilities can be ameliorated, they seem to place little value on providing alternatives. Salomon, however, at least implies that this approach may yield significant results for specific deficits which can be bypassed.

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The approach described in this study is probably a combination of all four approaches, with the strongest emphasis on the preferential and inducement models which appear to emphasize results in terms of assets or strengths. The ultimate product or process expectation, however, still remains an improvement in all abilities, whether they are considered diagnostically "strengths" or "weaknesses."

In contrast to the voluminous research on various strategies, techniques, or procedures to be implemented within the remedial approach, (Mann and Sabatino, 1973) there exists very little in the literature that supports or describes the use of an approach specifically designed to develop and utilize strengths in order to remediate deficiencies, particularly in the area of learning disabilities. In other areas of research, particularly creativity research, some support does exist for this notion.

Torrance and Myers (1970b) in introducing their book, Creative Learning and Teaching, speak informally, but eloquently about teaching for creativity:

> ...We know good and well that learning in creative ways and mastering fundamentals or acquiring information are not incompatible. In fact, we know they can facilitate one another.... We are recognizing that a psychology of adjustment is inadequate for our age. Today's children must learn to respond constructively rather than just adaptively or adjustively to change and stress. All of these things cannot be acquired by teaching exclusively by authority. Teaching in creative ways is also required (pp. 4-5).

When Torrance (1970a) describes some of the current programs in practice for "creative children" he expresses his dissatisfaction thusly:

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> Children exhibiting behavior problems, children who excel in one or two fields but are not well-rounded, children from disadvantaged backgrounds, and children who learn a great deal on their own but do not excel on those things that count on the grade books are usually excluded (p. 206).

Renzulli (1973) has found that some children "usually excluded" (i.e., culturally disadvantaged) are, in fact, found to be as creative as any other children, and in some cases (figural measures of creativity) more creative than white middle class children. Recent personal communications with Dr. Renzulli and Dr. Frierson added support to the idea that some children currently described as learning disabled may also be found to be creative, and may respond to treatment procedures designed to utilize creative assets or strengths. Dr. Renzulli's group is currently beginning research on this topic.

Torrance (1970b) has been interested in the question of "reversals in patterns of development" in children, particularly in those children with academic and behavioral problems. In obtaining raw data from 135 experienced teachers, administrators and school psychologists, the following reversals in patterns of development were mentioned most frequently:

> From nonreader to average or superior reader.
> From vandalism, destructiveness, and lack of school achievement to constructive behavior and improved achievement.
> From emotionally disturbed and unproductive behavior to productive behavior and outstanding school achievement.
> From estrangement and lack of communication to communication and good contact with reality.
> From social isolation and rejection to social acceptance and productive group membership.
> From fighting and hostility to improved speech skills and lack of fighting.
> From bitter, hostile sarcasm to kindly, courteous, thoughtful behavior.

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> From apathy and hate of school to enthusiasm about learning.
> From lack of self-confidence and self-expression to adequate self-confidence and creative self-expression.
> From mediocrity of achievement among gifted pupils to outstanding performance.
> From inattention and short attention span to absorbed attention and sustained performance.
> From diagnoses of mental retardation to diagnoses of normal or superior mental functioning.
> From troublesome behavior to outstanding job performance (p. 26).

"The most frequent change described by the 135 respondents is from non-reader to reader, a change usually accompanied by generally improved behavior and achievement" (p. 27). The drastic changes followed an intervention program that capitalized on the recognition and furtherance of the creative potential of the child in question.

Unfortunately, thus far, data of this type (brief, anecdotal accounts) has not been followed-up by any type of study specifically designed to investigate the effects of teaching for creativity on children identified as having learning or behavioral problems.

However, in view of the logical and empirical criticism of current strategies employed in the remedial approach to treatment of children with learning problems, it seems to be at least relevant and justifiable to consider an alternative. For today's learning disabled child, remediation programs are typically implemented in a setting in which the appropriate response is structured for and rewarded when it occurs.

> This stimulus-response psychology with its rewards and punishments actually creates obstacles to the genuine kind of motivation that results in self-initiated and continuing learning. Usually, motivation of achievement by external rewards and punishments is actually motivation by fear. So much energy goes into coping with the fear, and the accompanying learning requires such expensive energy, that motivation

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to continue learning cannot be sustained. The drill that seems necessary in much stimulus-response learning and adequate reinforcement of desired responses is frequently so monotonous that we have the same effects as occur in fatigue and exhaustion. Many children also regard such learning as drudgery. There is a lack of intrinsic interest. There is no fun. Again, learning under such conditions requires expensive energy and leaves little energy available for continued learning, especially self-initiated learning. Frequently stimulus-response learning requires unquestioning acceptance of customs and traditions, conventionality and uncritical imitation of contemporaries, subjection to authority and to books, and slavery to details with attention to ability to organize and systematize the information acquired. Thus, there is little wonder that external rewards and punishments have to be reapplied continuously in order to keep the processes of learning and achievement going" (Torrance, 1970a, p. 77).

Many of the remedial techniques currently used are quite specific. Mann and Phillips (1971) call them "fractional approaches" and voice part of their criticism as follows (when they speak of portents for special education):

> ...in terms of their often facile extrapolation of unsettled and controversial experimental and theoretical issues into educational and clinical dicta and practice; in the establishment of techniques of uncertain, and, at best, limited validity, as prime diagnostic and treatment instruments; in their seeming disregard of the handicapped child as a unitary, though complex organism; by their approach to him as a collection of discrete and isolated functions (p. 357).

Perhaps it is time to look at another type of approach, but to look closely, even intensively, at that approach.

The Intensive Design

Researchers believe in the value of the intensive case design for a number of reasons. According to Thoreson (1972), the intensive case design or experimental study of the individual case has specific advantages. It is a design particularly well suited to the specialist

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as a clinician-researcher who seeks to discover and confirm empirically more effective ways of helping individuals change. A longstanding value, he believes, has been the discovery of new techniques.

Starkweather (1964) believes that case study analyses are indicated for the formulation of hypotheses. Kiesler (1971) also acknowledged the value of the intensive study of the individual as a source of hypotheses, but denied its validity as a means of confirming hypotheses.

Ebel (1967) does not discuss specifically the intensive case design, but discusses reasonable alternatives to basic research in education, which would give up empirical, practical and reasonable knowledge on which to formulate hypotheses and to systematically plan basic research.

Allport (1937, 1962) very early urged that scientific techniques be developed to study the individual. Although Allport championed the "ideographic" approach in his writings, most of his quantitative work was based on "nomothetic" methods using group norms such as personality measures. Allport's conception of the study of the individual cases was based primarily on gathering several different descriptive measures of the individual at one or a few times.

Lewin (1935) similarly argued that the individual merited scientific study in his own right rather than being treated as a random event or unexplained variance (Chein, 1946). For Lewin, cause and effect relationships were best understood in the "here and now" of contemporary events. He argued that the causes of behavior were multiple and contemporary, involving the interaction between the individual

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and his immediate physical and social environment. For Lewin, the "on the average" thinking promoted by inferential statistics and an Aristotelian notion of historical causality prevented investigators from understanding and explaining individual performance. In fact, the use of groups is carefully used to cancel out uncontrolled individual variables statistically. If individual variability is seen as a chance event, then classical statistical models are indeed appropriate. But individual variability may be seen as lawful, subject to control by environmental events, rather than uncontrollable. If this is the case, then the researcher needs to study individuals, not groups (Thoreson, 1972).

According to Dukes (1965) a brief scanning of general and historical accounts of the study of individuals will dispel any doubts about their importance. Many instances of pivotal research will be revealed, in which the observations were confined to the behavior of only one person or animal. Dukes states: "Foremost among N=1 studies is Ebbinghaus' investigation of memory. Called by some authorities 'a landmark in the history of psychology'..." (p. 74).

Freud tried to develop a theory of personality from his analyses of case histories. He studied intensively the backgrounds of a few patients in the hope that some general theories of human behavior could be discovered. At the same time, he was interested in the well being of his own patients (Sax, 1968). Jean Piaget relied heavily on descriptive, anecdotal reports of specific individuals to generate more empirical, abstract laws relating to a theory of child development.

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In citing other landmark instances, Dukes (1965) mentions Watson and Rayner's study of Albert's conditioning to fear a white rat which "has been hailed as 'one of the most influential papers in the history of American psychology.'" And further...

> Perhaps less familiar to the general student but more significant in the history of psychology is Bruer's case of Anna O, the analysis of which is credited with containing "the kernal of a new system of treatment, and indeed a new system of psychology" (p. 75).

In a summary table, Dukes lists a total of 246 studies of this type that have appared in the most respected psychological periodicals. Dukes' comments and cautions are appropriate:

> Further documentation of the significant role of N=1 research in psychological history seems unnecessary. A few studies, each in impact like a single pebble which starts an avalanche, have been the impetus for major developments in research and theory. Others, more like missing pieces from nearly finished jigsaw puzzles, have provided timely data on various controversies.
>
> This historical recounting of "successful" cases, is, of course, not an exhortation for restricted subject samplings, nor does it imply that their greatness is independent of subsequent related work (p. 76).

However, he defines several instances in which this type of study is very appropriate. For purposes of this exploratory study, one section stands out:

> Instead of being oriented either toward the person (uniqueness) or toward a global theory (universality), researchers may sometimes simply focus on a problem. Problem-centered research on only one subject may, by clarifying questions, defining variables, and indicating approaches, make substantial contributions to the study of behavior. Besides answering a specific question, it may (Ebbinghaus's work, 1885, being a classic example) provide important groundwork for theorists (p. 77).

Getzels and Jackson (1962) made such a choice when they decided to study intensively a limited and necessarily atypical sample of

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creative children to make possible "greater depth and intensity of knowledge of individual subjects" (p. ix). Though often criticized in the literature on creativity, the study nevertheless remains a landmark when discussions arise on differences and similarities between highly intelligent and highly creative children. It has indeed provided important groundwork for theorists.

Several variations of intensive designs have been reported (Thoreson, 1972). The intensive empirical investigations pioneered by Skinner gather data continuously (i.e., at several points) during a pretreatment or baseline period. Typically an intervention is then introduced and carefully monitored in terms of continuing to gather data during the intervention itself. Data is also gathered for a specific time period after the intervention is terminated. According to Thoreson, the intensive design focuses carefully on individual performance while the group design emphasizes point estimates of average performance.

Intensive designs minimize the use of statistics to control for individual variability. Instead, stress is placed on direct experimental control to examine individual variability, altering certain conditions to see if change occurs.

> Experimental control also operates in terms of extraneous factors that might influence experimental results. Intensive designs offer excellent experimental control in having the subject serve as his own control for all kinds of events prior to the actual investigation. It has been argued that no type of extensive group design can exercise that type of important experimental control. Campbell and Stanley (1966) point out that intensive designs (e.g., multiple time series) control for all of the major extraneous variables that might influence the experimental results during the actual investigation;

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> factors such as maturation, regression effects, and instrumentation. An intensive design can provide a great deal of careful experimental control, often more than the classical group experiment (Thoreson, 1972, p. 10).

Adelman (1972) and Capobianco (1971) are two authorities amongst many in the field of learning disabilities who have discussed the widespread variability and heterogeneity of the group of children currently called "learning disabled." The differences observed are as variable intra-group as intra-child and even between learning disabled and normal populations. With a population as diverse as the learning disabled population apparently is, it would seem feasible, sensible, rational, and even crucial to use the intensive case design for the experimental study of a learning disabled child.

Diagnostic Value of Measures of Creativity

Whenever one attempts to describe, define or measure "creativity," a multitude of descriptors come to mind. Quite justifiably, creativity may be defined in many ways. It is usually defined as a kind of person, product or process. It may also be defined in terms of an environmental condition (press). These "Four P's of Creativity" contribute to a total definition involving many criteria (Torrance, 1965).

Torrance (1965) states:

> ...a thorough understanding of creativity must involve the study of all four aspects of creativity (person, product, process and press). It is obvious that an investigator must at any one time focus on one aspect and then on another, always being alert to the other three aspects of creativity (p. 8).

Within the last eight to ten years, research on creativity has enlarged exponentially (Guilford, 1970). Even a brief review, however,

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will demonstrate that the major amount of information, on measurement especially, concerns adolescents and adults (Davis, 1971; Kaltsounis, 1971). There has been little effort in the development of test procedures for young children. In fact, the only major sustained efforts have been those of Torrance and Starkweather (1964), who has limited her work to pre-primary children. This review, however, will attempt to summarize the available information that relates to young children, and in particular any information relating to the diagnostic value of creativity measures for purposes of educational planning for individual children with learning problems. This information can be further broken down into information concerning: (1) standardized measures of creativity (PROCESS), and (2) creative personality and intellectual characteristics of young children (PERSON).

Standardized Measures of Creativity (PROCESS)

Torrance (1965) has this to say about his approach to instrument development:

> In developing instruments to test hypotheses concerning the role of evaluation in creative thinking, we have tried to make the best possible use of what is known about creativity--the creative process, the creative person, the creative product, and the presses which facilitate creative functioning. We have relied upon the historical accounts of creative achievement, studies of the lives of creative persons, laboratory and field studies designed to affect creative functioning, studies involving the evaluation of creative products and processes, efforts to measure various aspects of man's mental functioning, and the like. We have used these sources in generating ideas and in testing them theoretically to make certain that the instruments developed would have as good face validity as possible.
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> We have also gone as far as time and resources will permit in demonstrating objectively that these instruments have validity

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and reliability. The charges of some critics that studies of creative behavior are being made with instruments which have validity only in the minds of their creators is not true....

In seeking to assemble objective evidence of the validity of the instruments which have been developed for the study of creative behavior, we have considered a wide range of indicators. In considering the matter of the creative thinking abilities, we have been concerned about the mental abilities which appear to be involved in the creative process and in producing creative ideas. For example, some of the ideas which we score in determining ideational fluency are certainly not very creative. We continue to derive a fluency score in this manner because we believe that the evidence indicates that the person who is able to produce a large number of ideas will be more likely to think creatively than the person who is unable to do so (pp. 38-39).

According to the factor analytic studies described by Torrance (1964, 1969, 1970b) and Guilford (1967, 1972), the measures divide themselves into verbal and non-verbal (i.e., figural) measures of fluency, flexibility, originality, and elaboration. (See definitions.)

> The abilities measured by tests of creative thinking emphasize divergent kinds of thinking (fluency of ideas, flexibility, originality, and elaboration); sensitivity to problems, defects, and missing elements; and ability to redefine and restructure problems, information, visual or auditory stimuli, and the like. Traditional measures of intelligence emphasize memory, recognition, and logical reasoning and call for convergent thinking or getting the "one correct or best answer" (Torrance, 1969, p. 28).

These particular thinking processes lend themselves to a mental abilities approach (Guilford) as well as to the more pragmatic approaches of educators (Torrance, Renzulli).

In the Introduction to the Research Edition of the Torrance Tests of Creative Thinking (1966), Torrance suggests some legitimate uses of the batteries:

1. <u>Basic studies that will yield a more complete understanding of the human mind and its functioning and development</u>. In

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order to design a more human kind of education that will give all children a better chance to achieve their potentialities, studies of this type are needed. There seems to be little doubt that the abilities brought into play by these tests give us additional insights into important aspects of one's mental functioning. This is true whether one is willing to call these abilities "creative thinking abilities" or would prefer to use some other label. Whatever they measure seems to make a difference in the lives of children, young people, and adults.

2. Studies designed to discover effective bases for individualizing instruction. Educators have long talked of the ideal of individualizing instruction without very many scientific bases for accomplishing the task, even in a one-to-one relationship.... It seems rather clear that children who score high on measures of creative thinking abilities, divergent thinking abilities, etc., differ in some quite fundamental ways from those who score low on such measures. They prefer to learn in creative ways, by experimentation, manipulation, inquiry, etc., rather than by authority, through spontaneous rather than deliberate ways, by discovery rather than by authoritative identification. This is a general and somewhat tentative conclusion and should be tested further and elaborated a great deal.

3. Sources of clues for remedial and psychotherapeutic programs. Certainly there is a need to learn far more than we now know about the clinical uses of these tests. A number of clues for remedial and psychotherapeutic programs are already available. Studies now in progress with potential dropouts in junior high school show that such students manifest serious disability in elaborating their ideas. This observation is supported by dozens of other studies that indicate that elaboration is involved in grade getting in school, that a lack of it is characteristic of delinquents, that high elaborators are concerned about not being able to meet the high expectations that others have of them, and the like. Many children who have learning difficulties manifest tremendously creative behavior on figural tests but apparently their fear of verbal symbols makes them seem to be mentally paralyzed on verbal tests. Children with certain behavior difficulties in school may perform outstandingly on measures such as the Product Improvement activity or Unusual Uses, yet show little creative behavior on tasks involving the formulation of hypotheses concerning causation and consequences, as in the Ask-and Guess Test. The developmental curves for these tests also show discontinuities in development that seem to be psychologically meaningful and seem to have some rather direct relevance to problems of personality disturbance, delinquency, and mental health.

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4. Assessing the differential effects of various kinds of experimental programs, new curricular arrangements or materials, organizational arrangements, teaching procedures, and the like. The author has always felt frustrated by experiments that show that students without instruction learn as much as those with instruction, as much with TV instruction as with live teachers, as much with inexperienced teachers as with experienced ones, as much in large groups as in small ones. Almost always the measures used in such assessments involve primarily recognition of reproductive kinds of achievement and mental growth. There seems little doubt but that many of these studies would show different results, if a greater variety of measures of intellectual growth and/or achievement had been used depending upon the goals of the educational experience.

5. As a means of becoming aware of potentialities that might otherwise go unnoticed. Although the measures derived from Verbal and Figural Tests A and B will not identify all possible types of creative potentiality and we do not know whether kindergarteners identified as creatively gifted will actually become creative adults, we feel rather confident that these measures can be used by school psychologists, counselors, and teachers as a way of becoming aware of potentialities that might otherwise be overlooked. This is especially true in looking for giftedness in culturally disadvantaged children, children from lower socio-economic classes, minority groups, and the like. Even if we find that some children who score extremely high on these tests do not become highly creative adults, this would not prove that the tests are invalid or that they do not have value in helping educators become aware of intellectual potentialities. We need to recognize that educational experiences and guidance have or can have important consequences. Any test of mental ability represents some kind of potentiality. We should recognize that even socially disapproved behaviors may indicate the existence of valued potentialities. Clever and ingeneous ways of cheating on an examination have been recognized as indicators of talents that with wise guidance were developed into socially valued achievements (pp. 4-5).

Uses 2, 3 and 5, as described above form the foundation, rationale and justification of this study. Since the Research Edition was printed in 1966, several studies have been published that focus on creative potentialities of disadvantaged children (Torrance, 1971, Torrance and Phillips, 1972, Renzulli, 1973).

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Torrance (1971) cites 13 studies, involving the testing of more than 4,000 school aged children. Contrary to what Jensen might suppose, there were few significant differences in performance between students of high and low socio-economic status and/or between blacks and whites. Of the few differences, most favored the "disadvantaged" on the figural tests. "Warm-up" activities facilitated increased verbal responses.

In choosing stimulus materials for the tasks, Torrance (1971) states that a deliberate effort was made to include only things that were common to all children or strange to all children. Perhaps this is why the "disadvantaged" are scoring significantly better on these measures than on the convergent type of responses found in measures of intelligence or academic achievement (Renzulli, 1973).

Pollack et al., (1973) administered part of two figural forms (Incomplete Figures and Circles Test) to eight trainable mentally retarded students and eight educationally mentally retarded students (EMRs). Not surprisingly, they found the EMRs did better and that the fluency criterion was a better differentiator than the flexibility criterion.

Tognetti (1972) compared learning disability students with students in special day classes and with regular students on the variables: academic achievement, creativity (fluency, flexibility, originality and elaboration) and locus of control. The learning disability students were more flexible than special day class students and both these groups were less elaborate but more original in their responses than regular

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students. A knowledge of this facet of a learning disabled child's behavior could facilitate better planning.

Bannatyne (1973c) discusses the results of a test of concept utilization used with a small sample (20) of learning disabled children. The researchers found a tendency to cluster into groups by characteristics. The second group, although small, displayed 65 percent Unusual responses, 24 percent Affective responses and 13 percent Aberrant responses. Bannatyne states: "I suspect Newton, Nelson and Churchill were in Group two" (p. 608).

A few other studies and reports (Bannatyne, 1973a, Perlman, 1973) mention giving one or two of the Torrance Tests as a part of a more complete battery. Neither study, however, mentions how the information gained from the creativity test was used in any way. Someone seeking to replicate such a study would find the information regarding use helpful.

Wallach and Kogan (1965) attempted to devise somewhat different measures than the Torrance Tests, providing no time restrictions, in a "game-like" atmosphere. Rotter et al., (1971) used two of these measures in an attempt to report the validity of tests of creative thinking with seven year old children. Guilford (1971) was unusually critical of this work because: the lack of time restrictions may change the character of the test and the variable or variables that it measures; what a test measures early during the working period may be different from what it measures later in time; and because it is not very efficient in terms of value received for time expended. Treffinger et al., (1971)

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cautions that researchers who give "creativity tests" should be careful to report procedures for test administration, timing and directions.

This concern for administering tests exactly according to instructions so as not to influence reliability or validity is also mentioned by Torrance (1964):

> In administering, slight differences in the wording of our instructions influence what the children will produce. For example, in administering a test which involves making a picture using a colored triangle as a major part, about 90 percent of the children in the first grade will ordinarily use the triangle as the roof of a house. If we ask them to think of a picture that they think no one else in the class will think of and assure them that if they use their own ideas that what they produce will quite likely be different from the drawings of the others, almost none of them will make the triangle a housetop....the neutral instructions usually given in administering tests of creative thinking may decrease the power of the tests to discriminate among more or less creative individuals. In other words, the more creative individuals more than the less creative individuals tend to inhibit their creative thinking, unless they feel confident that original ideas will be acceptable (pp. 19-20).

Thus it seems important to follow instructions exactly when administering these measures, as well as any standardized achievement or intelligence measures.

The nature of the Ask and Guess Test, perhaps more than any other, should yield some important diagnostic information about a learning disabled child. According to Torrance, (1965) curiosity has long been accepted as an important aspect of creative behavior and is recognized as being reflected in the number and kinds of questions asked. Questions are of particular interest in this study also, as they seem to reflect not only interest and curiosity, but also the need for external evaluation.

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> Much of the evaluative behavior of teachers appears to be designed to enable the teacher to control or coerce conformity to behavioral norms. Such evaluative behavior is not likely to have a positive influence upon any kind of truly creative behavior. Some teachers have observed that it is only when the child is convinced you are not trying to reform him that he is able to open up and behave creatively (p. 21).

The last statement above may be particularly true of a learning disabled child who knows his teachers have been trying to reform him. It is particularly appropriate that a young child be encouraged in a test situation to actually think up as many specific questions as he can, and then to speculate on numerous possible causes and consequences. The procedures represented by the Ask and Guess Test have yielded similar results with many different kinds of pictures as long as the picture has the capability of stimulating many types of questions. The scoring of only fluency and adequacy allows for variability in the stimulus picture (Torrance, 1964).

The procedure for the individual administration of the Product Improvement Test includes the possibility of manipulating the toy dog or monkey. Barron (1969) and others feel this tendency to manipulate begins at an early age and is probably the basis for the development of curiosity and creative imagination. Torrance (1964) found that the degree of manipulation is clearly related to the number and originality of the responses produced. This effect increases from first to third grade in boys, but not in girls.

The concern for manipulative activities has been found also in the procedures utilized in learning disabilities programs. The majority of teachers this writer has interviewed, however, hold that manipulation devices are merely aids to learning and should be gone from the

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Imaginative Stories was conceptualized and is scored somewhat differently. All of the titles involve an animal or a person who possesses divergent characteristics. (Examples are: The Dog That Won't Fight, The Flying Monkey, The Lion That Doesn't Roar.) This was deliberately done by Torrance to investigate the ways in which children value divergency and how children perceive their society's pressures against divergency. Studies (Torrance, 1964, 1965) show the titles appeal to the interest and imagination of children. A child almost has to create in order to produce a story about the titles given. With the number of options presented (10), a learning disabled child should be able to choose and tell a story that interests him.

The Incomplete Figures Test (on an individual basis) offers an opportunity to observe and record the tendency toward early closure. It is felt (Torrance, 1964) that the more quickly a subject closes in the stimulus figure, the less open he is towards incoming information, ideas, etc. The tendency toward closure is found less often in highly creative individuals.

"Closure" in learning disabilities is generally seen as something children need to achieve. It is defined as "the ability to recognize a whole or Gestalt, especially when one or more parts of the whole are missing or when the continuity is interrupted by gaps" (Lerner, 1971, p. 397). The definition in both instances is quite similar. The value placed on this ability differs dramatically.

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The six verbal and three non-verbal measures of creativity chosen for this study should yield an overall profile of creative ability and a baseline from which to judge future change in behavior.

Personality and Intellectual Characteristics

Testing materials, promising in their own right, may help to identify creative children, but there is still much need for non-test means of assessment.

In the first place, it will be some time before existing tests of creative thinking will be in common use in school systems. Secondly, children may not be motivated to perform creatively on a test. Inherent limitations of the tests include time limits, and creativity cannot always be hurried or forced. Highly creative children can have trouble with the written and/or verbal responses required. All of these problems plus others may prevent some highly creative individuals from revealing their creative potential through tests (Torrance, 1967).

Torrance also suggests that creative children may, in some cases, lead a double life. Perhaps they do indeed become two personalities, but a more plausible explanation for a child's being seen in one way at home and in another way at school is that the perceptions of the people involved differ from each other.

Torrance (1967) relates a description of a 13-year-old, retained in school, bored, withdrawn, disinterested; flunked because it was the only way to make him "buckle down or else."

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(and hence usually forgetting to take out the trash). She saw him as having an outgoing, bubbling personality and a terrific sense of humor. Two rather different perceptions.

The parallel between the above account and the accounts of Thomas Edison and Albert Einstein is painfully obvious (Patten, 1973, Thompson, 1971). Einstein in school had tremendous academic problems and apparently some behavioral problems as well. But at home he spent hours constructing intricate and colossal playing card houses, some of them 14 stories high. With his uncle (and not in school) he was able to prove the Pythagorean Theorem by a method of his own--before the age of ten (Patten, 1973).

Frustrated and hating school, Edison quit at age eight, three months after enrolling. From then on, whatever he learned, he learned in his own way. Both men had a verbal disability that contrasted sharply with their ability in non-verbal spheres of activity. Other great men also had unusual difficulty in learning certain aspects of language--particularly reading and spelling. Among those mentioned by Thompson (1971) are: Harvey Cushing, Woodrow Wilson, and Auguste Rodin.

Bannatyne (1973b) speaks informally of this problem of talented, creative, and/or highly intelligent children who have learning problems. Not all of the people he cited as examples had language problems. "Quite a few such as Tolstoy, Churchill, Hans C. Anderson, G. K. Chesterton, Kipling and Pestalozzi were later to prove themselves verbally talented. Yeats, the poet, found it difficult to learn to read and spell and even George Bernard Shaw tended to spell in a phonetic manner" (P. 348).

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Lest the reader think that all individuals with learning problems evolve into fantastically creative artists, Thompson (1971) also advances the hypothesis that Lee Harvey Oswald had a specific language disability.

Any one of these people may or may not have risen to the occasion if a test of creative thinking had been administered. But there are other ways of identifying the creative individual, and these are primarily based on observation of behavior.

Several researchers (notably Torrance, Barron, Gowan, Taylor, Getzels and Jackson) have addressed themselves to behaviors found in creative individuals. Again, however, most of the definitive studies have been on adolescents and adults. Interestingly, however, many of the behaviors mentioned by Torrance and Starkweather as evidenced in creative young children, are similar to behaviors found in adults. This is somewhat suggestive of De Hirsh's et al., (1966) consistent "style" or Salomon's (1971) "general ability" preference for learning. The traits or behaviors the writers describe are within the general realm of personality and intellectual characteristics. Which characteristics may be "personality" and which "intellectual," will not be dealt with.

In an attempt to document characteristics, first reference will be made to a study by Torrance (1967) in which 13 behaviors were identified. Additional behaviors which are mentioned in the literature will be added to this initial listing.

Eighty-seven teachers, counselors and administrators participating in a Creative Thinking Seminar were asked to list five

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behavioral indicators of creative talent. Analysis and summarization of the most frequently mentioned categories of behavioral indicators are as follows:

Curiosity, inquisitiveness, investigativeness, penetrating questioning, etc.	66%
Originality in thinking and doing, unusual solutions, unusual answers, unusual approach to problem solving, etc.	58%
Independent in thinking and behavior, individualistic, self-sufficient, etc.	38%
Imaginative, fantasy creating, story teller, etc.	35%
Non-Conforming, not bothered by acceptance of others, etc.	28%
Sees relationships, perceptive of relationships, etc.	17%
Full of ideas, verbal or conversational fluency, etc.	14%
Experimenter, tries new ideas, new products, etc.	14%
Flexibility of ideas and thoughts	12%
Persistent, perseverant, unwilling to give up, etc.	12%
Constructs, builds, or rebuilds	12%
Irritated and bored by routine and obvious, prefers the complex, copes with several ideas at the same time	12%
Daydreamer, preoccupied, etc.	10%

(p. 247).

In reference to the above characteristics, other authors have documented their existence and importance as indicators:

Curiosity: "Curiosity seems to be the central impulse of the creative personality, yet the conformity of society continually stifles this risk-taking endeavor" (White and Williams, 1971).

Curiosity, especially asking questions, is seen by Torrance (1970) and others as running a calculated risk because of possible ridicule by others.

> A survey of existing knowledge about curiosity indicates that it may be said in summary that curiosity is reflected in the number and type of questions asked, is an important element in creative thought, exists in varying degrees in all individuals, has both its inherited and learned aspects, and is an indication of the psychologically healthy personality (Torrance, 1966, p. 10).

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Originality: Primarily seen as the statistically infrequent response, but it is generally agreed that in order to be considered "original," the response must be adaptive to reality (Torrance, 1965).

Independence: In young children felt to be the degree to which they choose to exhibit conforming/non-conforming behavior. The values and attitudes of creative children are different, and this shows up in studies as being a rejection of the majority view--thought perhaps to be a function of divergency in general (Getzels and Jackson, 1962; Starkweather, 1964).

Gowan (1972) sees independence as a characteristic of boys; he's not sure about girls.

Imaginative/Imagination: "Imaginative role playing, telling fantastic stories, making unusual drawings, and the like are normal aspects of a child's thinking and a part of his way of experimenting and problem solving" (Torrance, 1969, p. 10).

Torrance also quotes Chukovsky, a Russian child psychologist who:

> ...also defends fantasy among both young children and adults. He believes that "fantasy is the most valuable attribute of the human mind and should be diligently nurtured from earliest childhood." (Chukovsky also believes that) ...without imaginative fantasy there would be complete stagnation in both physics and chemistry... (Torrance, 1969, p. 10).

Non-conforming: One of the interesting aspects of the Getzels and Jackson (1962) study of differences between highly creative and highly intelligent adolescents has a bearing on personality and intellectual characteristics. For the highly intelligent students the relationships between (1) the qualities they

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value for themselves and (2) those they believe lead to success as adults is quite close. For the high creatives, the relationship is virtually nil. The same is true of the relationship between (1) above and the qualities they believe teachers like in students. For the high IQ's a strong relationship, for the high creatives a negative relationship Getzels and Jackson suggest that this has educational implications. High creatives appear not to be success oriented or to identify in any way with what teachers are looking for, in fact, they choose the opposite in some cases.

Sense of humor: Getzels and Jackson report a prominence of sense of humor in the self-ideal of the creative, not only self-report or choice of this favored trait, but also they found humor pervades all the free-response protocols. Torrance (1970a) found humor to be a "creative positive" in disadvantaged.

Haptic-type behavior: The term "haptic" occurs in the literature in only a limited way (Lowenfeld, 1964), and yet it seems to encompass a multitude of characteristics, perhaps even a "style" by itself. This descriptor refers to an individual

> who is mainly concerned with the body-self; primarily a subjective type, feeling the self as the true action of the picture; concerned with muscular sensations, kinesthetic experiences, touch impressions, and all experiences placing the self in value relationship to the outside world (Good, 1959).

In art, the haptic individual uses the human figure as an interpreter of his emotions and feelings. (Picasso and Van Gogh are examples.)

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The following "creative positives" mentioned by Torrance (1970a) appear to relate to this behavioral characteristic:

> ability to express feelings...enjoyment and ability in art, drawing, painting, etc...in creative dramatics, dance... in music...responsiveness to the kinesthetic...expressiveness of gestures, "body language"... (p. 207).

Torrance has repeatedly found (1969, 1970b) that three personality characteristics stand out as differentiators of high creative and less creative children.

> First, the highly creative children have a reputation for producing wild or silly ideas, especially the boys. Their teachers and peers agree on this point. Second, their drawings and other productions are characterized by originality. This emerges as a highly differentiating factor both when the author uses the number of unique or unusual details and when he uses the number of non-essential details as indices. This finding helps to explain why some of these highly creative children do not show up better than they do on traditional intelligence tests. Their ideas simply do not conform to the standardized dimensions, the behavioral norms, on which responses are evaluated. Third, their productions are characterized by humor, playfulness, and relative relaxation (Torrance, 1969, p. 15).

In additon to these somewhat unusual characteristics, Torrance and others feel that our failure to accept certain types of socially undesirable behavior as indicative of creative potential has eliminated consideration of large areas of childhood behavior.

Barron (1962) suggests that there are certain socially disrated traits which may go along with the creative mode of responding.

> These include disorderliness, rebelliousness, and exhibitionism; while the socially valued traits which accompany it include independence of judgement, freedom of expression, and novelty of construction and insight (p. 27).

However, Barron goes on to state that psychopathic deviation (such as found on the Pd scale of the MMPI) is not found among creatives.

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Kubie (1958) agrees. He does not equate the creative process with neurotic behavior. He considers potential creativity to be as universal as the neurotic process, but quite distinct from one another. Kubie suggests, however, that the school's educative process (particularly repetitive drill) tends to reinforce the neurotic process.

It is interesting to note that even the "popular press" has begun to champion the cause of the creative child. In a recent Sunday supplement newspaper article entitled "How To Bring Out The Edison or Rembrandt in Your Child," (Martin, 1973) the following appeared as a part:

> The creative child is often labeled a trouble maker because of his innate hostility to authoritarian rule, because of his constant annoying questions, because he is easily bored and daydreams frequently. But it should be recalled through these trials these traits may cause a parent or teacher that the world's most creative thinkers--Einstein and Edison, for example--were called troublesome as children, even stupid and lazy, and were characterized by many teachers and peers as misfits (p. 23).

If space permitted, an equally long list of personality and intellectual characteristics of learning disabled children could be presented. Such a list appears in the Appendix, as do a few more checklists of creative behaviors. The interested reader will find many characteristics similar and some exactly the same. It is difficult to classify with certainty such characteristics as "curiosity," "wild and silly ideas," "freedom of expression," and the like. Such a decision about a child (i.e., creative versus learning disabled) may not even be a function of the child, rather a function of the person or persons doing the decision-making.

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The Measurement of Academic Achievement

Generally, and from a diagnostic/remedial approach in the field of learning disabilities, Myers and Hammill (1969) describe three somewhat distinct types of evaluation that contribute to a better understanding of the child's comprehension of "the verbal symbols surrounding him and his ability to formulate and use these symbols" (p. 29). These are: (1) the speech evaluation, (2) the language evaluation, and (3) the academic evaluation.

Since the above authors do not advocate all three types of evaluation being administered by any one person, and since a purpose of this study is replicability by a teacher, the academic evaluation only will be described. It does not necessitate extensive clinical-type experience in speech and/or language problems, as do the others.

"The academic evaluation is concerned solely with the decoding, association and encoding of graphic symbols" (Myers and Hammill, 1969 p. 53). The authors agree that the distinction between the oral (vocal) and graphic may be arbitrary, but they feel it is appropriate at this time.

In order to yield a profile that is of diagnostic significance, the academic evaluation should comprise six general areas:

1. Oral and silent reading ability
2. Oral and silent reading comprehension
3. Listening comprehension
4. Phonic and other word attack skills
5. Oral and written spelling ability
6. Oral and written arithmetic ability (p. 54).

According to Myers and Hammill, "the first five areas of the evaluation may be assessed through the use of any of several good

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diagnostic reading tests which are administered individually" (p. 55). They mention three such tests, of which one is the Durrell Analysis of Reading Difficulties, New Edition (Durrell, 1955). It has "the advantage of providing the examiner with estimates of the child's ability to respond to the graphic symbol system using both visual and auditory input modalities and vocal and motor output modalities, while only a single test battery is administered" (p. 55).

Ramsey (1972) summarizes the usefulness and the overall extremely adequate information the Durrell provides, although he does list some limiting factors, which will be discussed later in this section.

Lerner (1971) and Roswell and Natchez (1964) also mention the use of the Durrell in academic evaluation, and Lerner mentions in addition the Developmental Test of Visual-Motor Integration (Beery and Buktenica, 1967) and the Gates MacGinitie, (1964) which can supply further information on visual-motor performance skills and a comparative measurement of a group reading comprehension test.

Additional support for the use of the Developmental Test of Visual-Motor Integration is given by Gearheart and Willenberg (1970) who state: "This test should be recognized as representative of one of the more complete tools for evaluation of the visual-motor function in young children" (p. 34).

Several authors (including Myers and Hammill, 1969; Johnson and Kress, 1972) advocate the use of an Informal Reading Inventory or Assessment. This technique in a sense is a detailed study of a child's performance in the reading area and those language and thinking functions

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related to reading. The specific methods are not standardized; no norms have been established for performance compared with what other students can do. Instead evaluations are made in terms of absolute standards or gain in performance (Johnson and Kress, 1972). Many authors suggest using the tape recorder to allow later accurate analysis of the child's oral responses.

According to Johnson and Kress (1972) there are four purposes in using an informal inventory. Stated briefly they are:

1. Appraise achievement level in reading (independent, instructional and frustration levels)
2. Determination of specific strengths and weaknesses
3. Help the learner become aware of the above
4. Vehicle for evaluation of progress.

These purposes are in accord with the purposes of this study. For the remainder of this section on measurement of academic achievement, literature that related to the specific procedures chosen will be described.

1. Sight vocabulary measure:

> To appraise the child's immediate recognition vocabulary and use of word analysis skills, words are presented in isolation ...lists of words should be typed clearly, so that they can be flashed with a manual tachistoscopic technique for immediate recognition purposes. Clear, readable type should be provided so that there is no possibility of difficulty which results from the vagueness of the visual stimulus rather than from the child's inability to handle the particular word recognition task required. From each list of words two scores will be derived, one representing the child's immediate recognition of the words (flash presentation), and the second, his performance in working words out in an untimed situation. In each case, the percentage of words correct is the score (Johnson and Kress, 1972, pp. 194-5).

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Additional detailed explanation of this method of administration and scoring will be found in the Johnson and Kress article (1972). The actual words to be presented vary from situation to situation and examiner to examiner. The choice of the Dolch words and their ordering is in accord with clinical testing procedures (Dolch, 1960).

2. Informal measures of listening comprehension and auditory recall: The Durrell Analysis of Reading Difficulty does provide a reasonable measure of listening comprehension of one paragraph (Durrell, 1955). However, children are often asked to listen to stories or records that are much longer than one paragraph. Listening comprehension is often referred to as "potential reading level," therefore, for a learning disabled child, who has a low reading achievement level, (conceivably because of a visual perception problem or problems) it seems important to obtain some measure of potential reading level, plus what might be a measure of typical classroom performance (Larsen, et al., 1973).

According to Johnson and Kress (1972) criteria for judgement of adequacy of hearing (listening) comprehension are the same as those for establishment of instructional level. The child should be able to understand at least seventy-five percent of the material when it is read to him. Secondly, the child should, in responding to the material, show an oral language which is comparable to the language level of the material read to him.

In retelling or recounting something a child has just heard, Duckworth (1973) feels you can safely say the child understands if the

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message is told in his own words--rephrased to capture important passages. Repeating, (rather than rephrasing) does not indicate understanding.

To take into account (1) longer length, (2) understanding, and (3) responding, high interest materials (i.e., selected by the child) will be administered to, hopefully, control for motivation.

3. Informal handwriting assessment: Myers and Hammill (1969) mention certain motor functions as necessary elements of a learning disabilities diagnostic procedure. These include: copying geometric figures, drawing human figures, writing his name, letters, numerals, words, sentences.

Lerner (1971) has this to say about handwriting:

> Handwriting is the most concrete of the communication skills. The child's handwriting can be directly observed, evaluated, and preserved. It differs from the receptive skill of reading in that the measurement of the reading comprehension skill must necessarily be indirect, through the asking of questions; the child must verbalize in some way to let you know what he has read (p. 188).

Writing and learning to write are not easy. Writing is a thinking process, entailing smooth motor coordination of eye, hand, and finger muscles, in addition to accurate perception of the symbol patterns. Writing from memory demands the retention of visual and kinesthetic images of forms. In addition, a higher level of organizational skill is demanded (Lerner, 1971).

Any improvement in writing, therefore, can be adequately evaluated by improvement in writing, judged by actual examples.

The clinical or academic diagnosis has two purposes: (1) to collect information that will help in planning an educational or

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treatment program to improve the child's learning, and (2) to provide baseline measures against which future measures can be compared (Lerner, 1971).

Admittedly, this diagnostic battery is incomplete. However, it is a representative sampling and satisfies the above two purposes.

Evaluation by the Individual

In several of Torrance's studies, it was noted that there were significant differences in the measured creative behavior of children when exposed to many different types of evaluative conditions. Some children responded positively (direction of test scores increased) while others responded negatively (scores decreased). This observation reminds us of the significance of individualizing instruction. An important aspect of individualization of instruction relative to creative work is the <u>way</u> teachers talk with (evaluate) individual pupils about their productions (Torrance, 1964).

Sylvia Ashton-Warner (1963) takes a strong stand against correcting the writings of children. She states:

> You never want to say that it's good or bad.... You've got no right at all to criticize the content of another's mind. A child doesn't make his own mind. It's just there. I never mark their books in any way; never cross out anything beyond helping them to rub out a mistake, never put a stick or stamp on it, and never complain of bad writing.

According to Torrance, (1964) most American experts are not willing to abandon correction to that extent. In general, they maintain that a child writing for (or communicating with) others must write his thoughts correctly. The prevention and elimination of errors can

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Torrance (1964) describes a study in which the responses of teachers to children's writing were classified into four instructional approaches. (The stimulus was two examples of "The Cat Who Wouldn't Scratch," stories written by two children.) Each teacher response was classified as creative, critical, implicit or remedial. The creative category was scored when any reference was made to the creative aspects of the story: imagination, cleverness, humor, etc. The critical category included remarks about consistency, repetition, diction, sentence structure, balance, organization, etc. If the respondent attempted to instruct a student by example, whether by asking the pupil to read or to listen to stories or by using picturesque and stimulating words himself, his instructional response was labeled implicit. References to spelling, penmanship, punctuation, grammar and neatness were placed in the remedial category.

Torrance (1965) has summarized this issue:

> Concerning evaluative behavior, some authorities maintain that all external evaluation must be absent from the environment which nurtures successfully creative behavior. Others insist that all negative evaluation be made taboo, and still others emphasize the importance of using positive and negative evaluation in order to stimulate and develop creative thinking.
>
> Concerning the evaluative behavior of the creative personality, some advocate a "freewheeling," abandoned, uncritical attitude. Others stress the importance of sensitivity to deficiencies, and still others consider the key to be an attitude of constructive criticism (p. 2).

Even though a teacher's responses may be more creative than critical, implicit or remedial, some writers feel that the greatest

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personal growth and development in creative writing results from learning to evaluate one's own work. In a different analysis of the teacher's response in the above study, "self-evaluation" was mentioned as a technique by primary and intermediate teachers (30-34 percent of praise response), but not by high school teachers, and only minimally by undergraduates and graduate students (10-15 percent of praise responses).

Torrance's (1964) beliefs about the evaluative behavior of the individual are as follows:

> In view of the value which society places upon self-confidence, it might be regarded as surprising that educational procedures give so little attention to having pupils judge the value of their own work (pp. 2-23).

He does, however, mention a few people who have been concerned with evaluation by the individual.

Carl Rogers and Abraham Maslow place great importance on the self-concept as a determiner of behavior; Rogers has emphasized the importance of the internal locus of evaluation. Sears believes that the self-evaluative behavior of the individual may be more related to creative behavior than to school learning such as reading. Apparently very young children can learn to evaluate their own work: five year olds, for example, can think creatively. Such thinking is more likely to occur when the children evaluate their own work (Torrance, 1964).

Torrance (1965) believes that talking with children about their work is really important and deserves study.

> From the observations and studies of people who have worked with children in creative activities and have studied the lives of creative people, we also derive many clues about treating them so as to give them a better chance to develop self-evaluative attitudes more conducive to creative behavior. Most children like to talk about their creative activities, and it is difficult

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> to prevent some of them from doing so. Through such talk they clarify and develop their self-concepts as they relate to their creative functioning. It is my own observation that all, or almost all, children really desire and need such opportunities. Those silent ones who say little about their creative activities may have difficulty in developing healthy attitudes concerning the value of their ideas. In listening to children, young people, adults, or old people, it is important to remember that the originator of a novel solution needs to make a good argument for it. After being made to look bad, the originator of the novel idea is likely to present more commonplace, less original solutions (p. 25).

In Louise Clark's (1973) book describing the process of educating and living with a dyslexic child, a chapter of the book is devoted to how Mike (the child) views his disability and the problems associated with it. In his own words, here is how Mike sees this problem of evaluation by the individual versus external evaluation:

> When a person has been struggling to get a concrete view of the world, the tendency is to stick with it. After a while, you think that any view you can come up with that seems to agree with the majority of people is the one to hold on to. Now I have learned to go the opposite way. I spend a long time taking that image I share with other people apart, and looking at it in a way different from the rest of the world. Creativity is taking ordinary images and relevant facts apart and restructuring these rather random images in an entirely new way. Picasso did it in his abstract paintings.
>
> It is only our cultural training which says that certain colors go together, or dictates that certain lines form a cat or a bed. What happens in research is that certain ideas are culturally defined. Research says that while these may be the facts, there is no reason why one should follow their previous orientation. That is one of the big problems I had. Actually, in doing research, I discovered that all through my life until then I hadn't been willing to depart from the presented orientation. I was never strong enough to examine facts except in the light of the way a particular person presented them to me. I was just so pleased when I could retrieve the pattern of the original presentation. I think, too, that I was always afraid that if I didn't retrieve them in the original pattern I wouldn't be able to retrieve them at all. I'd lose everything (p. 131).

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His view is retrospective, of course, but as seen from the scientific framework he has gained (completing Ph.D., attended Harvard) it is definitely insightful. He describes, also, how difficult it was to get a perspective when he was in the middle of a problem, often with conflicting "helpful" suggestions being given by others. Only after years of hard struggle did he reach the conclusion that his way of looking at things may have been as good or perhaps better than those who sought to help him.

The possibility that other learning disabled children view the world only as externally controlled and evaluated is suggested also in Tognetti's (1972) work. His findings regarding the "locus of control" of students in learning disability and special day classes and regular classes suggest that the first two groups were less able to take responsibility for their academic successes than regular students. There is some indication that these same two groups do not take responsibility for their academic failures.

It would seem, therefore, important to study the effects of teaching a learning disabled student to take responsibility for evaluating his own work. In the long run, this might be a more cost effective and beneficial strategy than remedial and critical evaluation by numerous external sources.

Teaching for Creativity

As has already been illustrated, the factors that influence children's creative growth are complex. Out of this complexity, Williams (1972) presents six generalizations based on research findings. Two,

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the multiplicity of creative abilities and the universality of creativity, have already been discussed. The remaining four as stated by Williams are:

> Many individual differences exist not only in the amount of creative potential possible but also in the way it is expressed. For one child, it may be in music; for another, in arithmetic; for another, in dance, literature, science, art, ceramics, or athletics. Creativeness, whether found in the arts or in the sciences, has common attributes.
>
> Since creativity consists of many talents, attitudes, and abilities, it cannot be encouraged, identified, or measured singularly. There must be numerous ways to nurture it, just as there must be many ways to measure it. There can be no single or best strategy in teaching for creativity. Likewise, there can be no single or best test used to measure it.
>
> Creativity development necessitates the teacher's finding out about where the child is, and where he is capable of operating. Once this is determined, then each teacher should try to take the child from there by encouragement, stimulation, practice, and reward.
>
> There is a difference between teaching creatively and teaching for creativity. The first includes using new teaching tools, approaches, and materials. The second implies definite strategies which can cause children to think and feel creatively. Certainly, creative teaching techniques must be used in the classroom, but these are teacher behaviors and should be considered only as a means to an end. Encouraging or modifying children's behaviors toward more self-actualization, independence, self-sufficiency, and becoming effective thinking and feeling human beings should be an end goal or set of objectives when teaching for creativity (pp. 12-13).

Parnes (1967) states this a little differently:

> We still know little about what "creativity" really is. But we do know how to stimulate greater creative behavior in individuals. It is a matter of helping them to release whatever creative potential they possess, like removing the governor from an automobile. The individual's creative ability is frequently so repressed by his education and experience that he cannot even recognize his full potential, let alone realize it (p. 34).

Although the process of releasing creative potential is a bit hard to get a handle on, there are a few principles, guidelines, suggestions,

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Renzulli (1973b) suggests that there are seven principles. The principles of:

open-endedness
fluency
environmental relevancy
enjoyment
mild competition
active teacher participation
self evaluation and peer evaluation.

A situation in which these principles are employed would have children working with the teacher, competing to find multiple relevant, enjoyable educational experiences which they would then evaluate by criteria which they themselves generate.

Because of the complexity in trying to explain the entire process, perhaps it would be appropriate to factor out at least some of the components, if only to look at them just a little more closely. It is not suggested that any of these factors in reality or in practice can ever be separated from any other. They are all too totally interactive.

In teaching for creativity three somewhat distinct variables emerge: environmental variables, teacher variables and learner variables. Only a few will be listed here.

Environmental Variables

Parnes (1971) believes that education can do much to help the individual achieve what he calls "fullest self-realization," whatever the individual's level of native capacity. Many people seem to possess

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the seeds of creativeness, but the environment fails to provide the proper nourishment for growth. Some of these properly nourishing situational variables are:

Openness or Open Education

Torrance (1970a) states:

> Perhaps the most essential characteristic of self-motivating learning experiences is incompleteness or openness....The incompleteness may be encountered in pictures, stories, objects of instruction, the behavioral settings of the classroom, or in structured sequences of learning activities....In answering the child's questions, information is frequently given as incomplete. The incompleteness and changing nature of the objects presented are emphasized....(p. 53).

Duckworth in an article entitled "Piaget in the Classroom" (1973) describes open education as being situationally determined by learner interest. This in turn leads to application of knowledge. She contrasts this with "closed education" promoted by stimulus-response psychology, in which the learner is the receiver, and efficiency in learning is emphasized. One difficulty comes in trying to evaluate in the open system.

Piaget (1973) suggests that raising questions is as important as knowing how to solve them. He suggests that we ask ourselves whether we will facilitate the tendency found in most children or just try not to kill it. He believes that a truly open environment will facilitate this tendency with many appropriate materials.

Alternatives Provided

Many of the authors speak of ways in which the environment can facilitate the learning experience. In many cases, these can be seen

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as providing alternatives for the learner to pursue learning. Torrance (1970a,b) suggests providing the learner a chance to learn in preferred ways; providing the learner a chance to communicate what he has learned --in his most expressive mode; providing the learner with some structure, some guides to behavior.

Self-initiated Activities

A responsive environment promotes and encourages the learner seeking out new and different activities, which he himself chooses to pursue. Often these activities have not been thought of by even the most creative teacher.

> He will produce things that go beyond the wildest predictions of the teacher or the curriculum maker. This is a major reason why the creative child makes the insecure, authoritarian teacher so uncomfortable and is punished so severely by such teachers. It is also the reason the secure teacher finds such joy in teaching such children. Many of the child's guides to behavior come from the way the teacher responds to him and especially to his self-initiated attempts to learn (Torrance, 1970b, p. 204).

Purpose and Meaning

Genuine purpose and meaning need to be provided for the learner for each learning experience (Torrance, 1970a). Note that Torrance mentions purpose is to be provided to the learner, not only to the administration and other teachers. Perhaps we forget in learning that the learner needs to understand why we are doing certain things and not just what, who, how, when, and where.

Unevaluated Practice

Torrance (1965) suggests, and supports with studies of young children, that periods of unevaluated practice will help a child

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become more open, responsive, and less defensive in the learning situation. Perhaps this principle is not in accord with stimulus-response psychology which suggests that all responses need reinforcement for learning to occur, but perhaps also it fits into the construct that an intermittent reinforcement schedule carries with it the highest probability for continued learning. In any case, Torrance feels this is important, and this writer feels it should be given strong consideration in the case of a learning disabled child who seldom is provided with this option.

Evaluation Tied in with Causes and Consequences

Torrance in all of his work suggests that evaluation, when it occurs, should be tied in with causes and consequences. Particularly with behavior--appropriate or inappropriate--it is important to try to understand the probable and possible causes of a behavioral event occurring and what probable and possible consequences the event will precipitate. For example, if a child continues to make letters inappropriately because he does not see differences (or whatever else the possible reason), others will not always be able to understand what he wants to communicate (and thereby other consequences will be precipitated). Evaluation, with a cause/consequence outcome, is a process that must be provided in a responsive atmosphere.

Teacher Variables

For anyone who is a strong champion of individual variability or differences, there is a recognition that teachers also differ on the

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same variables that we see and evaluate in learners. Thus, it is very important to determine if a teacher can accept the basic philosophy/ belief system described thus far. Williams goes so far as to outline twelve questions that a teacher must ask herself before embarking on a planned program of teaching for creativity (Williams, 1972).

1. Are you genuinely interested in each child's intellectual as well as emotional development?

2. Do you want to significantly increase the number of strategies you can use to cause children to learn?

3. Do you really want to accommodate intellectual differences that exist among all of your pupils?

4. Do you feel a classroom should be concerned with and accommodate the emotions and distinct personalities of each pupil?

5. Should creativity be rewarded, regardless of the subject in which it occurs?

6. Do you enjoy children asking stimulating questions which you cannot answer?

7. Are you comfortable with children who can think faster and figure out better ways of doing things than you can?

8. Are you able to tolerate divergent thinking, even if the class is noisy and disorderly?

9. Do you really care about dealing with emotional problems of a child, even if this disrupts your planned lesson?

10. Do you think pupils can be creative at the same time they are learning subject matter?

11. Do you think your classroom needs some new innovations and changes?

12. Do you think education should be primarily concerned with encouraging and developing certain thinking and feeling processes, rather than with teaching a subject? (pp. 15-16).

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He suggests that teachers who are able to answer "yes" to the majority of the questions are ready to begin. On the other hand, if the answers are mostly "no," he recommends that the teacher re-examine his/her attitudes and motives toward teaching.

On the assumption that the teacher is positively oriented toward teaching for creativity, let us look at the teacher characteristics which should be present. Except as otherwise noted, these characteristics have been extracted from Torrance's work with teachers over a ten year period. They have been analyzed and found to be important teacher variables.

Responsiveness: The teacher needs to be responsive to and respectful of unusual and imaginative ideas, a plethora of questions.

Flexibility: The teacher needs to be able to cope constructively with unforeseen events, last minute changes in schedules, plans and new forces that upset the direction and flow of their pupils' activities.

Spontaneity: The teacher must be able to react to events quickly and confidently.

Respectfulness: A teacher must let the student know he is important, respected, valued. A quote from Mike, the adult dyslexic, (Clark, 1973) illustrates this. He is describing the one teacher he feels "made a lot of difference": "She had that gift of being able to make me feel so strongly that I was helping her. That meant a lot, beyond the actual process of putting the things together" (p. 129). A teacher who is respectful will give students a chance to use what they learn as tools in their thinking and problem solving.

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Originality: "...teachers cannot follow a course that others have mapped for them. They are constantly forced to adapt materials and create new ones, devise new techniques, and respond to the unexpected" (Torrance, 1970a, p. 3).

Knowledgeability: Teachers need to have competencies in task analysis and task description, so that they can selectively and individually match the difficulty level of the task to the abilities of the child. Tasks must be sufficiently difficult to challenge and not bore the child.

Intuitiveness: Teachers must often be intuitive in their judgements, trusting their hunches. So often there just isn't time for careful analysis of the situation that demands immediate action.

Sensitivity: Teachers must have something that is akin to "ESP" in certain situations. They must be able to "sense," for instance, when to call a halt to a situation or experience that would not be beneficial if continued. They must also be able to "sense" resistance or defensiveness and know or feel when it would be appropriate to proceed in spite of this.

Receptivity: Teachers must often be good observers. Watching and listening to children perform can reinforce the belief that there are many different kinds of excellence and ways of expressing it.

Communicability: Teachers who recognize and value such differences, will openly communicate their feelings.

In looking at these variables, it would be wise to bear in mind what Torrance (1965) has to say about the genuineness of these characteristics:

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> A basic problem in providing a responsive environment is that many teachers do not genuinely respect individual differences. Some well-meaning ones think that they are being respectful of differences when they are merely tolerating them....merely tolerating differences indicates that the differences are distasteful and that we have to put up with them. Respect cannot be shown until the teacher recognizes that each child is unique and is glad to have the daily opportunity of enjoying the expression and development of each child's uniqueness (p. 22).

Learner Variables

Torrance and others indicate that children with higher creative potential value and prefer to learn in creative ways. Implied, but not specifically stated, is that there may be some types of children for whom this strategy or technique would be inappropriate. At some later point in time, it might be valuable to know the types of learners for whom this holds true, but in this study, there happens to be a focus on those specific children for whom this is appropriate.

The reader can refresh his memory by rereading the section of this chapter that describes personality and intellectual characteristics as well as the section that relates to the diagnostic value of standardized measures of creativity.

The purpose of an intensive evaluation of these learner variables is to select children for whom teaching for creativity would be most appropriate. At this time, it is left for the reader to decide if there are, in fact, learning disabled children for whom teaching for creativity would at any time not be recommended.

Summary

In this chapter, four models of treatment currently employed in dealing with learning problems are presented (Salomon, 1971). The

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most common, "the remedial approach," has many shortcomings (Mann and Phillips, 1967). Support is built in the first section for the use of the "preferential model," in which the treatment exploits the strong points in the learner's characteristics. Statements and data regarding teaching for creativity in a learning disabled child are presented. These statements reflect a philosophy of individualizing instruction, which is further supported from a research point of view in the second section entitled "The Intensive Design." Definitive and historically important case studies are mentioned (Dukes, 1965) and the rationale behind intensive, descriptive study of an individual is presented (Thoreson, 1972) particularly in the case of a learning disabled child.

In the third section, Diagnostic Value of Measures of Creativity, several key aspects of the creative process and the creative person are explored. The major amount of information in this section is taken from Torrance's extensive and distinctive work in the area of creativity over the last ten years. Several interesting accounts of famous people who had a childhood history of learning problems are related. The personality and intellectual characteristics of a creative person are presented in such a way that the reader is encouraged to value this divergency and to think of it positively as a strength, rather than a behavioral problem to be remediated.

Accurate and meaningful assessment of a learner's weaknesses is also a necessity. The fourth section, Measurement of Academic Achievement contains a brief review of the current thinking regarding the academic diagnostic tools chosen for this study.

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In the next section, Evaluation by the Individual, there is a focus on why it is important for a learning disabled child to learn to evaluate his own work. Current thinking of the relatively few individuals studying this phenomenon is reflected. A quote from a learning disabled adult (Clark, 1973) is particularly illuminating.

In the last section, Teaching for Creativity, what has been described in the previous sections is brought together in a meaningful way. The three interactive components: environment, teacher and learner are highlighted to display in panoramic form what will be found in later chapters when the reader explores further the effects of teaching for creativity in a learning disabled child.

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CHAPTER III

DESIGN OF THE STUDY

Selection of Subject

The subject chosen for this exploratory study was a seven year, four month old, white female, identified by her school as learning disabled. The school is located in a suburban community of Lansing, Michigan. The child had received help from the school learning specialist and the remedial reading teacher during the first grade, which she had just completed. Referral to a school district psychologist resulted in the recommendation of intensive psychological counseling for the child and her parents.

Both parents, and more especially the mother, felt she was different, but viewed the differences as "charming" and "delightful," although sometimes exasperating. They were aware of academic deficiencies, but felt behavioral "deficiencies" were a result of her unique personality, and the different way she liked to approach things.

Reported difficulties in school were in reading, arithmetic, peer group acceptance, impulse control and short attention span. According to the classroom teacher, the child often expresses wild and unusual ideas, and her drawings often were unlike the other children's. She was given to singing and humming at unusual times, and often "acted out" stories or songs in bodily movement.

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Prior to beginning treatment, a contract was signed between the experimenter and the child in which the child agreed to work for a maximum of 1 1/2 hours a day until school started and the experimenter agreed to supply ten small, mutually agreed-upon surprises and one bonus prize for this work. A copy of the contract is included in the Appendix.

Research Setting

For purposes of an intensive exploratory look at the nature of the learning process under controlled conditions, it was decided to do all experimental work in a non-school setting, when school was recessed for the summer. No other planned, systematic psychoeducational intervention occurred during this time. All treatment took place in the experimenter's own home, with measures taken to assure as little interruption as possible. The choice of a home situation rather than a school-type setting is in accord with a statement by Guilford (1967), "It is very doubtful that the ordinary schoolroom offers opportunities for observing all the significant aspects of creative behavior that would provide an adequate basis for making judgements (about creative behavior)" (p. 164).

The child's preference for a "work area" was a 3' by 5' coffee table at which she could work while sitting or kneeling on the floor. On the table were arranged approximately 20 pencils, ball point and felt tipped pens. Some clinicians prefer to have an instructional setting that little resembles a typical school setting, particularly if the school setting has been onerous to the child.

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Instructional materials and equipment available in this setting include:

1. Sony TC 45 portable cassette recorder with condensor microphone for taping sessions.

2. Phonograph and collection of children's records, primarily Walt Disney selections.

3. Bookshelves containing materials such as books, cards, glue, paper, etc.

4. Two children's encyclopedias: The Book of Knowledge and The Encyclopedia of the Animal World.

5. Past issues of the National Geographic Magazine from 1962.

6. A collection of children's books available from the public library, Parents Magazine Book Club, Weekly Reader Book Club, and Ranger Rick's magazine. (Many of the books were past winners of awards for excellence.)

7. Miscellaneous odds and ends, such as Lego Blocks, pieces of foam, scraps of materials, etc.

8. Cuisenaire rods.

9. One live dog: a five year old Weimaraner who refused to be separated from his adopted protege. (Note: The dog became an important part of the learning process. His part will be discussed in later chapters.)

The parents were cooperative in setting a schedule that included time set aside from 9 to 11 a.m., six days a week for a total of six weeks.

Design

The design of this study is a combination of successive treatments design (ABACA) and a multiple baseline-controlled intervention design. According to Thoreson (1972) the multiple baseline procedure is an alternative to the more typical reversal design (ABAB) and the

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successive treatments designs (ABACAF) in which only one treatment or sequence of treatments and one behavior can be studied at a time.

In the multiple design two or more behaviors of the person may be measured over time so that several baselines are gathered. Wolf and Risley (1971) have suggested that the multiple baseline design is very useful when carried out across two or more environmental conditions with the same response(s) and on the same subject. This design is very appropriate in this study because of the research questions of concern.

The main advantage of the multiple baseline design is its flexibility. The researcher is not limited to one behavior and one situation. Many design combinations of persons and situations and behaviors are possible. In this case, the combination of successive treatments was chosen. It was desired to study the effects of the two treatment procedures on many aspects of the child's behavior, broadly defined as academic achievement, creative thinking abilities and evaluative effort.

This experimental study of the individual will help focus special education research on the "basics" of scientific inquiry: experimental control and systematic replication.

The terminology used in this explanation of the design will be used throughout the remaining chapters. The symbol "A" refers to a baseline period. The arabic numeral refers to the specific period (i.e., first, second or third). The symbol "B" refers to the first treatment period, in which an attempt was made to determine the specific nature of the child's creative thinking abilities and to provide multiple opportunities for using these abilities. The symbol "C" refers to

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the second treatment period during which an attempt was made to allow the child many opportunities to develop and use her own evaluative abilities. The figure symbolically describing this design appears below.

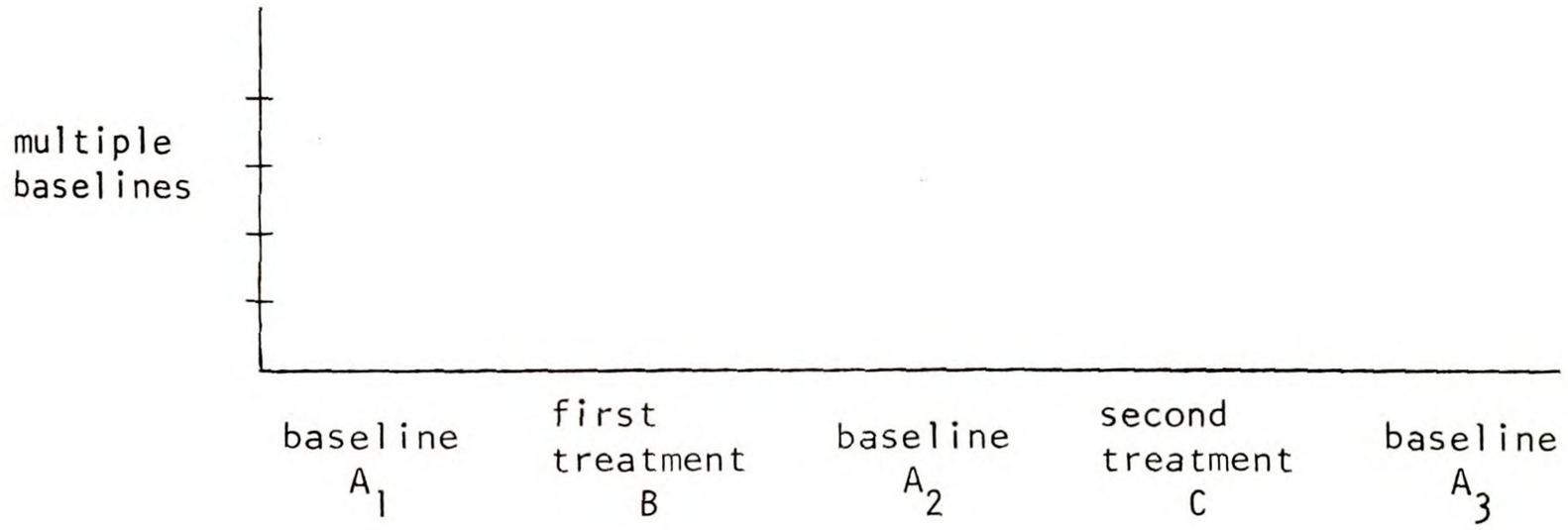


Figure 3.1.--Design

During the baseline periods no attempt was made to facilitate either of the goals of the treatment (controlled intervention) periods. That is, the measures described under Academic Achievement, Creative Thinking Abilities and Evaluation by Child were administered under non-intervening conditions.

Figure 3.2 illustrates the above design in terms of the specific overall procedures employed. The ultimate objectives of the entire procedure and this study can be found in the last column: (1) to evaluate change in academic achievement, (2) to confirm the diagnostic profile of creative strengths, and (3) to evaluate change in evaluative effort on the part of the child.

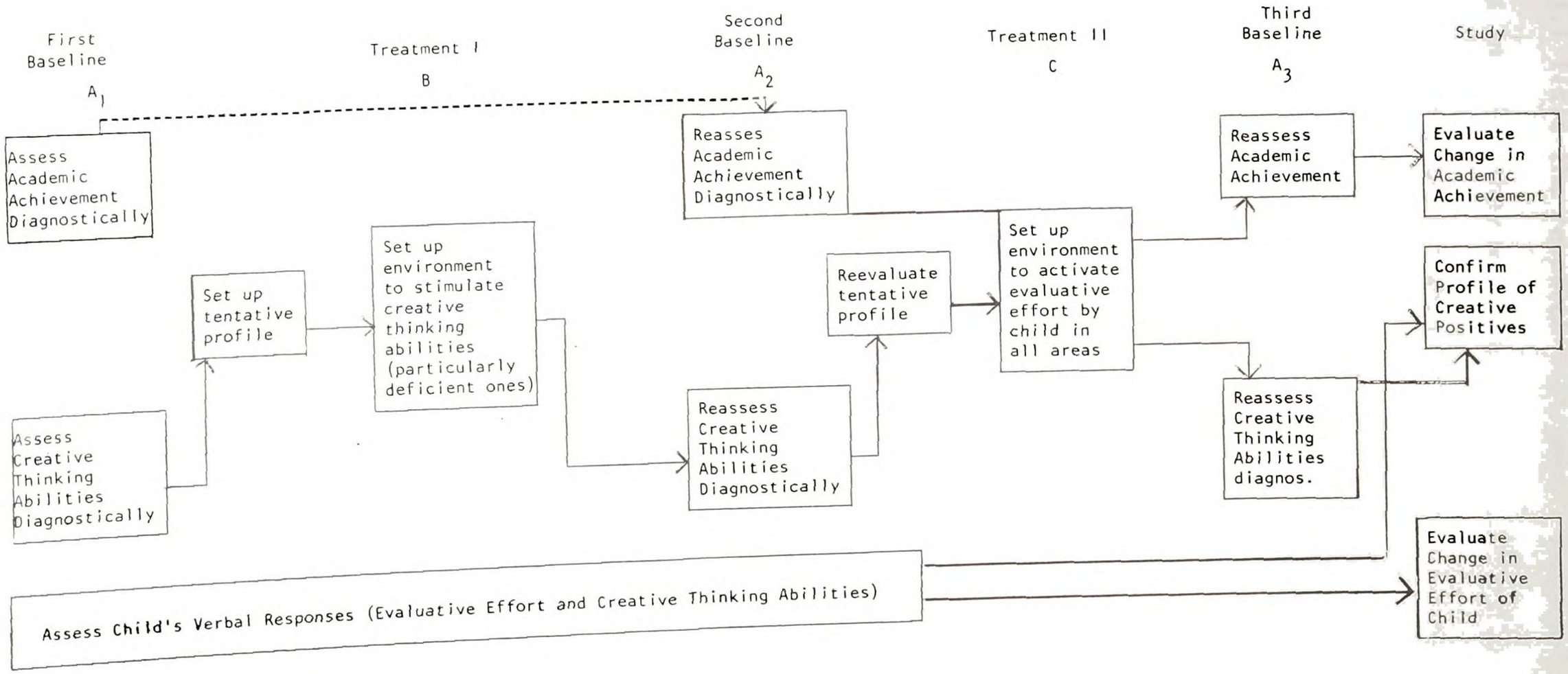


Figure 3.2.--Procedures of the Study.

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Table 3.1 lists the research instruments (measures) and the baseline periods in which they were administered. The alternate form given is listed under the period when appropriate. The measure labeled "Response Form" was used also during the two treatment periods. It was the only measure employed on a systematic daily basis for the entire study.

This exploratory study took place over a period of 33 days, involving work Monday through Saturday with Sunday seen by both experimenter and child as a day of rest. The actual recorded time for all sessions was 33.5 hours. The treatment periods were kept constant at ten days apiece. The baseline periods varied, presumably due to the length of time necessary to administer the scheduled measures. Table 3.2 lists the time involved.

Procedures

Overview

Diagnostic Battery

One purpose of this study is to identify a diagnostic battery (from all the research measures used in this study) that would help in planning a treatment program for a learning disabled child with an emphasis on the learner's strengths rather than weaknesses. In this Chapter the measures chosen for this study are described in detail and in the next Chapter the data gathered while using these measures is presented. The specific research questions to be answered relate to the variables that the research instruments are supposed to measure. The choice of "best" measures for a diagnostic battery is a clinical one based on the amount and type of data recorded during the study.

Table 3.1.--

		Research
Evaluation by Child	Academic Achievement	Gates Ma
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Table 3.1.--Research Instruments Used During Baseline Periods.

	Research Instruments	Baseline Period		
		A_1	A_2	A_3
Academic Achievement	Gates MacGinitie	Form 1		Form 2
	Durrell			
	Oral Reading	Alt. passage	Alt. passage	Alt. passage
	Silent Reading	Alt. passage		Alt. passage
	Listening Comprehension	Para. 2 & 3		
	Naming Letters	Chart		
	Informal Reading Assessment	Sight words Alt. story	Sight words Alt. story	Sight words Alt. story
	Developmental Test of Visual-Motor Integration	Same form	Same form	Same form
	Informal Handwriting Assessment	Same form	Same form	Same form
Creative Thinking Abilities	Figural			
	Picture Construction	Jelly bean shape	Teardrop shape	
	Incomplete Figures	Form A	Form B	
	Circles and Squares	Circles	Squares	
	Verbal			
	Ask and Guess	Alt. picture	Alt. picture	Alt. picture
	Unusual Uses	Tin Cans	Cardboard boxes	
	Product Improvement	Toy dog	Toy monkey	
	Imaginative Stories	Form A	Form B	Parts of A and B
	Response Form*	Same form	Same form	Same form
Evaluation by Child	Response Form*	Same form	Same form	Same form
	Dolch Words	Same form	Same form	Same form
	Math Problems	Same form	Same form	Same form

*Also used during both treatment periods.

Table 3.2.--Ti

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Table 3.2.--Time Per Period.

Period	Time	
	Days	Minutes
First baseline (A_1)	6	319
First treatment (B)	10	623.5
Second baseline (A_2)	4	199.5
Second treatment (C)	10	663
Third baseline (A_3)	3	209.5
TOTALS	33	2014.5 (33.5 hrs.)

The measures used in this study can be divided into three types: (1) measures to assess academic achievement, (2) measures to assess creative thinking abilities, and (3) measures to assess evaluative effort on the part of the child. These measures were chosen specifically for their ability to help answer the specific research questions in this chapter.

The intent, data recording and dependent variables differ in each of the three areas mentioned above. A summary of the measures in each of the areas is provided in Table 3.3. There is, however, some overlap. The reader will note that the child's verbal responses as recorded on the "Response Form" fall into two different areas, (i.e., creative thinking abilities and evaluation by child.)

TABLE 3.3.

Academic Achievement			Creative Thinking Abilities			Evaluation by child	
Research	Gates	Durre	Inform	Develo Mo	Inform	Figu P I C Ver A L R	R

TABLE 3.3.--Research Instruments and Variables.

	Research Instruments	Variables
Academic Achievement	Gates MacGinitie	1. Vocabulary 2. Comprehension
	Durrell	3. Oral Reading 4. Silent Reading 5. Listening comprehension 6. Letter naming
	Informal Reading Assessment	7. Sight word recognition 8. Listening comprehension
	Developmental Test of Visual-Motor Integration	9. Copying maturity
	Informal Handwriting Assessment	10. Organization 11. Visual motor sequencing 12. Structure of symbolic forms 13. Perception of size 14. Spatial relationships
Creative Thinking Abilities	Figural Picture Construction Incomplete Figures Circles and Squares Verbal Ask and Guess Unusual Uses Product Improvement	15. Fluency 16. Flexibility 17. Originality 18. Elaboration 19. Closure
	Imaginative Stories	20. Organization 21. Sensitivity 22. Originality 23. Imagination 24. Psychological insight 25. Richness
	Response Form	26. Clarifying questions 27. Clarifying comments
Evaluation by Child	Response Form	28. Judgemental questions 29. Extraneous questions 30. Judgemental comments 31. Extraneous comments
	Dolch Words Math Problems	32. accuracy 33. Congruence 34. Time

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Tape Recording of Data

All sessions were tape recorded in their entirity for later classification and analysis. Model Sony TC 45 was chosen because of its small size and portability, digital counter, and built-in condensor microphone. The tape recording device offers the advantage of a permanent and complete record, making reliability checks and new hypotheses formulation possible at a later date. It reduces the reliance on human memory and allows natural speech to be accurately analyzed (Webb, et. al., 1971).

Renzulli's (1973) comments on the use of tape recorders with disadvantaged youngsters apply to learning disabled children as well:

> ...because most youngsters have a greater facility with the spoken rather than the written word, it is especially important that the disadvantaged child not be required to "write down" all of his responses. Tape recorders or human recorders can serve in uncovering higher forms of thinking which might otherwise go undetected because of limited writing ability (p. 441).

Immediately following each session the experimenter listened to the tapes of the session and transcribed them word for word. Each tape and transcription was labeled with: the number of the tape and side, the date, the specific baseline or treatment period, which day within that period, and the tasks undertaken during that day. Periodic readings from the digital tape counter were recorded on the left hand margin of the transcription. The digital readings for each task were labeled on the tape. Each tape looks approximately like Figure 3.3 on the following page.

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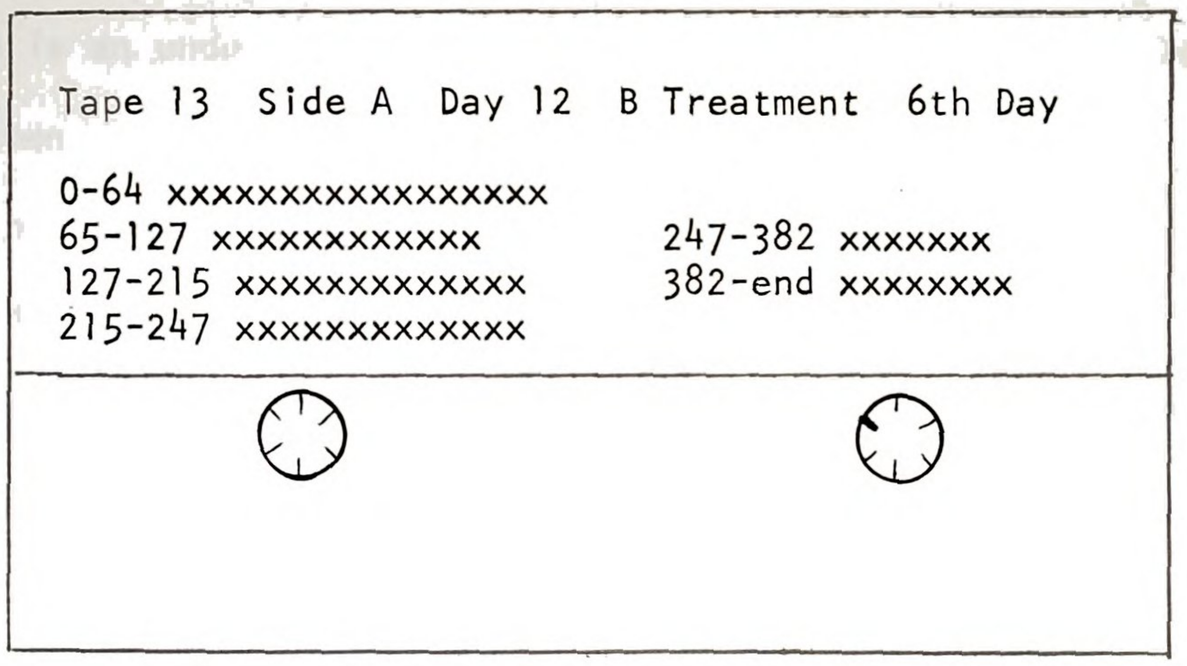


Figure 3.3.--Response Tape Illustration.

All tapes have been stored for later retrieval, if necessary.

The handwritten transcription looks approximately like this:

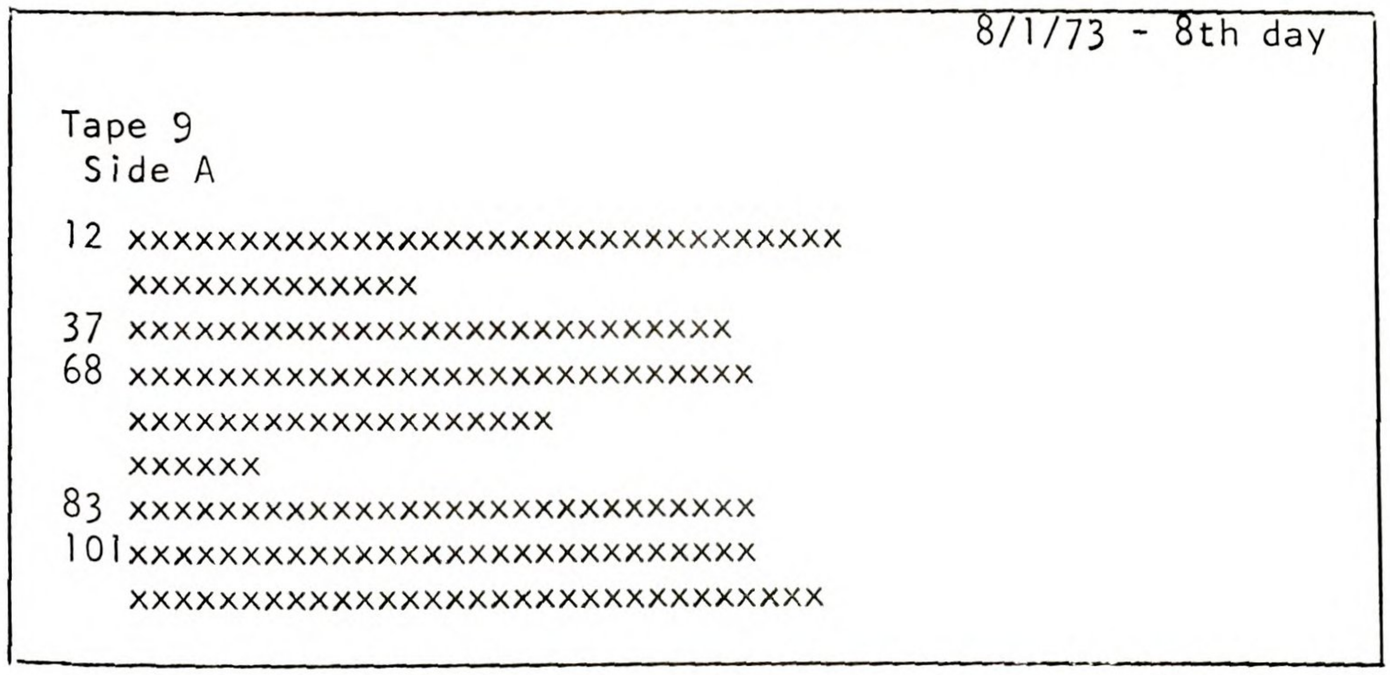


Figure 3.4.--Tape Transcription Illustration.

Note: The double line indicates a break between specific instructional tasks.

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Although the two treatments differ in their specific objectives, there is an underlying thread of continuity that flows through both treatments. The treatments in other words are not mutually exclusive but they are consecutive. In a sense, an artificial cut-off point was introduced by including the second baseline period. But it is, nevertheless, an important distinction and allowed some decisions to be made about the two types of environments and the structured objectives of each.

The two treatment programs are process-oriented. The teacher-child relationship is very definitely process-based in this study. Both treatments had an underlying focus of situational or environmental comfort. This does not imply that the child did not experience some discomfort or unease, but that, when experienced, it remained within her "tolerance of frustration" range.

For example, to facilitate more responses from the child in regard to a particular task, it became necessary in both treatments to probe more than she was used to--i.e., "Think of some more reasons, what else can you think of?..." When the child felt relaxed in the situation and when she felt the mutual trust, she responded as intended whenever possible.

This relationship and the process trend flow underlying both treatment programs is represented in the following figure.

The overall purpose of the first treatment was to (1) increase the tendency to respond to open-ended situations and to (2) increase

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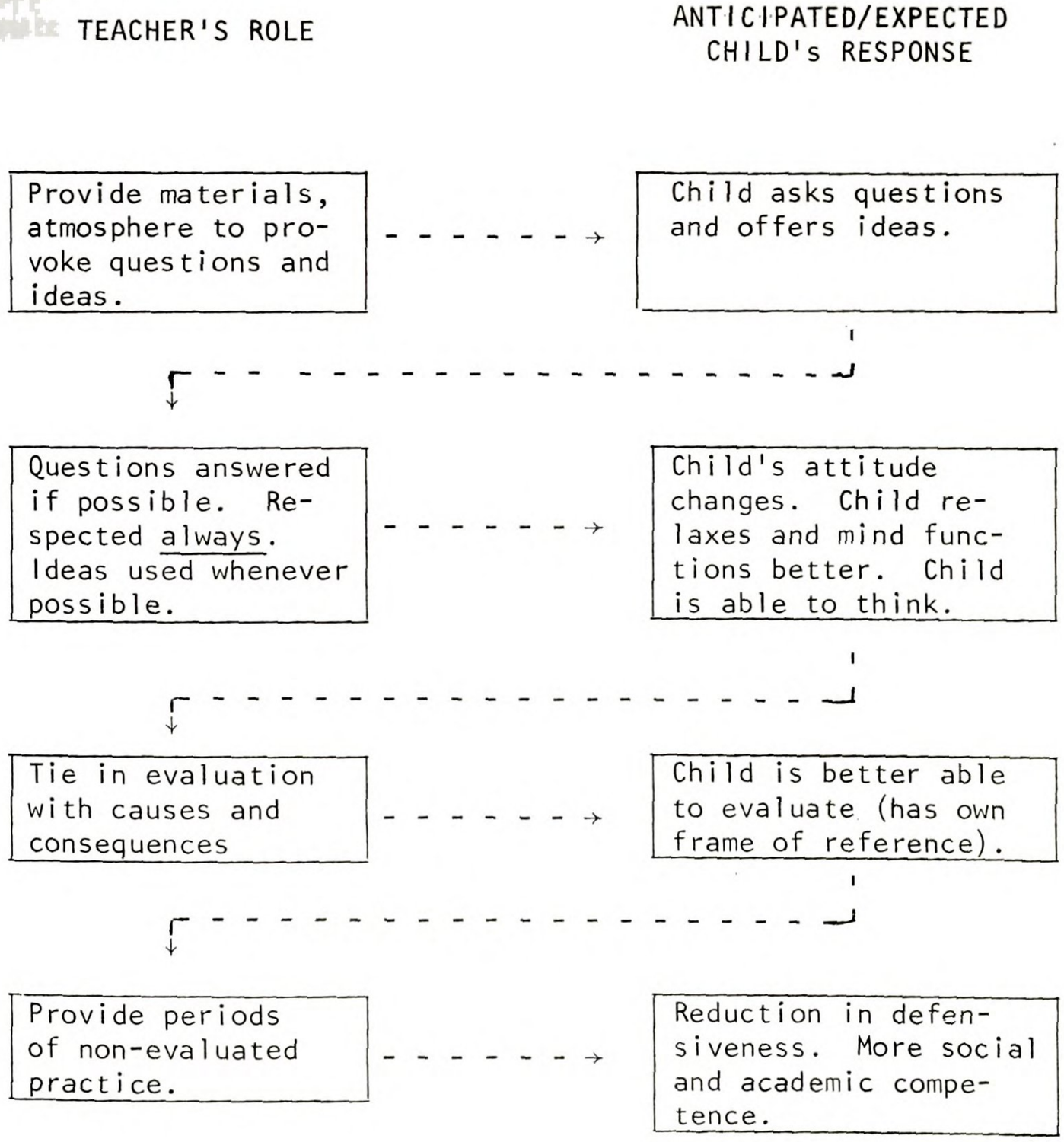


Figure 3.5.--Process Trend Flow of Teaching for Creativity.

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the number and types of responses to each situation, so that in the second treatment period there would be a willingness on her part to evaluate her own work, given that there were more responses to draw upon.

The processes involved in achieving these goals and objectives are generally described in global terms--i.e., "respect a child's unusual responses," "value individual differences," etc. (Torrance, 1970a). Even Figure 3.5 is rather general. However, by following this process, it was possible to systematically gather more specific data and to represent this data in the form of exemplars, principles and two flow charts which can be found in a later section of this chapter where the two treatments are described in more detail.

Treatment I

The first treatment program had as its goal setting an environment that stimulated the child's creative thinking abilities. The scores on the creative thinking measures used during the first baseline period provided a point estimation of the child's creative thinking abilities, (a tentative profile) but a characteristic of a learning disabled child is variability in behavior (Capobianco, 1971). It was felt that if the environment during the first treatment period were sufficiently structured to allow multiple, varied, original and elaborate responses to emerge consistently, then the child would be able to use these creative strengths on a consistent basis in the second treatment period.

In addition, if the tentative profile that emerged was tremendously discrepant (i.e., some abilities much higher than others),

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there might be some advantage in improving the less visable (or lower) cognitive-intellective aspects of creativity. At the end of the first treatment period there emerged a somewhat more consistent profile of creative strengths which was then used during the second treatment period.

The procedures used during the first treatment (B) are described in detail in a later section of this chapter.

Treatment II

The second treatment program had as its goal setting an environment which allowed the utilization of creative thinking abilities to activate evaluative effort on the part of the child. The creativity profile generated during the previous baseline and treatment periods was employed systematically to allow the child opportunities to evaluate her own performance in all areas.

There were specific procedures employed during this treatment period (C) which were expected to generalize across all areas of academic and social behavior. These procedures will be described in detail in a later section of this chapter.

Diagnostic Battery

The diagnostic battery in this exploratory study is representative but not exhaustive. To assess even a small sample of a child's behavior is a complex task. The representative sample of measures used in this study is described on the following pages. To allow the reader some clarity in reading through this section, the headings have been

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organized according to the area the measures represent: (1) academic achievement, (2) creative thinking abilities and (3) evaluation by child. The data gained from one measure (the Response Form) has been used in assessing both creative thinking abilities and evaluation by child. The specific parts of this measure will be described separately in light of the general area to which the data relates.

Academic Achievement Measures

The measures chosen to assess academic achievement vary. Three are standardized measures and can be analyzed in terms of the variables they are said to measure. Two are informal assessment devices organized to investigate specific aspects of academic achievement. Procedures for designing, implementing and evaluating these informal measures were taken from previous studies and are in accordance with recognized procedures. (See Chapter II: Measurement of Academic Achievement.)

The five research instruments will be described separately.

Gates-MacGinitie

The Gates-MacGinitie Reading Test (Gates and MacGinitie, 1964) Primary A, is one of several standardized reading achievement tests that can be administered to students in the first grade. The form which measures Vocabulary and Comprehension was chosen as these are considered important reading variables which relate to academic achievement. Two parallel forms of the test (Form 1 and 2) are available. There are 48 items in the Vocabulary section and 34 items in the Comprehension section of each form.

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Analysis of performance on this test is usually given in terms of: number correct, standard score, percentile score and grade score for both the Vocabulary and Comprehension sections. For this study additional data was recorded: number of errors, number attempted, number skipped, and percent correct of those attempted.

The Vocabulary and Comprehension sections were administered consecutively during the first day of baseline periods A_1 and A_3. Total time for this measure was recorded. Total time allowable is 40 minutes.

Durrell

The Durrell Analysis of Reading Difficulty, New Edition (Durrell, 1955) is an individually administered measure which yields a profile of reading ability. The age range is from six to twelve and the grade range is from beginning first to beginning seventh grade.

Of the seven tests that are listed on the record booklet, only four were chosen for this particular child. The four subtests administered were: (1) oral reading, (2) silent reading, (3) listening comprehension and (4) naming letters. A brief discussion of these subtests follows.

In the oral reading subtest, the child was given a paragraph to read at the pre-primer level. A different, but equivalent paragraph was given during each of the three baseline periods. Analysis of the performance as given by the manual was in terms of number of errors, comprehension and time. Clinical impressions of the child's performance on the oral reading subtests, as well as the other subtests, were also recorded.

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In the silent reading subtest, the child was given a different paragraph to read; again at the pre-primer level. This subtest was given during the first and last baseline periods. Analysis of the performance was in terms of memory for details, assisted and unassisted. (Both the oral and silent reading stimulus paragraphs are printed on orange and blue heavy stock paper, a factor which could influence a child with a visual figure-ground problem.)

For the listening comprehension subtests, second and third grade level paragraphs were read to the child. This subtest and the naming letters subtest were given during the first baseline period only. Analysis is based on percentage correct of the comprehension questions.

Naming letters has two parts: capital letters and small letters. The child was asked to name each of the 28 letters presented in each part. Analysis was in terms of accuracy and percentage correct.

Informal Reading Assessment

Sight Vocabulary Measure.--The 200 Dolch words (Dolch, 1960) are available commercially on 2" x 3" white cards. Prior to the first baseline period, these cards were assembled for presentation in order of difficulty. The ordering was done according to "One Thousand Most Used Words" compiled from Thorndike, Ayres and Commonwealth lists, and from Fry's (1972) Instant Words. The order of presentation of the total sight vocabulary measure appears in the Appendix.

Prior to the first administration of these words, it was noted that the child was unable to viusally focus sufficiently quickly to

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allow for tachistoscopic (one second flash) presentation, which is the usual method of presentation. The cards, therefore, were presented to the child with little reference to time. However, the time involved in this procedure became so lengthy that only 155 words were given during the first baseline period. The same number of identically ordered words were also used in the second and third baseline periods.

The scoring criteria for the Dolch words is described in the following figure.

Criteria 3.1

Scoring Criteria for Dolch Words

Score	Criterion
1	Immediate (1-2 seconds) correct recognition; perceived by child as correct.
2	Correct recognition, not immediate; perceived by child as correct.
3	Incorrect recognition; perceived by child as correct.
4	Incorrect recognition; perceived by child as incorrect.
5	Non-recognition; placed aside by child to come back to.
6	Non-recognition; placed aside as not known.

This scoring system allows not only for the typical correct/incorrect assessment, but also for data to be collected on the child's evaluation. That process is described in full in the section on Evaluation by Child in this Chapter.

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Listening comprehension and auditory recall of stories.--In an effort to remain consistent with typical performance in the classroom, this measure was included. Selected, high interest imaginative stories were read to the child under replicable conditions in all baseline periods and during both treatment periods. After the story was read, the child was asked free-answer type questions to ascertain how much and what aspects of the story were remembered. (Examples of this type of question are: "What can you tell me about the story? What happened in the story? What do you remember about this story?") She was first asked to tell as much of the story as she could remember without the pictures, then was given the book so she could use the pictures (if she wanted to) to add more to the story.

The stories selected were on a reading level of second through fifth grade, and took approximately ten minutes to read. The books selected were inexpensive, commercially available children's books which have been field-tested with other learning disabled children.

No effort was made to make sure the books were all at the same reading level, covered similar topics, or any other research variable. They were just interesting books that might be found in a classroom for younger children. They all required someone else to read them. The child selected which book she wanted to be read to her.

The following criteria for assessment were developed after reviewing various sources in the literature (Johnson and Kress, 1972; Duckworth, 1973).

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Criteria 3.2

Criteria for Listening Comprehension of Stories

Understood 75% of material	+ or -
Showed oral language comparable to language level of the material	+ or -
Rephrased, rather than repeated story when retelling	+ or -

The above judgements were made, not in the session, but later by analyzing the child's responses on the tape. The number of independent memories of the story were also recorded, both with and without the pictures.

Developmental Test of
Visual-Motor Integration

This standardized measure, developed by Beery and Buktenica, (1967) is commonly used with learning disabled children who have difficulty copying (Gearheart and Willenberg, 1970). It consists of 24 symbolic forms arranged in order of increasing difficulty, from a vertical straight line to overlapping triangles. There are only three forms per 8 1/2 x 11 inch page, which makes the visual aspect less difficult. The child is asked to copy the stimulus form in the empty box that is provided below the form. This test is not timed.

The manual with instructions for scoring is very detailed. It includes many samples which assist the scorer in decision making. Age equivalent scores are provided for transforming raw scores. Each symbolic form to be copied has a number of criteria, all of which must be met in order to count the copied form as acceptable. This measure was administered during all three baseline periods.

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Informal Handwriting Assessment

In a first and second grade classroom a child is asked to write certain things and to copy certain things. This visual-motor measure was included to assess change in performance on a handwriting task and a word copying task, similar to what might be expected in a classroom.

The above task (Beery) also involves visual-motor performance, but only that of copying instructionally separated symbolic forms. The writing of words and letters, whether copied or not, is a more complex task for a young child. Many more decisions must be made by the child. Many more decisions must be made by an evaluator also. For instance, what words does the child "know" well enough to write unassisted? In an effort to find the answer to this question, as well as to remain consistent with the philosophy of allowing opportunities for the child to make decisions, the following procedure was developed.

During the first baseline period, a brief discussion took place in which the experimenter and the child explored the topic of obtaining work samples over time to assess change in performance. This particular work sample related to writing words and letters. The child was asked: "What would you like to write on?" She chose 8 1/2 x 11 inch lined yellow paper. When she had chosen the preferred writing instrument (a pencil) she was then asked:

> Will you write your name?...
> What are some words that you know? Write them for me on the paper...
> What are some letters that you know? Write them for me on the paper...

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After writing her name, this is the order in which she chose to write the words and letters:

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During the next two baseline periods, the child was asked to replicate what she did during the first period. This exact duplication of the original task allowed the experimenter the freedom of having the child participate and controlled for the necessary comparisons in performance.

She was then asked to copy the phrase "sit upon a table" which had been printed in large letters at the top of an 8 1/2 x 11 inch sheet of lined yellow paper. It is a simple phrase, but it contains a single letter and a three, four and five letter word. In addition, it contains many of the letters which are sometimes reversed or distorted by developmentally immature children (s,t,p,n,a,b,e). The order in which the words were copied was noted, as well as any major deficiencies.

Creative Thinking Measures

The measures chosen to assess creative thinking abilities differ in many ways from measures of academic achievement. The reading and visual-motor measures chosen for this study, as well as the vast majority of other academic achievement measures, focus on the one correct response, usually within a given time framework.

Creativity measures assess almost an opposite type of ability --that of generating many responses, and/or elaborate responses and/or

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unique responses. The focus is more truly individualized. Along with prior knowledge and experience, a child can also draw upon his imagination. The instructions on the measures emphasize the idea of generating many, elaborate or unique responses.

It is assumed for purposes of this study that all children have creative potential. This means that the child picked to study also has creative potential. Standardized measures of creativity attempt to measure existing creative ability.

In this study many creativity measures were administered. The criteria for selecting these measures were discussed in Chapter I. Restated, these five criteria are: (1) availability, (2) ability to be given by a teacher, (3) acceptable reliability and validity, (4) suitability for a young child, and (5) pre/post measurement possible.

The four cognitive-intellective aspects of creativity of most concern in this study are: fluency, flexibility, originality and elaboration. In Chapter I, these words have been defined in terms of how they are viewed in the literature relating to Creativity. In this chapter, these four aspects will be further explored in terms of the standardized measures used to assess creative thinking abilities, and the products that result from the administration of these test activities in terms of Guilford's divergent thinking factors (fluency, flexibility, originality and elaboration.)

The creativity instruments used in this study fall into two general areas: figural measures and verbal measures. Similarly, the Torrance Tests of Creative Thinking (Torrance, 1966) are divided into

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a Figural booklet and a Verbal booklet. According to Torrance (1964) the figural or non-verbal measures were developed for a number of reasons. One reason was that some highly creative children appear to lag in their development, while others are shy and fearful about voicing their ideas even in the best of situations. The non-verbal measures are sufficiently diverse to allow a child to express himself, and yet they still allow for comparisons with the verbal measures on scores of fluency, flexibility, originality and elaboration, and the development of a profile of creative abilities.

Since the types of responses elicited by creativity tests differ from the convergent, one correct response type that are typically scored in schools, one questions whether creativity measures can be scored reliably by a teacher. Studies of scorer reliability have shown that individuals specially trained and experienced in scoring are capable of scoring the measures with a very high degree of reliability. Torrance (1966) further states:

> To answer the question about the reliability of results derived by untrained scorers, an experiment was conducted in which regular classroom teachers and educational secretaries scored tests without benefit of any training other than the study of the scoring manuals. Results available for six teachers and one educational secretary indicate that when the scoring guide is carefully studied and accepted, scores of acceptable reliability are obtained. The mean Pearson product-moment coefficients between the scoring of trained scorers and untrained teachers for the figural tests are: fluency, .96; flexibility, .94; originality, .86; and elaboration, .91. The mean reliability coefficients for the verbal tests are: fluency, .99; flexibility, .95; and originality, .91. A more complete analysis of the scorer reliability study will be found in the Norms-Technical Manual (of the Torrance Tests of Creative Thinking) (p. 8).

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Questions concerning the validity of tests of creative thinking abilities occurred frequently in the literature of the early 1960's. The validity question at this time seems to have been extensively analyzed. Torrance devotes 24 pages and an entire chapter of the Norms-Technical Manual (1966) to explanation of the types of validity investigated and the results. He lists several reviews of the validity problem by Taylor and Barron, Yamamoto and others.

In addition, Torrance describes several key studies in great detail. Even if one were to select out only those studies reported involving elementary school aged children, there are still over 50 studies which represent varying degress of evidence depending on the type of validity involved. For much of this research, statistical data is supplied (i.e., coefficients of correlation, t-scores, T-ratios and the like).

Torrance describes 22 key studies relating to construct validity; some involve comparison of personality characteristics, others involve simple correlations between creativity test scores and other measures. He further divides the relevant studies of construct validity into studies involving: children; growth resulting from experiences in creative thinking; preferred ways of learning.

Under concurrent validity studies, Torrance discusses: educational achievement, teacher nominations and peer nominations. He also discusses research presently underway to study predictive validity.

Torrance himself acknowledges the impossibility of providing all research workers and potential users of tests of creative thinking

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satisfactory evidences of validity. However, he has undoubtedly put forth a monumental effort. In addition, other respected researchers such as Guilford, Yamamoto, Taylor and Barron have addressed themselves to similar problems for over a decade. Work is continuing in these areas and is expected to continue.

In this study, according to the theoretical conceptualization described in Chapters I and II, a process approach outlined by Torrance has been followed. With this approach, one can then think of the abilities necessary for the successful operation of the process in various situations or for the production of various kinds of products resulting from the process. This is the general approach used by Torrance in developing and validating tests of creative thinking ability. Torrance considers the measures described in this chapter "ready for use in certain kinds of applications" (1966, p. 1). These uses are quoted in full in Chapter II in the section: Diagnostic Value of Standardized Measures.

It should be remembered that the specific measures in this study were chosen to find out how much and what type of diagnostic information could be gained that would be helpful in planning a treatment program for an individual child with learning problems.

Figural Measures

With that in mind, let us examine the specific figural and verbal measures of creativity used in this study, beginning with the figural measures. There are three such measures: Picture Construction, Incomplete Figures, and Circles and Squares. A copy of the stimulus

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form of each of the figural measures used appears in the Appendix. These forms were taken from a report of a Cooperative Research Project funded by the United States Office of Education (Torrance, 1964). They are public domain and therefore can be copied without permission. There are two alternate forms of each measure available and they were given during the first and second baseline periods.

Picture construction.--This measure is felt to be related to the ability to find a purpose and then to elaborate upon it (Torrance, 1965). There are at least two forms of this measure currently available for testing kindergartners through graduate students. The basic idea is to start with a simple stimulus form (a curved shape) and to create an elaborate and original picture using the stimulus form as a basis. The curved shapes in the two measures chosen were: a jelly bean shape (A_1) and a teardrop shape (A_2).

The instructions to the child were:

> Here is a piece of paper in the form of a curved shape. Think of a picture or an object which you can draw with this piece of paper as a part. Stick your gummed colored shape wherever you want it to make the picture you have in mind. Then add lines with your pencil or crayon to make your picture. Try to think of a picture no one else will think of. Keep adding new ideas to your first idea to make it tell as interesting and exciting a story as you can. When you've completed your picture, think up a name or title for it and I'll write it at the bottom of the page. Make your title as clever and unusual as possible. Use it to help tell your story. You'll have ten minutes to complete your work.

This measure is scored for originality and elaboration. The scoring guide for originality is based on the responses of 223 subjects ranging from kindergarten through high school. Scoring is accomplished on a scale ranging from zero to five according to the frequency of

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occurrence in the 223 records analyzed. Responses occurring on five percent or more receive no credit for originality. Other obvious responses such as "jelly bean" and "blob" are also scored zero. Responses from 4.00 percent to 4.99 percent receive one point; responses found in 3.00 to 3.99 percent of the records are scored two; those occurring in 2.00 to 2.99 percent of the cases are awarded three credits, those found in from 1.00 to 1.99 of the records receive 4 credits. All other responses showing imagination and creative strength are credited with five points (Torrance, 1966).

For the jelly bean shape, a few samples and their originality scores are as follows:

zero: boat, car, cloud, hot dog.
one: bus, crown of tree, face of person.
two: fantasy animal, horse head, lake, airplane.
four: neck of person, potatoes, table.
five: bone, bee, cage, cake, flag, Octopus.

Picture Construction and the following figural measure (Incomplete Figures) are also scored for title originality. The titles are evaluated on a scale ranging from zero to three on originality or cleverness according to the following criteria:

Criteria 3.3

Criteria for Scoring Title Originality

Score	Criteria
0	Obvious class titles, such as "Man," "Hat," "Dog."
1	Simple descriptive title at a concrete level, involving a modifier plus a class, such as "Man with Big Ear," "A Heavy Hat."

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2 Imaginative, descriptive title in which the modifier goes beyond concrete physical description, such as "Uncle John's Frozen Ear," "The Latest Style from Mars."

3 Abstract but appropriate title, going beyond what can be seen and telling a story, such as "A Hat with a Thousand Eyes," "Princess Mona's Golden Hound."

The score for title originality is counted as a Verbal score.

Two assumptions underlie the scoring of elaboration for the Picture Construction Test. The first is that the minimum and primary response to the stimulus figure is a single response. The second is that the imagination and exposition of detail is a function of creative ability appropriately labeled elaboration (Torrance, 1966).

Credit is given for each pertinent detail (idea) added to the original stimulus figure itself, to its boundaries and/or the surrounding space. For example, if the original response was a caterpillar, one point would be given for the addition of legs, one for eyes, one for shading. If a tree or leaf were added to the picture, each detail of the tree or leaf would also be scored. Hence it is possible to get an extremely high elaboration score--perhaps indicative of a character trait. The basic response must be meaningful, however, before elaboration has any worth or can be scored.

The high elaborators and perfectionists do not have enough time and would spend several times the allotted time of ten minutes, if permitted to do so. Some highly fluent individuals keep thinking of additional ideas to add, change completely their first idea, or write a story about the picture they drew.

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Incomplete Figures.--The Incomplete Figures Activity is an adaption of the Drawing Completion Test developed by Kate Franck and used in studies of Barron (1958) and others. The alternate forms (Forms A & B) used in this study were taken from Torrance's (1964) work. He has since (1966) revised the number of the stimulus figures to ten, but the basic idea is exactly the same. For a learning disabled child, it was felt that the forms from the 1964 report were more clearly distinct in terms of the stimulus function. It is necessary, however, to use the scoring guide of the 1966 version to score this test.

This test consists of six incomplete figures on a single sheet of paper. This sheet was divided into six squares, each 2 x 2 inches. (See Appendix.)

The child was told she was to think of pictures or objects to make from the incomplete figures as follows:

> By adding lines to the six figures on your sheet you can sketch some interesting objects or pictures. Try to think of some picture or object that no one else will think of. Try to make it tell as complete and as interesting a story as you can by adding to and building up your idea. Make up an interesting title for each of your drawings and I'll write it at the bottom of each block. You will have ten minutes.

Each figure completed is scored for fluency, flexibility, originality and elaboration. The titles are scored for originality and cleverness.

The fluency score is obtained by counting the number of figures completed. The maximum score is six. A considerable number of children complete all 6 figures so the fluency score is only moderately useful.

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However, it would be interesting diagnostically to determine why all six figures were not completed if that is the case. High elaborators may fail to complete all the figures in the time allotted, possibly because of high anxiety over not being able to meet what they perceive as high expectations of them by others (Torrance, 1966).

The flexibility score is obtained by counting the number of different categories into which the responses fall. Both the drawing and the title must be used in determining the category. Categories are given in the manual which fit approximately 99 percent of the responses given. New categories can be created if necessary.

Some of the categories and the category numbers taken from the scoring guide are:

flexibility category	response
8	boat: canoe, house boat, sail boat, etc.
11	box: including packages, gifts, presents, etc.
31	furniture: bed, chair, desk, table, TV, etc.
40	letters: of alphabet, singly or on blocks
66	weapon: bow and arrow, cannon, gun, slingshot, etc.

The child's responses could all fall into the same category (i.e., furniture). The score for flexibility would then be one.

The guide for scoring originality is based on a tabulation of the responses submitted by 500 subjects from grades one through twelve. A separate guide is given for each of the six figures since each tends to elicit different common responses. Responses are given zero, one,

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or two point scores, based on frequency of occurrence in the original sample tested.

Originality and cleverness of the title are also scored according to the criteria outlined for scoring this aspect of performance on the Picture Construction Task (see Criteria 3.3).

The elaboration score for Incomplete Figures is obtained in the same way as the elaboration score was obtained for Picture Construction. Examples are included in the 1966 scoring manual.

Theoretically the incomplete figures elicit the creative tendency to bring structure and completeness to whatever is incomplete. Thus to produce an original response, the subject usually has to control his tensions and delay gratification of this impulse to closure. This seems to be an important diagnostic tool; i.e., how quickly does a child complete the figure, and how many are completed immediately. This tendency to closure is discussed separately in Chapter IV.

Circles and Squares.--The stimulus material for this activity consists of 42 circles or 42 squares each one inch in diameter on a single sheet of paper. It is similar to the Incomplete Figures activity in that the common element tested is the ability to make multiple associations to a single stimulus. The psychological rationale of Circles and Squares is somewhat different however, since the circles and squares are closed figures and a subject must use the ability to disrupt or destroy an already completed form.

The Circles Test was administered during the first baseline period, the Squares Test during the second. Substituting "squares" for "circles" in the second setting, the instructions to the child were:

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> In ten minutes see how many objects or pictures you can make from the circles (squares) below. The circles should be the main part of whatever you make. With pencil or colored pen add lines to the circles to complete your picture. You can place marks inside the circles, outside the circles, or both inside and outside the circles--whatever you want to in order to make your picture. Try to think of things that no one else will think of. Make as many different pictures or objects as you can and put as many ideas as you can in each one. Make them tell as complete and as interesting a story as you can. We can add names or titles below the objects.

In this activity a deliberate attempt is made to stimulate all four types of divergent thinking and to set up a conflict among the response tendencies represented by them. Fluency is stimulated by the instructions "see how many objects..."; flexibility, by "make as many different pictures..."; originality by "try to think of things that no one else will think of"; and elaboration, by "put as many ideas as you can into each one and make them tell as complete and interesting a story as you can." The time is not adequate to permit emphasis on all four kinds of thinking, thus individual response tendencies come into play.

Prior to actual scoring, responses that are repetitious and irrelevant are eliminated. A relevant response is defined as one which contains the stimulus element of the test (circle or square) as an integral part. The scoring manual lists examples of irrelevant responses.

Another scoring problem occurs when several circles or squares are used for a single picture. Such responses do not lend themselves to the usual scoring procedure and are, in fact, rare. This type of response frequently reflects a powerful ability to synthesize and

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depart from the commonplace and unexpected and may be an important clue concerning the child's way of thinking (Torrance, 1966). Bonus scoring for originality is described later in this section.

Circles and Squares are scored for fluency, flexibility, originaltiy (plus bonus, if applicable) and elaboration.

Fluency is simply the number of responses minus the number of duplications and irrelevant responses.

The flexibility score is obtained by counting the number of categories into which a subject's responses can be classified. The categories were derived from an analysis and classification of the responses of a sample of 558 subjects from kindergarten through the college years. Over 99 percent of the responses fell into the categories given in the scoring manual.

Scoring for originality is based on tabulations of the same subjects, with values assigned on the basis of statistical infrequency and/or obviousness. Sample responses scored zero, one and two on originality, and the flexibility categories for the Circles test are listed below:

Response	Flexibility Category	Originality Weight
wheel	60	0
button	30	0
expressive human face	31	1
dime	12	1
fish	22	2
bug	1	2

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Bonus originality scoring is based on the observation that the combining of circles is a relatively rare response, indicating a rather high level of originality. The test instructions and format establish a set to make a separate object from each circle or square. Combining two or more figures, however, is not forbidden and this strategy has been deliberate. The rationale for this position is that the creative person sees possibilities that others assume have been closed out. The following scheme is recommended for general use (Torrance, 1966):

Combining...

two circles (squares)	two bonus points
3-5 circles	five bonus points
6-10 circles	ten bonus points
11-15 circles	15 bonus points
more than 15	20 bonus points
all circles into unified structure	25 bonus points

Bonus points are added to whatever originality score the child has already been awarded. This grand total becomes the originality score. Title originality is not scored.

The principles for scoring elaboration are the same as those that have been stated for the Picture Construction and Incomplete Figures. The problem is to determine the number of ideas communicated by each object, in addition to the minimum basic idea.

This triad of figural test activities represents three different aspects of creativity or three different creative tendencies. The complexity of the tasks is varied through the instructions. In the first task, the primary motivation is for originality or unusualness and the

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secondary motivation is for elaboration. In the second task flexibility or variety of type of responses is added to originality and elaboration, and fluency is a minor consideration. In the third task, fluency enters to compete with originality, elaboration and flexibility.

Verbal Measures

The verbal measures of creativity which will be discussed now have a similar basis in design, but they appear to assess different expressive abilities of a child.

Ask and Guess.--One of the clearest and most straightforward modes of important elements in the creative thinking process is found in the Ask and Guess activity. It was included to give the child an opportunity to express her curiosity and to give a picture of her ability to develop hypotheses and think in terms of possibilities. According to Torrance (1966), in developing the various forms of this test, it seemed that much of the essence of creative thinking was captured in the process of asking and guessing. Such a concept is certainly in harmony with the definition of creative thinking as a process.

The Asking activity gets at the person's ability to become sensitive to what is unknown, to gaps in knowledge, because the questions asked must be those that cannot be answered by looking at the picture. The Guess Causes and Guess Consequences activities are more in line with Western scientific thought regarding causal conditions and results or effects of these conditions. According to Torrance, results

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of these measures are in harmony with Piaget's work in causal thinking and effect thinking.

One purpose of this study is to develop the evaluative abilities of the child and a primary procedure for doing this is to tie in evaluation with causes and consequences (see Figure 3.5). This Ask and Guess measure used over time could provide another index of evaluative ability. It was felt, therefore, that this particular process measure should be given during all three baseline periods.

A number of stimulus forms have been used since the 1960's and Torrance has stated (1966) that the basic idea is to provide a visual stimulus in the form of a picture which has the potential to elicit numerous questions and causal and consequential reasoning. Since the 1966 version only provides two pictures, earlier versions were explored. Torrance (1964) suggested using nursery story pictures such as "Bobby Shaftoe," "Ding, Dong Bell," and "Tom, Tom the Piper's Son." "Tom" was therefore given in the first baseline period.

However, the child responded in such a way as to cause the experimenter to revaluate the use of nursery rhyme pictures. Her learning set appeared to be so firmly entrenched that she was unable to get to the unknown from the known--i.e., she "knew" what the picture was about and didn't want to ask questions. (Note: Although this is technically a "result," it precipitated the search for another version of the Ask and Guess activity and hence is included here as part of the explanation.)

Three reasons prompted a further search: (1) a belief in the validity of the process being assessed by asking and guessing, (2)

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Torrance's statement that many different stimulus forms yielded similar results, and (3) a desire to find a replicable procedure that would lead to unlimited visual stimulus forms that could be used throughout the study.

The following selection procedure was finally developed to find the necessary pictures. From then on the procedures followed in the Ask and Guess activity were exactly as found in Torrance's (1966) version. The intent of this selection procedure was to develop a replicable way to find pictures that could be used in the Ask and Guess activity, as well as during the treatment periods.

A ten year old child with known creative abilities was given 20-25 issues of the National Geographic Magazine. He was asked to search and find many pictures. The instructions to this child were:

> Please look through these magazines to find many interesting pictures. Just look at the pictures. When you find a picture that makes you wonder, that you want to know more about, STOP. Don't read anything. Just cut out the picture and put it aside. Do this until you've found 30 pictures.

Later, without the article, the experimenter and this child discussed the pictures. Based on the pictures and the responses of this "helper" child, three pictures were selected which seemed to have a high probability of eliciting questions, and causal and consequential thinking.

The three pictures thus chosen were randomly ordered and used during the three baseline periods as the stimulus pictures for the Ask and Guess activity. For the child in the study, the explanation and instructions were as follows:

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This activity is called Ask and Guess. That's because you're to ask questions and guess at some things. You'll be shown a picture. First, you're to ask any question you can think of that cannot be answered by looking at the picture. You can ask questions about any or all events occuring in the picture. Don't ask questions like "Is the grass green?" You can tell that by looking at the picture. You'll have five minutes to think of the questions and ask them.

When the time was up, the following instructions were given:

Now I want you to think of all the possible things that could have caused or led up to the action shown in the picture. It could have just happened or happened long before. Guess out loud whatever you think could have happened before to cause this. You'll have five minutes.

After five minutes, the last set of instructions were given:

Now think of what might happen in the future after this event is over. What will happen next? Tell me all the things you can guess that could happen next. You'll have five minutes.

Regardless of the nature of the stimulus picture, the following scoring procedure, taken from Torrance (1964) is applicable. The responses are scored for fluency and adequacy only.

Fluency is merely the number of responses elicited from the child in each of the three activities.

Adequacy or quality, however, is the variable of interest. The general rule for scoring the adequacy of a question is: Could the question be answered by looking at the picture? If the question could not be answered by looking at the picture, the response was scored as adequate.

In judging the adequacy of the hypotheses about causation, responses were scored as adequate if they reflected "universal, abstract, necessary causes." Sequences of events of the "this-is-the-way-it-happened" type were not scored as adequate. A series of

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statements such as the following would not be scored as adequate: "Tom ate his breakfast and then he went to school. At recess he played with Mary and Bill." Young children in kindergarten through second grade tend to give sequences of events as causes. This tendency gradually disappears with age. Among young children, it is very rare to find responses that are indicative of genuine causation (Torrance, 1964).

The rules for scoring adequacy of consequences are essentially the same as those for scoring causes. The consequence must follow as a logical outcome of the behavior in the picture to be considered adequate. In scoring sequential stories, each action in the story is scored as a separate response and given one point, if it indicates a genuine cause and effect relationship.

The percentage of adequate responses (adequacy divided by fluency) given by a child seems to be of special significance (Torrance, 1964). In a factor analysis, the percentage of adequate responses clustered with being chosen in response to the sociometric question, "Who in your class thinks of a lot of good ideas?" According to Torrance, this suggests that children keep a kind of batting average on one another. It is not the total number of good ideas, but "how much of the time they are right" (p. 4-50).

Unusual Uses.--The Unusual Uses activities are fairly direct modifications of Guildord's Brick Uses Test. Torrance substituted "tin cans" and "cardboard boxes" for bricks, feeling that children will respond more creatively to those things currently available to them in their play.

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"Tin cans" and "cardboard boxes" create in many individuals rigid sets that are difficult to overcome. Once defined as a "container," it is difficult to free one's mind of this well established set and produce other types of responses. However, the idea behind this activity is to think of many different kinds of unusual uses for tin cans and cardboard boxes.

Substituting "cardboard boxes" for "tin cans" in the second baseline period, the instructions to the child were:

> Many people throw away their empty tin cans, (cardboard boxes) but they have thousands of interesting and unusual uses. Think of as many clever, interesting and unusual uses as you can for tin cans. They can be any size or shape, and you may use as many as you like. Think of <u>new</u> uses. You'll have ten minutes.

According to Torrance, some children may stop before the end of ten minutes. They should be cautioned to wait and to continue thinking, and perhaps an interesting idea will occur to them. When and how the child stops responding can be an important indicator. Some non-learners, for instance, will finish very quickly and will be unable to add any responses. This would be important diagnostic information about a learning disabled child.

This activity yields scores for fluency, flexibility, originality and elaboration.

In scoring fluency, scorable responses are those which involve some use of a tin can or cardboard box, either intact or disassembled and modified.

There are 24 flexibility categories given in the scoring manual. Originality weights of zero, one and two are given for specific

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responses. Some sample specific responses for cardboard boxes and their flexibility categories and originality weights are listed below:

Responses	Originality weight	Flexibility category
Chair, something to sit on	0	12
decorations	1	3
play fort	0	4
train (toy)	0	23
signs	1	11

Other relevant responses showing creative strength and getting away from the obvious and commonplace are given two credits.

Although elaboration is not especially encouraged in the instructions for the Unusual Uses activity and elaboration scores are not likely to be large, it is useful to score this activity to strengthen the elaboration scores obtained in the non-verbal tasks. The general rationale is the same. The problem is to determine the extent to which the idea is spelled out or elaborated by counting the details over and above what is necessary to communicate the basic idea.

Product Improvement.--This activity has always been one of the most dependable measures (Torrance, 1966). It is a complex task with a high degree of face validity. It almost always makes good sense to teachers, parents and businessmen. To most subjects at all age levels, it is an interesting task, enabling people to play with ideas they would not dare express in a more serious task. In the individual administration, it provides an object for manipulation, making obvious certain aspects of the creative process in children.

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The two products that are to be improved upon are a toy dog and a toy monkey. The child in this study was given a stuffed toy dog during the first baseline period and a toy monkey in the second. The following instructions were given:

> Here is a little stuffed toy dog (monkey). I want you to tell me in ten minutes the most interesting, clever and most unusual ways you can think of for changing this toy dog so that children will have more fun playing with it. Do not worry about how much the change would cost. Think only about what would make it more fun to play with as a toy.

A problem with time may occur, similar to that described in Unusual Uses. The child should be urged to continue thinking of improvements for the allotted ten minutes.

This activity is scored for fluency, flexibility, originality and elaboration.

The fluency score for this activity is the number of relevant responses produced. A relevant response is one which retains some quality of a toy and would be "fun to play with."

Twenty or more general principles may be used in thinking of new ideas for improving almost any product, process, organization, plan, etc. The flexibility score for the Product Improvement Task is the number of different principles or approaches used in responding to the task. A few of these general principles are: adaption, addition, change shape, division, rearrangement. There are 21 such categories.

Scoring for originality of zero, one and two credit responses is accomplished in the same manner as with Unusual Uses. Some specific responses for these tests, their flexibility categories and originality weights are listed below:

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Responses	Originality weight	Flexibility category
make it bigger	0	7
put it in car	1	5
give it gold leash	1	2
make it real hair	1	12
give it a name	0	21

Scoring for elaboration is optional. It is scored as described under Unusual Uses.

Imaginative Stories.--Three forms of the Imaginitive Stories test were used. On each of the forms, ten topics were given and the child was asked to choose one of the topics to tell the most interesting and exciting story she could think of about the topic. Emphasis was on putting many good ideas into the story. A time limit of ten minutes was established for this verbal form of the test.

All of the titles involve an animal or a person who possesses some divergent characteristic. This was done deliberately as Torrance's (1964) research group was interested in the ways in which children value divergency, and how they perceive society's pressures against divergency. According to Torrance, the titles appealed to the interest and imagination of the children he studied.

The instructions to the child were as follows:

> You'll have ten minutes to tell a story--a special kind of story with an interesting title. There are ten different titles to choose from. I'll read them along with you. Think about them as we read them....Is one of these interesting to you? Try to put into your story as many good ideas as you can.

Some examples taken from the twenty suggested titles are:

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The Dog That Doesn't Bark
The Rooster that Doesn't Crow
The Horse that Won't Run
The Teacher Who Doesn't Talk
The Flying Monkey

A complete listing of the suggested titles given in the three baseline periods appears in the Appendix.

Yamamoto's scoring guide (Torrance, 1964) was used. It includes scales for the following six general criteria: (1) organization, (2) sensitivity, (3) originality, (4) imagination, (5) psychological insight and (6) richness. Each of these six general criteria were then divided into five components. A total of 30 points can be accumulated.

Yamamoto's original detailed guide with examples is no longer available. However, the guide Torrance provides (1964) with definitions of the components is sufficiently precise to enable one to score the stories reliably. This guide appears in the Appendix.

In a study reported by Torrance (1964) the reliability of this scoring procedure was analyzed. To check interscorer reliability, three judges were given the same set of 85 protocols and asked to score them independently according to the directions. All three judges were alike new to the task of rating creative writing. Interscorer reliabilities of .79, .80 and .76 were obtained.

Response Form (Creative Thinking Abilities and Evaluation by Child)

One unobtrusive way of measuring specific aspects of a child's verbal behavior during baseline and treatment is to continuously record

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all verbal responses and later analyze them in terms of the variable chosen for study (Webb et. al., 1966).

In this study, after listening to the tapes of the first two days of the first baseline period, (total time: 149.5 min.; total number of tasks: 16) it seemed apparent that the child's verbal responses to these situations could be divided into two categories: (1) questions, and (2) comments. Questions were considered to be those meaningful verbal utterances to which an answer would have been appropriate and seemed to have been expected. Comments were those meaningful verbal utterances which did not seem to require an answer. (Although any one of the child's comments could have served as a stimulus for either a question or a comment on the part of the experimenter.)

The specific nature of the questions and comments was then examined. In terms of the task or situation she was expected to be participating in at a given point in time, any question or comment could be considered to fall into one of three categories: (1) clarifying, (2) judgemental, and (3) extraneous.

The thinking behind each of these six categories of verbal responses is as follows:

Clarifying Questions.--Those questions the child asked which seemed to indicate a need for further explanation about some point. Often she wanted a great deal more specific information about a certain topic. This type of question appeared to be an indicator of curiosity.

Therefore, since the goals of the first and second treatments were to capitalize on creative abilities, and since curiosity is seen as a characteristic of creativity, (Torrance, 1965, 1966), this type of question was valued. There was no desire to decrease clarifying questions.

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Judgemental Questions.--Those questions the child asked which seemed to deliberately solicit the opinion or ask for judgement of the experimenter. The questions sometimes asked how the experimenter valued the child's behavior (i.e., "Am I doing this right?", "Do you like this?"). This type of question seemed to reflect a need to have the experimenter evaluate the child's performance.

However, the second treatment described in this study was designed to facilitate effort on the part of the child in evaluating her own performance, rather than having the experimenter evaluate or pass judgement. Therefore, a decrease in this type of question could indicate less need to have someone else evaluate, or conversely indicate more confidence in her own ability to evaluate her work.

Extraneous Questions.--Those questions which were not related to the specific task or situation in which she was participating at that moment. These questions could be viewed as distractions, or as an attempt on the part of the child to manipulate the situation. Or they could be viewed as purely impulsive--they just popped out. Both impulsivity and distractibility are seen as characteristics of a learning disabled child (Lerner, 1971). In any event, they do detract from the task or situation, and an increase of evaluative effort on the part of the child should decrease the number of extraneous questions.

Clarifying Comments.--Those comments which seemed to add specific task-related information. The comments seemed to be of an elaborative nature, often adding information presumably for the expeimenter's benefit. (For example: "This is a very deep ocean, many creatures live there.") This can be seen as elaboration, which is one of the four cognitive-intellectual aspects of creativity. Like clarifying questions, clarifying comments were seen as a plus in a treatment program designed to facilitate use of creative thinking abilities, and were not expected to decrease.

Judgemental Comments.--The comments that fell into this category were of a personal nature, rather like an attempt to share how she felt about certain things (i.e., "I don't think this is right."). As long as the comment was task-related, no attempt was made to determine how accurate her perceptions were or how close to reality. (A procedure to determine this congruence is described in the next section.)

Although evaluation on her part was a goal, it was not known whether or not this type of comment could be expected to increase, decrease or stay the same.

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Extraneous Comments.--Those comments which were not related to the specific task or situation in which she was participating at that moment. Although probably not as manipulative as extraneous questions in terms of ability to distract, extraneous comments are still not task-related, and hence should decrease if the child becomes more task-oriented. Orientation to task should be indicative of appropriate evaluative effort on the part of the child.

From the above descriptions it can be seen that the clarifying category, including both questions and comments, relates to creative thinking abilities. The judgemental and extraneous responses, on the other hand, are more apt to be effected by an increase in evaluative abilities on the part of the child.

A "Response Form" was created in order to tabulate the number of questions and comments for each specific instructional task or situation. The amount of time in minutes for each task was also recorded.

This form also contained a space for "Miscellaneous." "Miscellaneous"in this study referred to any verbal utterances which were either not language-related (i.e., grunting, humming) or which were unconventional (i.e., singing a response). Information gained regarding the miscellaneous responses will be discussed elsewhere.

The response form used in this study is presented as Figure 3.6 on the following page.

For clarification, the following table contains examples of appropriately classified responses.

The Response Form and the classification procedure were used throughout the study. The responses were classified solely by a trained evaluator, after a period of training, and after acceptable (.93)

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	Clarifying	Judgemental	Extraneous
Questions			
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Task _____ Time _____

	Clarifying	Judgemental	Extraneous
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Figure 3.6.--Response Form

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TABLE 3.4.--Exemplary Responses of Child to Task or Situation.

	Clarifying	Judgemental	Extraneous
Questions	Where do bears live? What should I do? What did you say?	Is this right? Is this what you want?	When are we going outside? Why can't I go upstairs?
Comments	This is a mermaid This is supposed to be green	I know that word I like doing this I don't know this	I don't like bears I think dogs are silly
Miscellaneous			

interrater reliability was established between the experimenter and this outside evaluator. The evaluator was chosen because of excellent past work with the experimenter. All verbal responses for the entire study were classified by the evaluator, to control in part for experimenter bias.

Twice weekly during the study, the evaluator was given:

--the Sony tape recorder

--the transcripts of the sessions completed since the last classifying

--the tapes of the above sessions

--a stop watch

--response forms

The above were returned within 12 hours, as the tape recorder and stop watch were in use every day. The completed response forms were then attached to the transcripts and saved until after the final session, when analysis of the data was begun.

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Evaluation by Child

The preceeding section, Response Form, described part of the data that was collected regarding Evaluation by child. The data was collected unobtrusively--i.e., the child had no knowledge of this effort to quantify her verbal responses. Evaluative data regarding the child's verbal responses related to the frequency of judgemental questions and comments and also that of extraneous questions and comments. This data was collected throughout the study.

In addition, specific measures were developed which non-verbally assessed the child's evaluative effort during the baseline periods. This data was collected through the use of the Dolch Words and Math problems.

Dolch Words

A second unobtrusive measure was created to try to determine the effects of treatment designed to facilitate evaluative effort of the child. This measure was used only in those situations calling for a convergent-type response (i.e., only one correct response).

There seemed to be three variables that can be influenced in this type of treatment program: (1) accuracy, (2) congruence, and (3) time.

The first variable was the accuracy of the response of the child. For instance, when the child was given a sight recognition word (i.e., give), her response was either correct ("give") or incorrect (i.e., "gave," "jive"). This could be easily measured.

A second variable was how the child perceived that she had solved the problem. If she thought she had analyzed the word correctly,

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but in actuality had identified the word incorrectly, her evaluation of her performance was inaccurate. On the other hand, if the word was identified incorrectly, and she knew the word was incorrect, her evaluation of her performance was accurate.

The idea behind this is one of congruence between her perceptions and those of the experimenter in a situation in which there is only one correct response.

Prior to the administration of these specific measures during the first baseline period, the child was trained to perform the following non-verbal evaluative task.

In front of the child were placed three 5 x 8 inch index cards with faces on them in this order:

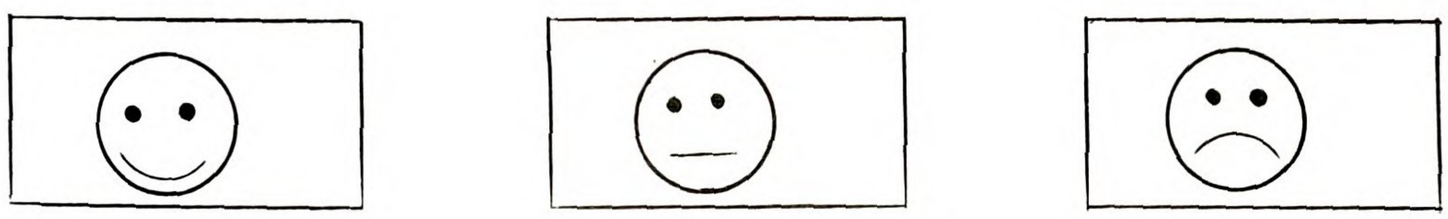


Figure 3.7.--Evaluative Stimuli for Child.

The instructions to the child, prior to the presentation of any word were:

> If you're sure the word you tell me is correct, place it in the first (yes) pile. If you aren't sure you know the word and would like to try it again later, put it in the middle (?) pile. If you don't know the word at all, place it in the last (no) pile.

During the task the examiner scored each word presented on a separate sheet according to criteria described in Criteria 3.1. After

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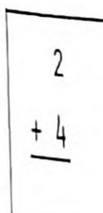
Figure 3.7

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the words for that session were completed, the piles the child made were collected for later scoring. No feedback was given to the child during this procedure.

This procedure was followed during each baseline period (A_1, A_2, A_3) for all 155 of the sight recognition words (Dolch words) presented to the child.

Math Problems

As a further check on the child's evaluative ability, a similar procedure was followed during the administration of simple mathematics problems. For this task, the evaluative stimuli (face cards) shown in Figure 3.7 were again placed in front of the child.

Five simple mathematics problems, appropriate for first grade level were put on 4 x 6 inch yellow index cards. The five addition and subtraction problems are shown in the following figure.

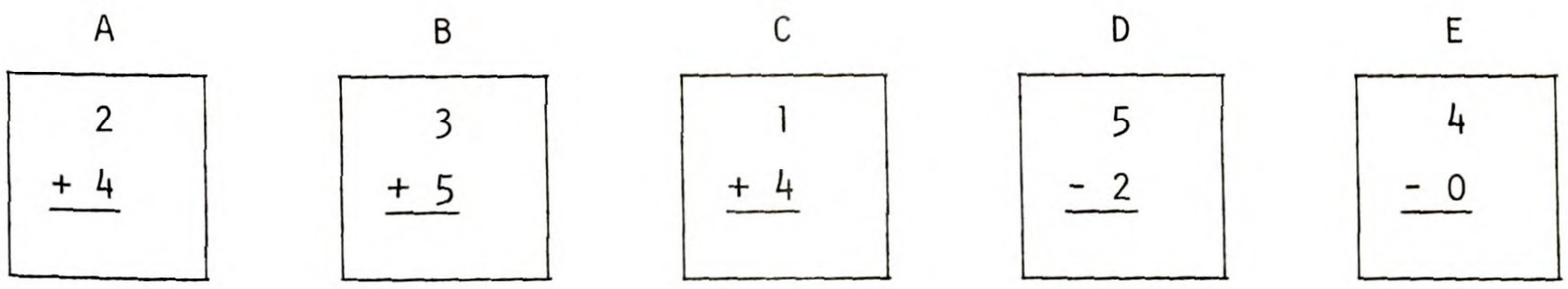


Figure 3.8.--Addition and Subtraction Problem Cards.

To answer the problems, the child was asked to circle the correct response on each of the appropriate answer cards. Three duplicate sets of answer cards were made on 5 x 8 inch index cards and contained one correct and three incorrect answers to the corresponding problem. The answer cards are illustrated in the following figure.

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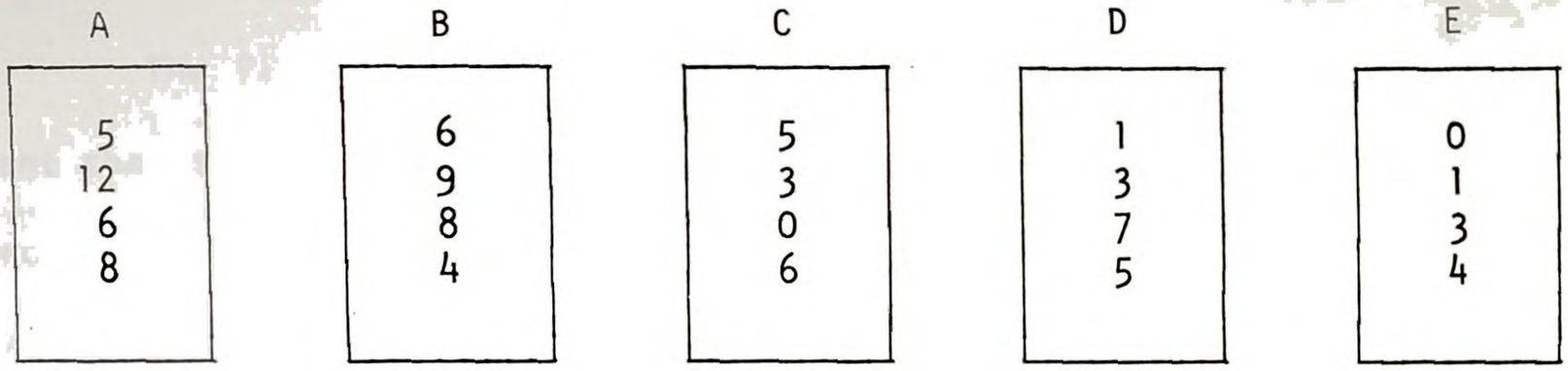


Figure 3.9.--Answer Cards for Math Problems.

After the child circled the answer, she was asked to place the answer card on one of the three face piles. The first face indicated that she was "very sure" of her answer, the second face "not too sure," and the third face "unsure." The idea behind this procedure is the same as that of the sight words: congruence between her perceptions and those of the experimenter in a situation in which there is only one correct response.

The third variable which was affected by an increase in the evaluative ability of the child was time. There are a number of possible reasons for this. For one thing she may have perceived that part of what she did during the task actually wasted time, and by becoming more task-oriented, decreased the amount of time. For another, she may have become more careful in her performance, increasing accuracy and perhaps increasing congruence. In any event, time does seem an important variable.

The total sight word recognition task was accomplished over several days in each baseline period. Each day's time and the total time were recorded. The math problem task was accomplished in a relatively short time; therefore, only the time required for each baseline period was noted.

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Treatment I

The first treatment program had as its goal setting an environment that stimulated the child's creative thinking abilities. The objective or outcome of this procedure was to develop a more definite profile of the creative strengths (creative positives) the child possessed.

A learning disabled child is quite variable. Teachers are often heard to complain, "I don't know from one minute to the next what to expect from the child." And yet...a learning disabled child (Clark, 1973) often feels he or she doesn't know from one minute to the next what to expect from himself or from his environment. That is, the situational variables change as the child changes, and he consequently gets different feedback from one minute to the next. The result is often chaos.

In this study the environment in both treatments was consistent for the child. As set forth in Chapter II: Teaching for Creativity, there were certain principles which guided the setting of this environment and the behavior of the people involved. They were not authoritative, rigid or dogmatic principles, but there was a great deal of structure; a structure that was both understood and valued by the experimenter and the child.

Perhaps a way to describe this first treatment environment is to give the guiding principle and then to give one illustrative example of how this principle was implemented with a learning disabled child.

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Open Endedness (Incompleteness or Openness)

This was an overriding principle or guideline of the first treatment. Contrary to the arguments of some, this type of environment requires a great deal of structure. It requires handling instructional circumstances so that the learner has input into the system. For this child, there were many instances in which she asked, "What is that?" or "What does that mean?" or similar questions. The easiest and safest response was to give the answer immediately. However, openness when employed, requires a "What do YOU think?" type of response from the teacher. In some instances, it involved hypothesizing or guessing, which Torrance gives as part of his definition of creativity. Openness is a far cry from authoritarian teaching.

To illustrate: one day a tape was played which had a ringing telephone as a stimulus. The question was: "Imagine that you're going to answer the telephone. Who could it be on the telephone?" After a slow, reality bound start, the child generated 32 responses.

Alternatives Provided

Again the structure stayed the same; every day six possible experiences were described to the child. She was allowed to choose four of these or suggest other alternatives, which, if mutually acceptable, were accomplished. She was also allowed to choose the order in which the activities would be accomplished. Making choices for a learning disabled child is as important as having alternatives.

One day she asked if she could make cookies. It is quite possible that an entire book could be written about making peanut butter

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cookies creatively. Things like..."What do the cookies all in a row remind you of?" How many do you think we can get on the cookie tray?" and so on. This self-initiated activity was one of the best (and most edible) in the whole treatment.

Environmental Relevancy

What is happening around the child sometimes overrides all other considerations. This is particularly true of a child with learning problems. If possible, a key to performance is capitalizing on what is relevant to the child at that moment, and not putting it aside.

One day a discussion started which involved camping. (The child was going camping in a few days.) After a few minutes, the subject of bears, and more especially Grizzly bears, came up. When the subject had surfaced it appeared that there was a fear on her part--real or imagined--of bears. She started asking questions about bears: "Do they eat children?" "How fast can they run?" and so forth. Luckily, there was an old issue of National Geographic which had a story about Grizzly Bears in Yellowstone Park that answered her questions. With that story in mind, she decided to create her own story about a bear. This story ultimately turned into a six day project, told and later illustrated in book form imaginatively. The fear of bears was never mentioned again.

Active Teacher Participation

This is an interesting and exciting principle. The teacher can serve as a model, a stimulus, or a catalyst, as long as there is

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involvement. This is both applicable and necessary for a child with learning problems who experiences little success on his own.

In this environment, and using this principle, it was quite interesting to join in. For instance, one task was to "Think of all the things that are green." The child started with "Leaf, plant, grass, pine needle..." indicating some fluency, but little flexibility. So the experimenter added a "green monster," to shift categories and model imaginative instances as well. This type of interaction was appropriate in the first and second treatment periods, but not in the baseline or testing periods.

Purpose and Meaning

This principle makes a great deal of sense, and it is possible to employ it in extremely diverse situations. The dog was mentioned earlier as a part of the research setting. He served many useful functions throughout the study.

One day a discussion took place about taking care of the dog, and because she felt it was important, was able to generate many, many responses to the question: "What are some things that you could tell pet owners about taking care of their pets?" Her answers reflected a great deal of concern about being responsible for those who need your help--a concept sometimes difficult to communicate to a young child.

Enjoyment

The principle of enjoyment is much easier to adhere to in a non-test situation. It is also easier to adhere to when one is not

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faced with a one correct response situation. However, enjoyment doesn't imply non-learning. All the tasks set up during the first treatment were designed to be both instructional and enjoyable. Perhaps the best example, therefore, is a non-example, or an example of non-enjoyment.

To structure for flexibility and fluency, the child was blindfolded and asked to tell all she could about the materials placed in her hands. (Tactile discrimination is often done with learning disabled children.) However, she wiggled and squirmed a great deal, and tried to take off the blindfold repeatedly. Later she stated she "hated having it on."

To get at the same objectives, but to adhere to her wishes about not using the blindfold again, similar objects were placed in an enclosed bag and she was asked to reach in and tell about the materials. The same behavior appeared again. She didn't <u>like</u> doing the task at all. It didn't seem too difficult, she just didn't enjoy it. Therefore, it didn't seem appropriate to continue.

<u>Self-Initiated Activities</u>

When Torrance (1970b) mentioned that a child may "produce things that go beyond the wildest predictions of the teacher or the curriculum maker," he was not exaggerating. One of the most interesting experiences that took place in the first treatment was totally unplanned for and initiated by the child.

She had been given a paper with two funny-shaped lines on it, and was asked if she could draw an unusual picture using the two lines in some way. After a few seconds of drawing she said: "You leave the

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room, I want this to be a surprise. I'll call you when I'm ready." When she had finished, she explained that it was a "puzzle" and the job that remained was to find the hidden pictures and identify them. After several accurate guesses (and some inaccurate ones) the "hidden figures" that became identified were: a pirate ship, a wicked queen in a locked room, a butterfly, a caterpillar fairy lady, an Indian Teepee, and a pot.

By a few strokes of the pen, the teacher-pupil roles had been pleasantly reversed.

Fluency and Mild Competition

There are actually two principles here, but for clarity they have been combined--as they often were in the instructional setting. The principle of fluency is simply the generation of many relevant responses, as opposed to one correct response. As important as the principle of fluency is, its modifier, relevant, is equally important. It is important to have the child understand the objective and then actively participate toward meeting that objective, as long as the responses are relevant and the interest is maintained.

The principle of mild competition can be implemented in a number of different situations; perhaps the most common in the field of creativity is the classroom, or at least in a setting where there is group participation.

However, in a clinical individualized setting, it is also possible for a child to enjoy mild competition,--either against (or

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with) herself or with the adult in the situation. In this particular situation, "active teacher participation" was a necessity. In a larger group it might not have been so necessary.

There are ways to structure for particular types of responses. There are ways to ask questions to get at an increase in flexibility, and ways to probe to get more elaborative information. The flow chart on the following pages (Figure 3.10) outlines some of the procedures used in this treatment to stimulate this child to perform in a consistent and predictable manner.

Treatment II

The second treatment program had as its goal setting an environment which allowed the utilization of creative thinking abilities to activate evaluative effort on the part of the child.

At the beginning of the second treatment program, the experimenter and the child discussed specific procedures to evaluate performance. The decisions made about objectives and priorities were interactive--i.e., the child had input relating to her own value system and motivations. For the ten days of this treatment period, those things mutually agreed-upon were: (1) target behavior, (2) growth and decline and (3) criteria.

Target Behavior

"On target" was the key phrase chosen for this procedure. "Target" referred to a specific objective which the child expected to reach. The target could be reached by a meandering, confusing course taking an inordinate amount of time, or it could be reached by a straight and

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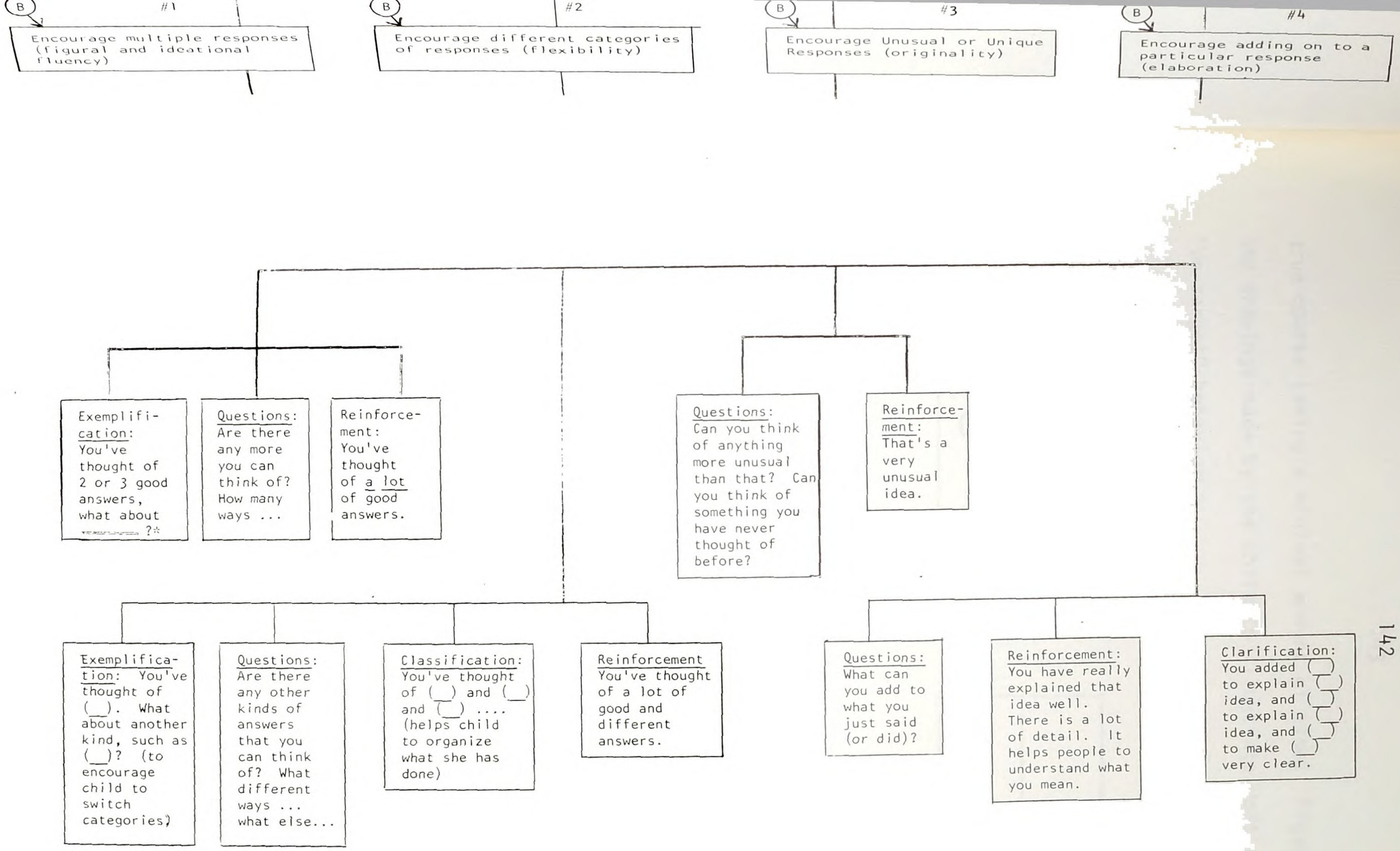
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OBJECTIVE: The teacher will facilitate responses from the child. Criterion number and type of response to be set by nature of the task (task analysis and task description) and the child's interest (subjective and objective general impressions).

Decision Aid I
1. Teacher gives all choices.
2. Child initiates own choice.
3. Teacher/child make decision.

Decision Aid II	
1. If fluent responses	#1
2. If flexible responses	#2
3. If original responses	#3
4. If elaborate responses	#4
Select any one or all	



*The blank (__) provided is for a specific word or words that the teacher is to provide. This changes as a result of the specific nature of the task.

Figure 3.10.--Flowchart of Stimulation of Creative Thinking Processes.

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true course taking a minimal amount of time. Figure 3.11 represents the drawings made by the child to illustrate "off target" behavior and "on target" behavior.

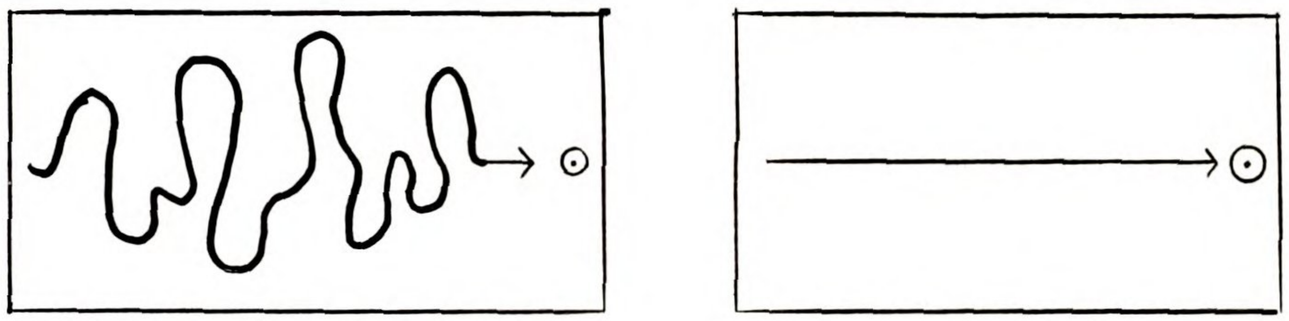


Figure 3.11.--Target Behavior Illustrations.

The use of the phrases "on target" and "off target" keyed the child to pay attention to the task objectives. A necessary condition then became knowledge of the objective. For each and every task during the second treatment period there had to be an open objective. The child had to know what the objective was. To be sure, therefore, that the child was motivated and cared about reaching the objective, the objectives were mutually agreed-upon also.

The following example illustrates the type of situation or task in which this procedure was employed: the child liked to tell stories. Her stories were sometimes imaginitive, sometimes humorous, sometimes fantasy bound and sometimes reality bound. In almost all instances, however, they were difficult to listen to because they tended to involve so many characters and ideas that the original thread was lost in the morass of confusing detail. After listening to the tape

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recordings of her stories in light of the target behavior concept, she decided to make the effort to keep her stories "on target."

Initially, she requested assistance in examining her target behavior. This assistance was given in indirect rather than direct form. That is, instead of a direct statement "You're off target" or "You're on target," the child was asked to evaluate stories she heard under varying circumstances. Some were stories from books, some stories from records, some made-up stories (that were genuinely off-target) and the like. Gradually, she began to understand if a story had an objective and when and how that objective was reached. She was then able to apply this evaluative behavior to her own stories.

Growth and Decline

Growth and decline in particular areas were things the child was concerned about. When she found she was improving in certain areas, she expressed a desire to know "how much" she was improving. This concept of measured improvement was first explained as "flower growth" and "chicken pox decline."

Flower Growth

Utilizing her creative artistic (figural) abilities, the child made a "chart" of what a flower looks like from a seed through full growth. She drew it in proportion and it was easy to see how much bigger it got, and as it got bigger it became prettier. The concept and value transferred easily: as a particular measure grew, it became better. She thus became interested in following the course of growth--i.e., improvement.

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Chicken Pox Decline

The child was able to visualize and then illustrate how many "spots" a person has when they have a full blown case of chicken pox. The spots don't do that much harm, but they do detract from a person's appearance. Gradually, however, they begin to disappear and finally they all disappear and the person is left as he would like to be, with no spots to detract from his appearance. The child grasped the concept of decreasing extraneous factors to allow the real person to show through, and placed a positive value on this also.

This humorous analogy was created for a purpose. With some learning disabled children it is difficult to get them to grasp the concept of decreasing "disturbing behavior." And, if grasped, it is sometimes more difficult to get them to value decreasing some of their own behaviors. If a child sees the decline, not so much as taking away, but rather as a means of allowing the real person to show through, he is more apt to value extinguishing "disturbing behaviors."

Grasping these two concepts allowed the child to participate actively in charting her own improvement in a number of different areas. She became adept at charting increasing frequencies and decreasing time when it was appropriate.

Criteria

Even with "on target" behavior and valuing improvement, the child expressed some concern regarding the criteria necessary to make decisions regarding task evaluation. Since she was anticipating taking

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responsibility for making decisions, rather than asking for external evaluation, this became important to her--and hence to the experimenter.

At first glance, each task or situation appeared to carry with it different criteria. However, after looking closely at the interaction in several situations, it became apparent that there was an overall teacher-child interaction that could be specified in greater detail. It related to Torrance's statement (1964) that evaluation should be tied in with causes and consequences.

This interactive process of evaluation in regard to criteria and task completion is specified in the flow chart following (Figure 3.12).

No doubt the reader would like to know the exact nature of the stimulus presented in each task-specific situation. However, that is neither appropriate nor possible. This strategy is completely learner-responsive and for any one stimulus (such as a specific picture taken from a specific page of a specific National Geographic Magazine) a multitude of possible objectives leap to mind.

Given the time frame and the 10-11 hours in each of the two treatment periods, it can be demonstrated that over 100 tasks were completed. And these were chosen from at least 400 different alternatives. The number was limited only by the creativeness and responsiveness of the teacher and the learner, not by the materials. Representative examples of specific tasks chosen and the events surrounding them have been included throughout this study.

Examples

1. What criteria did child have? (Ex. "Tell me about [ ]") Probe to get maximum information.
2. What other criteria could be considered?
What other criteria could be used to save this? "Why?"
Value - "Do you want to save this with anyone else? Why?"
"Do you want to share this with anyone else? Why?"
Understand what you

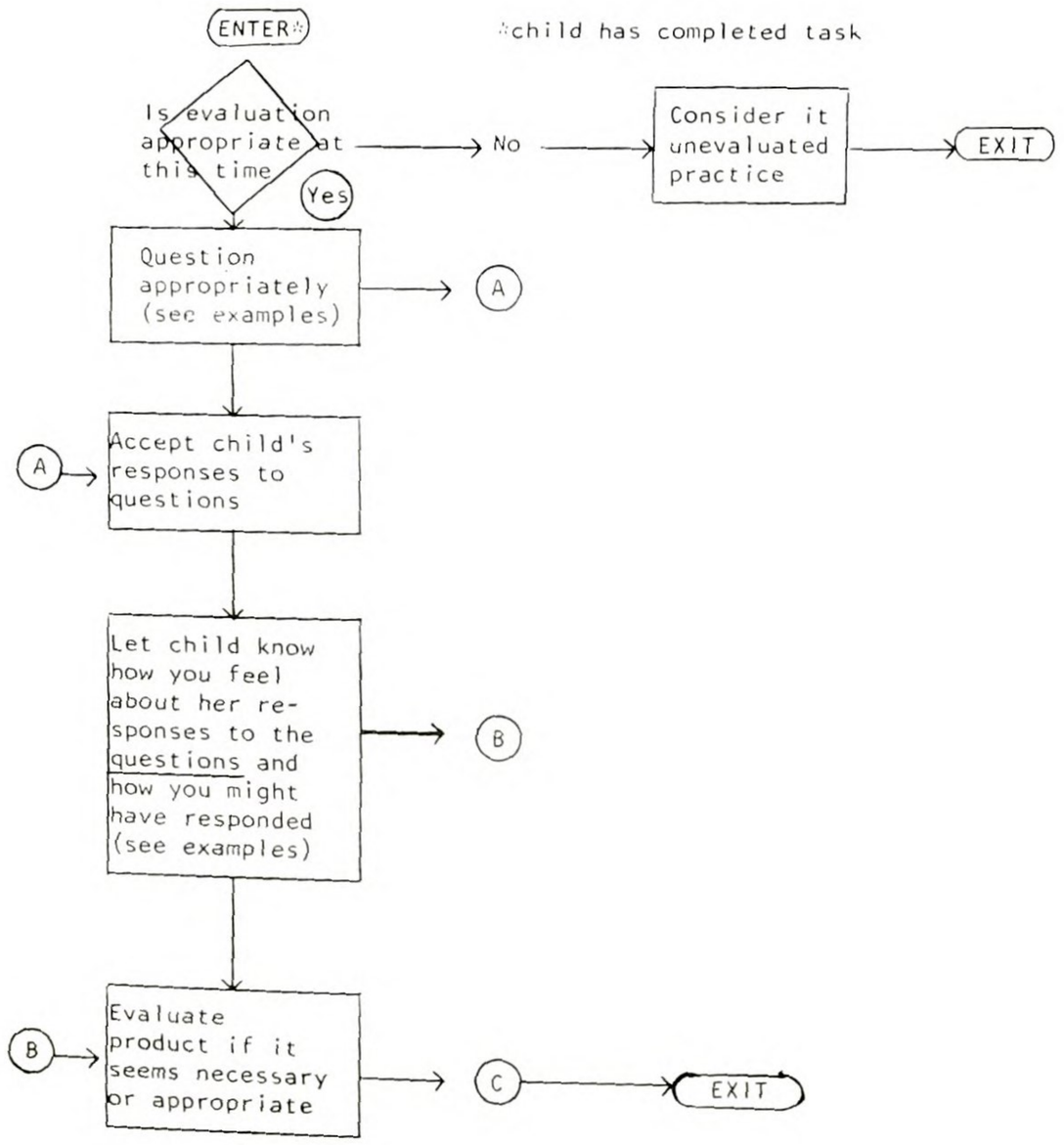
(A)

child has completed task

Consider it

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ENTER



(A) Examples

1. What criteria did child have? (Ex. "Tell me about [__]") Probe to get maximum information.
2. What other criteria could be considered?
   - Value - "Do you want to save this? Why?"
   - Usefulness - "Do you want to share this with anyone else? Why?"
   - Communicability - "Will that person or persons understand what you want them to understand? Why?"
   - Adaptability - "What could you do to make it more easily understood?"
   - Flexibility - "Would you be willing to change what you have done? Why?
   - Transfer - "Will you do anything differently next time? Why?

(B) Example of Various Teacher Responses

1. "I feel you really are happy about what you have done. I'm glad you want to share it."
2. "You've told me you would like to change what you've done. Is there some way that I can help you to change it?"
3. "You stated you don't like this, but you didn't know why you don't like it. I can understand that feeling. Sometimes when I don't like something I've done, I put it aside until I can think of a way to change it to make it better."
4. "You said that next time you'd tell a different story. I think that would be fun. I like to tell the same story over sometimes, just to see if I can tell it any better. Do you ever do that?"

(C) Examples

1. Try hard to avoid statements like: "That's really good." "That's not too good." "That's excellent."
2. Rather than making unqualified judgemental statements, a better way of responding is to compare this performance with past performance on the same criterion measure. For example:
   - "Does that 'a' seem a little better than the one you made yesterday, or is it my imagination?"
   - "Today's drawing of the Teddy Bear is not as complete as what you've done before. Is that the way you want it to look?"
   - "Can you tell me if this is an 'o' or an 'a'? I'm having a difficult time deciding on that one letter, but the rest of the letters are very clear."
   - "I really enjoyed story telling today. Your story was so clear and it was right 'on target.' You must have remembered what we talked about the last few times."

Figure 3.12.--Criteria: Process of Evaluation with Child.

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Research Questions

As outlined in the figure at the beginning of this chapter (Figure 3.2), the primary objectives or outcomes of this study were to:

1. Evaluate effect on academic achievement
2. Confirm profile of Creative Positives
3. Evaluate change in evaluative effort of the child.

Once the questions relating to the above outcomes have been answered, it is possible to discuss the identification of a diagnostic battery, and to further discuss Treatment I and Treatment II in terms of outcomes. This structure will be followed for the remaining parts of this chapter and for the succeeding chapters.

For each of the three areas mentioned above, the general objective will be stated first and the specific research questions relating to the research instruments will follow. A given underlying <u>each</u> of the research questions in this section is that there were at least two of the same forms or parallel forms of that particular research instrument employed to help answer the research questions. With the exception of the response form (used daily), these were administered in a pretest/post test format. "Difference in performance," therefore, relates to performance evaluated on that specific measure.

OBJECTIVE: Evaluate Effect on Academic Achievement.

The following questions relate to the general areas of assessing reading achievement with standardized and informal measures, and

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Is there a difference in performance on the two parallel forms of the Gates-MacGinitie Reading Test, Primary A, Vocabulary and Comprehension?

Is there a difference in performance on the Durrell Analysis of Reading Difficulty, New Edition, on the following subtests: oral reading, silent reading, listening comprehension and naming letters?

Is there a difference in performance on the criterion task of recognizing basic sight words?

Is there a difference in performance on an informal measure of listening comprehension of selected stories?

Is there a difference in performance on the Developmental Test of Visual-Motor Integration?

Is there a difference in performance on an informal measure of handwriting, consisting of a few words and letters?

Is there a difference in performance on an informal copying task, consisting of four words?

OBJECTIVE: Confirm profile of Creative Positives

The following questions can be organized into three different categories, one of which has a sub-category. The measures that relate to confirming a profile of creative positives are somewhat diverse, and yet they supplement one another.

The three categories are: (1) figural measures, (2) verbal measures, including two measures given during three baseline periods and (3) verbal responses: clarifying questions and clarifying comments.

Figural Measures

On the two forms of the Picture Construction Test, are the scores of diagnostic value relative to learning style?

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On the two forms of the Incomplete Figures Test, are the scores of diagnostic value relative to learning style?

On the two forms of the Circles and Squares Test, are the scores of diagnostic value relative to learning style?

On all of the figural measures of creativity used during the two baseline periods, are the scores of diagnostic value relative to learning style?

Verbal Measures

On the two forms of the Unusual Uses Test, are the scores of diagnostic value relative to learning style?

On the two forms of the Product Improvement Test, are the scores of diagnostic value relative to learning style?

On the three forms of the Ask and Guess activity, are the scores of diagnostic value relative to learning style?

On the three forms of the Imaginitive Stories activity, are the scores of diagnostic value relative to learning style?

On all of the verbal measures of creativity used during all three baseline periods, are the scores of diagnostic value relative to learning style?

Verbal Responses: (Clarifying questions and clarifying comments)

Is there an effect on the number of clarifying questions asked during the entire period?

Is there an effect on the number of clarifying comments offered during the entire period?

In order to confirm a profile of creative positives, the measures had to be analyzed in some way, and then combined. The analysis will be discussed in the next section. The combination of this data will be a clinical one, based on general criteria and not absolute criteria. Therefore, the objective of confirmation of a profile of creative positives is reached by the best and most reliable data available.

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OBJECTIVE: Evaluate change in evaluative effort of child

Using the response form, one can determine the nature of the child's verbal behavior over time. Analysis of the data from these forms should help answer the following questions:

> Is there an effect on the number of judgemental questions asked during the entire period?
>
> Is there an effect on the number of extraneous questions asked during the entire period?
>
> Is there an effect on the number of judgemental comments offered during the entire period?
>
> Is there an effect on the number of extraneous comments offered during the entire period?

Since the entire study could be divided into specific baseline and treatment periods, other questions can be asked which relate to the frequency and types of responses per period. It would be interesting to compare the frequency of each type of response for each period. This allows the following questions to be asked:

> What is the effect per period on the number of clarifying, judgemental and extraneous questions asked?
>
> What is the effect per period on the number of clarifying, judgemental and extraneous comments offered?

Using the second procedure (non-verbal evaluation) it was possible to generate six more specific research questions. The two academic tasks, sight recognition of selected words and solving math problems, were analyzed separately.

For analysis of the effect of the child's evaluative ability on the recognition of sight words in terms of accuracy, congruence and

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time from the beginning of the study to the end, the following questions were asked:

> Is there an effect on the accuracy of the child's responses when recognizing 155 selected sight words?
>
> Is there an effect on the congruency of the child's evaluation with that of another evaluator when recognizing 155 selected sight words?
>
> Is there an effect on the amount of time necessary to complete the task of identifying 155 selected sight words and evaluating performance?

For analysis of the effect on the child's evaluative ability in solving simple mathematics problems in terms of accuracy, congruence and time, the following questions were asked:

> Is there an effect on the accuracy of the child's responses when solving five simple mathematics problems?
>
> Is there an effect on the congruency of the child's evaluation with that of another evaluator when solving five simple mathematics problems?
>
> Is there an effect on the amount of time necesary to complete the task of solving the mathematics problems and evaluating performance?

Analysis

Academic Achievement

OBJECTIVE: Evaluate effect on academic achievement

According to various research experts (including Thoreson, 1972), the intensive design is not a design well suited to elaborate statistical techniques. Most of the analysis relating to academic achievement, therefore, is simple and contains descriptive data.

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To analyze the results of administering and scoring the various measures of academic achievement used with this child, several procedures have been employed. The general format to be followed, however, is the same. Each research question is restated and analyzed separately. Raw scores, scores derived from raw scores and numerical values have been organized into tables specifying the baseline periods in which the data was collected. In the case of the standardized measures, it was possible to compare the child's score with those of other children by means of standardized scoring procedures and tables supplied in the scoring manuals. Scores alone, however, seldom tell the entire evaluative story. When appropriate, other descriptive, countable data has been included. A brief clinical interpretation of the results will follow each table.

For analysis of the Dolch Words, a graph depicting time, accuracy and per cent correct has been included to further display the results of the question relating to sight word recognition. The data showing the ordered Dolch words and the criterion scores received during the three baseline periods appears in the Appendix.

In accordance with Lerner's (1971) observation that "the child's handwriting can be directly observed, evaluated, and preserved," (p. 188) examples of handwriting taken during the three baseline periods have been included. The reader may judge for himself any change in performance. The clinical analysis of performance in handwriting presented will be in terms of: visual-motor sequencing, structure of symbolic forms, perception of size, spatial relationships, and organizational

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abilities. The details of the data which relates to this analysis are presented in Table 4.7.

The Discussion of Results section of Chapter IV contains an overall clinical analysis of change in performance as measured by the specific research instruments. In Chapter V, the discussion relates to the effects of the two treatments on academic achievement, and which diagnostic instruments were most helpful in making such clinical decisions.

Creative Thinking Abilities

OBJECTIVE: Confirm profile of Creative Positives

The rationale and criteria for scoring the measures of creativity have been described. Part of the analysis, as it relates to the specific research questions just stated, is in terms of raw scores obtained during pre and post testing on each of the seven standardized measures and combinations of the measures. In addition to the specific numerical values which will be presented in tables, a clinical interpretation of each research question has been included in Chapter IV.

Although the procedure of comparing this child's score with scores of other children who have had these creativity measures administered to them would appear to be appropriate, in actuality this was not the case. Sufficient variation was present in the choice of creative activities for this study to disqualify any attempt at comparison. Such an attempt would be invalid. However, according to Torrance,

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(1974) the Norms-Technical Manual of the Torrance Tests of Creative Thinking has been revised and is being printed. Perhaps this revision will contain sufficient data to allow comparisons to be made in the future, if that procedure is felt to be appropriate.

Moreover, in an intensive design, the subject serves as his own control, (Thoreson, 1972) and it is therefore possible to analyze any change in performance in terms of that subject's performance. In this study, the research questions relate to assessing the value of the standardized creativity measures from a diagnostic standpoint relative to learning style, and that is the focus of the analytical discussions in Chapters IV and V. The objective of using the measures of creativity is to confirm the profile of creative positives, not "to increase creativity." That is an important distinction to be kept in mind for this study, especially in terms of analysis.

The Ask and Guess activity and Imaginitive Stories differ from the other standardized measures in that they were both given during all three baseline periods, and the variables which they assess are different. With three data points it is possible to measure the strength of the relationship between two variables and hence say something about the direction of the scores on these two measures over time. The procedure to be followed (i.e., using regression equations) is described fully in the following pages.

Included in the specific research questions regarding creativity are two questions relating to verbal responses throughout the entire study--i.e., the effect on the number and variability of

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clarifying questions and clarifying comments. Clarifying questions in this study are seen as a specific measure of curiosity, a characteristic of creativity; and clarifying comments are seen as a measure of elaboration, a cognitive intellectual characteristic of creativity used throughout this study. In effect, these two measures can substantiate or confirm the profile of creative positivies suggested by the use and scoring of Torrance's measures.

The procedure used in analyzing clarifying comments and clarifying questions was also used to analyze four measures relating to Evaluation by Child. The procedure described in the following pages should be understood, therefore, to be essential to all six types of categorized responses, and to the two general areas (creative thinking abilities and evaluation by child) to which they relate.

Analysis of Verbal Responses

The major concern is with accounting for observed changes gathered systematically over time. The data gathered over the six week period was examined in terms of frequency, magnitude and variability of responses within phases as well as between phases (Thoreson, 1972).

> In a time series successive observations are made over a relatively long period of time. This continuous record reveals the fluctuations in whatever time interval is being used....This highly descriptive design focuses on questions of 1) the trend of long term change in the data and 2) the variation about this trend. Such questions can be answered by visually examining the data or by use of data analysis techniques such as least squares, linear regression (curve fitting) and generating functions (Thoreson, 1972).

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Trend of Long Term Change*

Using the response form, daily totals were tabulated for all six categories of questions and comments. The total time in minutes for each session was also recorded. To control for time (which varied for each session) the totals for each type of question and comment were divided by the time in minutes to give the mean frequency per minute. This figure was multiplied by 100. These numerical values are presented in Tables 4.18, 4.20, and 4.21 in Chapter IV.

The mean frequency per minute (x 100) was graphed on a separate graph for every day for each type of response (i.e., clarifying questions, judgemental questions, extraneous questions, clarifying comments, judgemental comments, and extraneous comments). A total of six graphs represent this trend of long term change in data.

The mean frequency per minute (x 100) per period was graphed (bar graph) on one graph for questions, and on another for comments. These two graphs represent the trend of long term change analyzed according to period.

After the data from Tables 4.18, 4.20, and 4.21 was plotted as points on the appropriate graphs, it appeared that the y variable (frequency) increased or decreased as the x variable (time) increased. To determine the strength of these relationships, it should be possible to draw a "best fit" straight line through the data points, producing a deterministic model mathematical equation.

$$y = \beta_0 + \beta_1 x$$

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*"Long term change" as described by Thoreson suggests more than ten data points over time.

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β_o is the y intercept and β_1 the slope of the line.

However, when a value of x is substituted into the above equation, the value of y is determined and no allowance is made for error. When measuring human variables, one must allow for error.

Therefore, the statistical procedure for finding the "best fitting" straight line was employed. The prediction equation or regression line determined by the method of least squares is as follows:

$$\hat{y} = b_o + b_1 x$$

where b_o and b_1 represent estimates of the true β_o and β_1.

The principle of least squares minimizes the error involved in calculating. It can be shown by differential calculus that b_o and b_1 are the solutions to the following pair of simultaneous linear equations, known as least squares equations (Mendenhall, 1969):

$$b_1 = \frac{\Sigma x_i y_i - \left(\frac{\Sigma x_i \ \Sigma y_i}{n}\right)}{\Sigma (x_i - \bar{x})^2}$$

and

$$b_o = \bar{y} - b_i \bar{x}$$

The slope (b_i) and the y intercept (b_o) were calculated for each type of response (i.e., clarifying questions, etc.) Visual inspection of these "best fitting" lines will provide another way of

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looking at the trend of long term change in the data. The graph of the regression line has been superimposed on the graph of the mean frequency per minute to allow for the reader to visualize the total picture of the trend over time.

The reader may want to specifically look at the slope of the regression line. Variables that have no relationship to one another are represented in graphical form by a horizontal straight line. Those that have a strong positive relationship are represented by an upward sloping line, and those that have a strong negative relationship by a downward sloping line.

Variation about this Trend

Learning disabled children are often described as "variable from day to day or minute to minute," and sometimes as "predictably unpredictable." In fact, by visually inspecting the graphs (Figures 4.8, 4.9, 4.10, 4.11, 4.13 and 4.14) of the mean frequency of responses over time, one can actually see for himself the variability of this child's responses.

The treatment objective, however, was to have the child evaluate her own performance. By inference, therefore, one could predict that if she did indeed begin to evaluate, some of the unpredictableness might disappear--i.e., the variability might decrease.

Tables 4.19, 4.23 and 4.25 in Chapter IV represent the mean, $(\bar{y})$ variance, (σ^2) and standard deviation (σ) for each period for each type of response. These tables represent the variation about the trend of long term change in the data.

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One can answer each research question concerning "Is there an effect..." by presenting results concerning the trend of the change in the data and the variation about this trend.

Although this section has clustered the types of responses together for purposes of explanation, in the next chapter, the two questions and the data that relate to creative thinking abilities were first analyzed separately, as were the questions and data that relate to Evaluation by Child. Two of the research questions do look specifically at the relationship between the questions and comments. That is represented as two graphs (Figure 4.20 and 4.21).

Evaluation by Child

OBJECTIVE: Evaluate change in evaluative effort of child.

The description of the analysis of the verbal responses of the child throughout the study has just been presented. In addition to analysis of judgemental questions and comments and extraneous questions and comments, two more measures to assess evaluative effort of the child were used: Dolch Words and Math Problems.

Dolch Words

The data collected regarding the child's evaluative effort on recognition of sight words is presented in Table 4.28 in Chapter IV. The basic difference between what is presented in Table 4.28 and what is presented regarding academic achieveemnt in Table 4.3 is the measurement of congruency, or the percentage of the time her evaluation of performance coincided with the experimenter's.

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Table 4.3 also presents the number of words receiving each criterion score, as that represents a measure of the child's evaluative ability also. The discussion following that table clarifies this assumption. The variables of interest are accuracy, congruence and time.

Math Problems

The data collected regarding the child's evaluative effort in solving simple math problems is presented in Chapter IV. The variables of interest are accuracy, congruence and time.

Without specific research questions, and data gathered empirically, it is at best unwise to discuss in Chapter IV the primary purposes of the study--i.e., to identify a diagnostic battery, and to evaluate two separate treatment programs. This problem arises because of the absence of absolute criteria in an exploratory study.

However, in a design such as this, the descriptive comments and clinical judgements made in terms of general, rather than absolute, criteria are of value, and form the basis for discussion which leads to implications for further research. Such is the format for Chapter V.

Summary

The specific aspects of practically implementing an exploratory study with a learning disabled child are described in this chapter. The intensive design which was followed in this study was diagrammed in terms of the multiple baseline-successive treatments model. In the three baseline periods, alternate or the same forms of fifteen research instruments were used to measure 34 research variables. The

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objectives to be met in using these research instruments were: (1) to evaluate change in academic achievement, (2) to confirm a profile of creative strengths (creative positives), and (3) to evaluate change in evaluative effort of the child. Thirty research questions are stated in measurable form to assist in decision-making relating to the above objectives.

The two treatment procedures are also described in this chapter. In the first treatment the goal was to create an environment that would stimulate creative thinking abilities in the child; in the second treatment, the goal was to set an environment which allowed utilization of these creative thinking abilities to activate evaluative effort on the part of the child. Exemplars and flow charts have been included to aid the description.

The major part of this chapter is devoted to descriptions of the particular measures used in this study. The rationale and procedures for administering, scoring and analyzing the measures are detailed to allow for later discussion relating to the usefulness of these measures in a diagnostic battery for use with a learning disabled child.

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CHAPTER IV

ANALYSIS OF RESULTS

Organization of Analysis Chapter

Since there are a large number of research questions, with an equally large number of research instruments employed to help answer the questions, this chapter will be organized in the following manner:

1. In the first section, Research Questions, each research question will be restated; the data collected to answer the question will be shown in tables, graphs or descriptively; and a brief clinical interpretation of the data will be made. The clinical interpretation is not a discussion, it is merely an organizational adjunct to data presentation. This section will be grouped according to the three major areas of concern: (1) Academic Achievement, (2) Creative thinking Abilities and (3) Evaluation by Child.

2. In the second section, Discussion of Results, an overall analysis of results will be presented for each of the three objectives: (a) to evaluate change in Academic Achievement, (b) to confirm profile of Creative Thinking Abilities (Creative Positives) and (c) to evaluate change in Evaluative Effort by Child. For example, if all of the academic achievement measures used to assess change in performance indicate improvement, that is the focus of the discussion. Summary tables have been included to aid data presentation.

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3. In the last section, Summary, the results of data presented in this chapter are capsulized.

Research Questions

Academic Achievement

Is there a difference in performance on the two parallel forms of the Gates-MacGinitie Reading Test, Primary A, Vocabulary and Comprehension?

TABLE 4.1.--Results of Gates-MacGinitie Reading Test.

	Baseline Period	
	A_1 Form 1	A_3 Form 2
Vocabulary		
Number correct	21	18
Standard score	37	35
Percentile score	10	7
Grade score	1.4	1.4
Total possible	48	48
Number of errors	12	19
Number attempted	33	37
Number skipped	15	11
Percent correct (of attempted)	64%	49%
Beginning sound correct on missed word	8 (of 12)	18 (of 19)
Time (in minutes)	17.5	14.5
Comprehension		
Number correct	16	12
Standard score	45	38
Percentile score	31	12
Grade score	1.6	1.5
Total possible	34	34
Number attempted	25	26
Number errors	8	14
Percent correct (of attempted)	64%	46%
Time (in minutes)	24	19

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The dotted line indicates the cut-off between the information normally gained after administering and scoring this standardized measure, and the additional information extracted for this analysis. This dotted line in succeeding tables indicates the same thing.

In the pre test, after the first two pages, the child made check marks in what appeared to be a random manner, spending only a few seconds on each item attempted--certainly not enough to read the item and answer it. In the post test, she spent more time on each item she attempted and attempted more. However, the total time to take the test decreased (a total of 8 minutes) and the number of items correct also decreased. One possible explanation of this phenomenon is that she spent a greater percentage of her time on the post test in "on target" behavior, thereby decreasing the extraneous factors which may have affected her pre test performance time.

A point of information is that the lowest possible grade score on this form of the Gates-MacGinitie is 1.3.

> Is there a difference in performance on the Durrell Analysis of Reading Difficulty, New Edition, on the following subtests: oral reading, silent reading, listening comprehension and naming letters?

Oral Reading*

In the oral reading paragraph read during the first baseline period, there were numerous graphemic or word recognition errors

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*The analysis of performance on the Durrell was done in conjunction with an outside expert in reading at Michigan State University. The data recorded here has been organized by the experimenter and the outside expert to provide maximum information regarding the reading abilities of the child in this study, as determined by performance on the Durrell Analysis of Reading Difficulty, New Edition.

TABLE 4.2

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TABLE 4.2.--Performance on the Durrell Oral Reading Subtest by Sentence.

Sentence	A_1				A_2				A_3			
	1	2	3	4	5	6	7	8	9	10	11	12
Identification of words. Recognition or graphemic stability	+	-	-	-	-	+	-	-	+	+	$\overset{-}{+}$	+
Sentence direction appropriate; message meaning communicated	+	-	+	+	+	+	+	-	+	+	$\overset{+}{+}$	+
Grammar or syntax appropriate	+	-	+	-	-	+	+	-	+	+	$\overset{+}{+}$	+
+ = adequacy of performance - = inadequacy of performance												
Comprehension		+				+				+		
No. of recognition errors		6				4				2		
Time (in seconds)		70				60				95		

in three of four sentences. The child was still able to understand and communicate the message in two of these sentences, and in one of the three sentences, made syntactical sense also. General impression: poor oral reading, but tends to make sense out of it anyway. Intonation waves (i.e., the way she read the sentence aloud with inflexions) were "good" in three of four sentences.

In the oral reading paragraph read during the second baseline period, there were less (i.e., 4 instead of 6) graphemic or recognition errors in three of four sentences. The graphemic errors (and the poor sentence construction of the stimulus sentence) caused message meaning

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and syntax to become inadequate in sentence 8. General impression: poor oral reading, no difference between first and second baseline periods in the way she made the communication or the way she set up the sentences. Intonation waves were good in three of four sentences. The number of recognition errors and time decreased.

In the oral reading paragraph read during the third baseline period, there were less (i.e., 2 instead of 4 or 6) graphemic or recognition errors. The errors occurred in only one sentence, rather than three as in the first two paragraphs. The graphemic errors did not affect the message meaning or syntax of the sentence when read uncorrected. When the errors were corrected, the sentence was corrected and again the meaning and syntax were appropriate. Reading the sentence twice, however, took a longer time. General impression: poor to fair oral reading; some difference between this paragraph and the previous two paragraphs in that there was less error involved on all three dimensions. Intonation waves were good in all the sentences.

Silent Reading

During the first baseline period, the child was given a paragraph to read silently. The only information gained from this measure was that the child was completely unable to read silently according to the directions. The child apparently needs the auditory feedback which is a part of oral reading. Since she was unable to follow directions, the measure could not be scored.

The measure was not given during the second baseline period, but during the third baseline period the same silent reading paragraph

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was administered. This time the child attempted to follow the directions and did not try to read aloud; instead she read sub-vocally--i.e., aloud, but to herself, so no one else could hear. Again, however, the task was too difficult, and it was impossible to score with any degree of accuracy. A clinical interpretation was that she "tried harder" at an impossible task.

Listening Comprehension (paragraph)

Two paragraphs were read to the child during the first baseline period; one at the second grade reading level and one at the third grade reading level. Comprehension of content as measured by the questions in both cases was at the competency level (as opposed to the frustration or instructional level). This subtest was not administered on a post-test basis.

Naming Letters

The two parts of this subtest, Capital Letters and Small Letters, were administered to the child during the first baseline period. In both parts, she correctly identified 27 of 28 letters on the first attempt. The one mistake was corrected immediately. This is 96% accuracy in identification, or a competency level indicating mastery of the skill. This subtest was not administered on a post-test basis.

Is there a difference in performance on the criterion task of recognizing basic sight words?

Figure 4.1 illustrates the decrease in time along with the increase in the number of words immediately recognized and the percentage

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TABLE 4.3.--Results of Sight Word Recognition Task (Dolch Words).

	A_1	A_2	A_3
Total words given	155	155	155
Total immediately recognized (i.e., criterion score 1)	78	79	114
Percent correct (i.e., summed scores 1 & 2 divided by total)	69%	65%	84%
Total time* (in minutes)	68	47	27.5
Criterion scores given** (See Criteria 3.1)			
1 (correct)	78	79	114
2 (correct)	29	21	16
3 (incorrect)	9	6	0
4 (incorrect)	17	47	4
5 (unsure)	12	0	19
6 (not known)	10	2	2

*The total task was accomplished over a three day period during each baseline, with one third of the words given each day.

**Ordered words and scores for each period appear in the Appendix.

correct. The 84% correct score in the final baseline period indicates the child was functioning at an instructional level. Below 75% indicates the child is functioning at a frustration level, or minimal competency level.

In the second baseline period it should be noted that the child placed no words aside to try later (criterion score 5). In that same period, the number of words attempted but incorrect (criterion score 4: incorrect, child perceives as incorrect) appears high. A possible explanation of this difference is that she was trying very hard to

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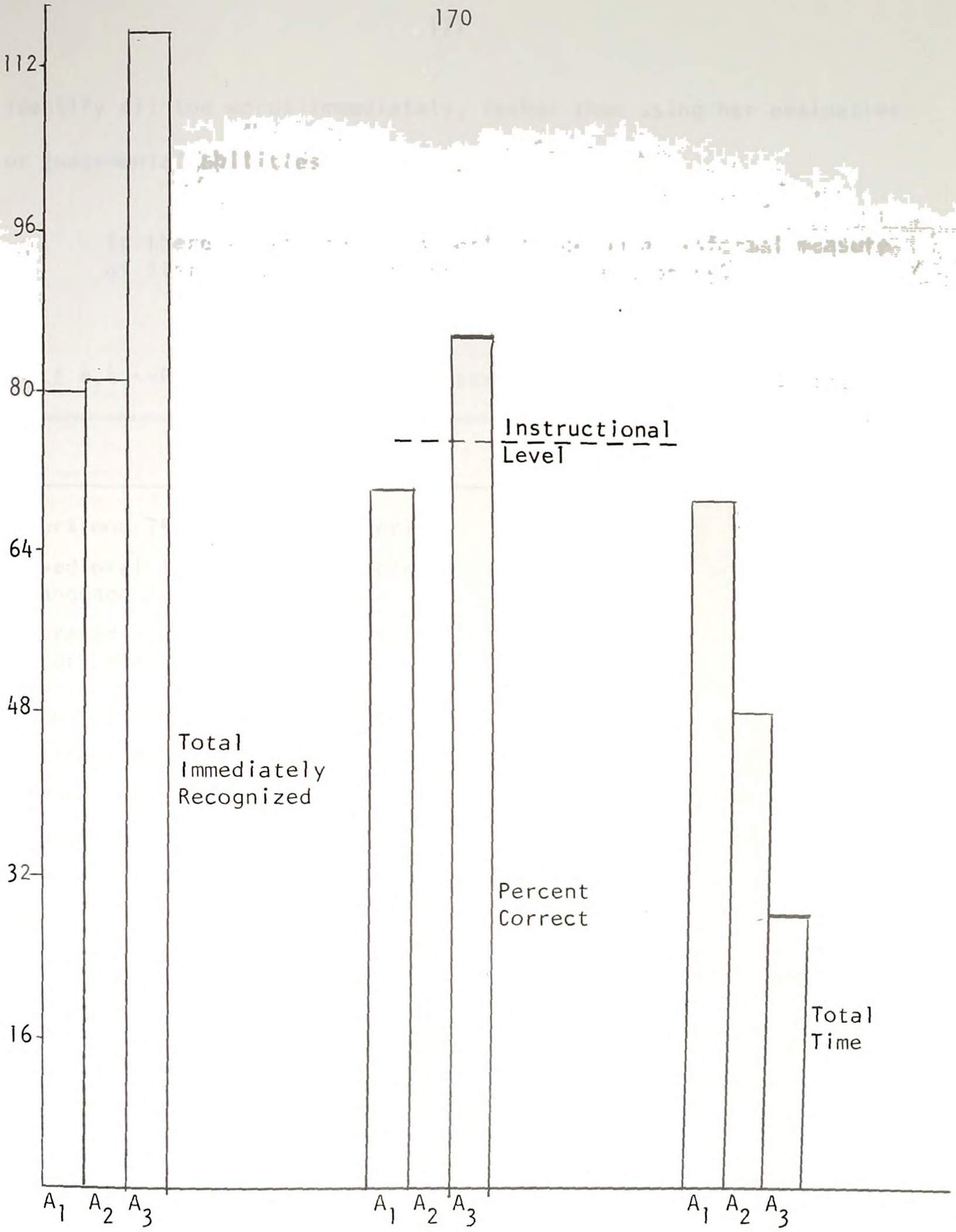


Figure 4.1.--Results of Sight Recognition Words (Dolch Words) per Period.

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identify all the words immediately, rather than using her evaluative or judgemental abilities.

> Is there a difference in performance on an informal measure of listening comprehension of selected stories?

TABLE 4.4.--Results of Informal Listening Comprehension Assessment.

	A_1	A_2	A_3
Understood 75 percent of material	+	+	+
Showed oral language comparable to language level of material	+	+	+
Rephrased, rather than repeated story when retelling	+	+	+
Number of independent memories			
without book	0	2	15
added with book	33	20	26
Total memories	33	22	41

The criteria for informal assessment of listening comprehension of stories (see Criteria 3.2) indicate that the child understood the stories read to her, demonstrating consistent potential reading comprehension. The data also indicate that more independent memories were retrieved during the last baseline period; especially of note is the fact that there were 15 memories without any assistance. In all three measures the child retold the story, occasionally quoting significant conversational elements.

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Is there a difference in performance on the Developmental Test of Visual-Motor Integration?

TABLE 4.5.--Results of Developmental Test of Visual-Motor Integration.

	A_1	A_2	A_3
Raw score	10	12	14
Age equivalent	5-6	6-2	7-2
Attempted	24	24	24
Erasures and second attempts	5	3	2
Time (in minutes)	9	8	7.5

The results of criterion tests such as this indicate only whether or not the student has passed the item, and not how close to criterion is the student. Table 4.6 lists (1) the items from 10-24 on this test (items 1-9 were passed during all baseline periods), (2) the number of criteria that must be met in order to pass, (3) the mean developmental age level at which this item is usually passed; and in the last 3 columns, (4) the number of criteria met by the student in this study in each of the baseline periods.

Table 4.6 better illustrates the extent of this child's visual-motor integration ability rather than a "disability" score showing "below age level maturity." She was able to pass three items that were at a developmental age level above her own, and came close on many others.

Two non-verbal behaviors were also noted during the administration of this measure: (1) sequential task order and (2) age appropriate handling of pencil.

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TABLE 4.6.--Proximity to Criterion on the Developmental Test of Visual-Motor Integration.

Item	No. of Criteria	Development Age	Number criteria met		
			A_1	A_2	A_3
10	4	5-6	3	3	Pass
11	4	5-8	Pass	Pass	Pass
12	4	6-5	3	3	Pass
13	2	6-3	0	Pass	1
14	4	7-5	3+	0	Pass
15	6	7-11	4	Pass	4
16	5	8-1	4	4	Pass
17	4	8-8	3	0	3
18	3	9-5	2	2+	2
19	3	9-4	2+	2+	1
20	5	10-1	2	3	3
21-24		Over 11	All attempts showed age-level maturity		

1. Sequential task order: in the first two baseline periods the child demonstrated a non-sequential task accomplishment. (For example, given forms 1-2-3 to do, she did them in a 2-3-1 order.) In the last baseline period, all eight sheets of the test were finished in a sequentially ordered manner, (i.e., 1-2-3, 4-5-6), which is considered to be more appropriate for this age student.

2. Age appropriate handling of pencil: prior to the last treatment and baseline period, the child had grasped the pencil in her left hand in a "clenched fist" position. In the last baseline period,

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and particularly during this measure in which behaviors were recorded, she held the pencil in a grasp that was appropriate and developmentally mature.

Is there a difference in performance on an informal measure of handwriting, consisting of a few words and letters?

Is there a difference in performance on an informal copying task, consisting of four words?

In Figures 4.2 through 4.7 the actual results of the handwriting assessment given during the three baseline periods are presented. Table 4.7 contains a brief analysis of the types of errors demonstrated over the study. The time on task for each baseline period was: A_1 = 9 min.; A_2 = 7 min.; A_3 = 7 min.

In the first baseline period, there were numerous errors. The most significant deficiencies were in proportion, reversals, ordering and organization. There were fewer errors during each succeeding baseline period.

Creative Thinking Abilities

Figural Measures

On the two forms of the Picture Construction Test, are the scores of diagnostic value relative to learning style?

In the first test, the child used the jelly bean shape as a basis for a very elaborate "hat" (for lack of a better descriptor) which balanced on top of a "Disgusting Mermaid." The mermaid was surrounded by very elaborate sea creatures, and was considered "mean" since she had imprisoned a "Beautiful Fairy" in a bottle. As is obvious from the score in Table 4.8, many points for elaboration were accumulated. While

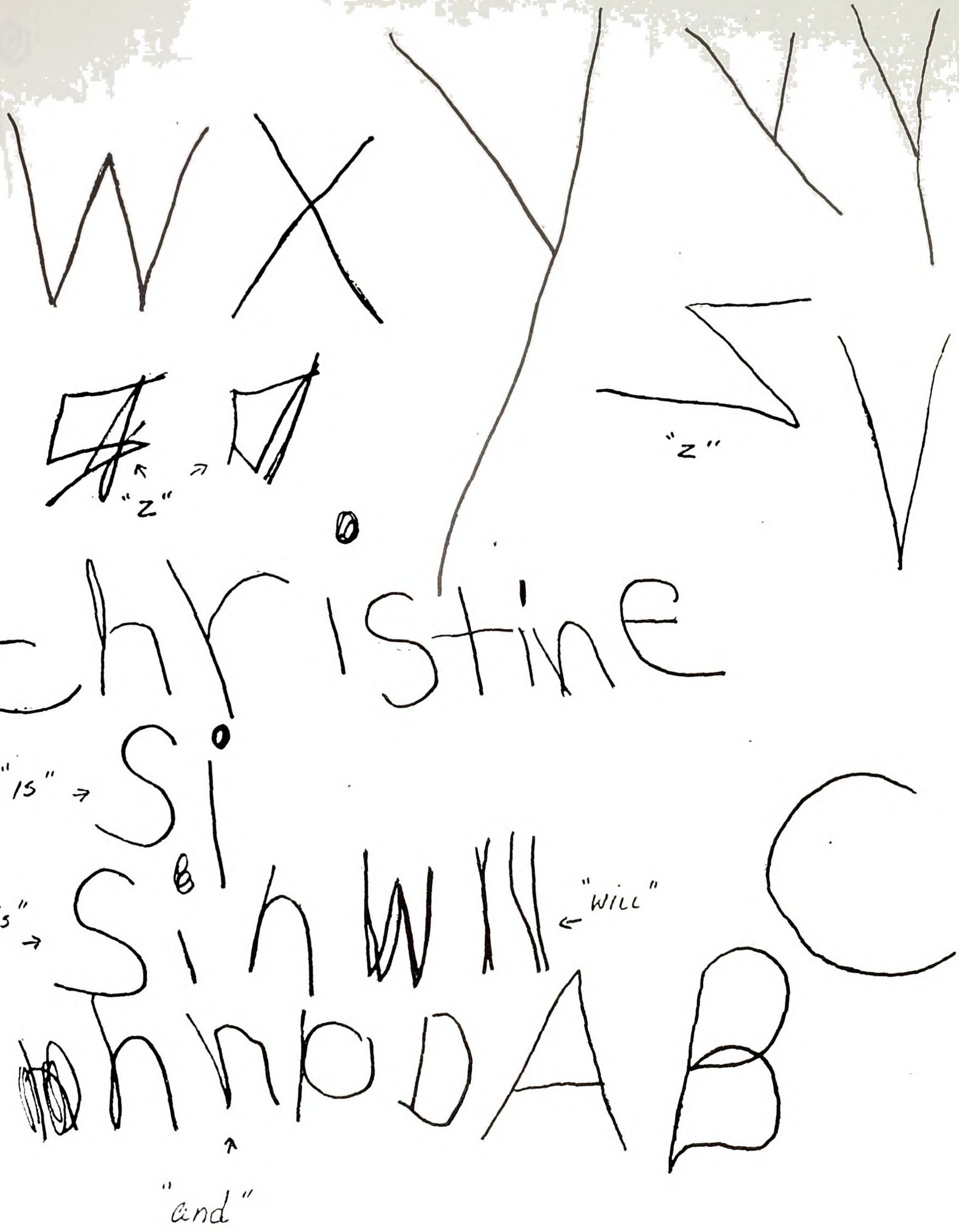


Figure 4.2.--Handwriting, 1st Period.

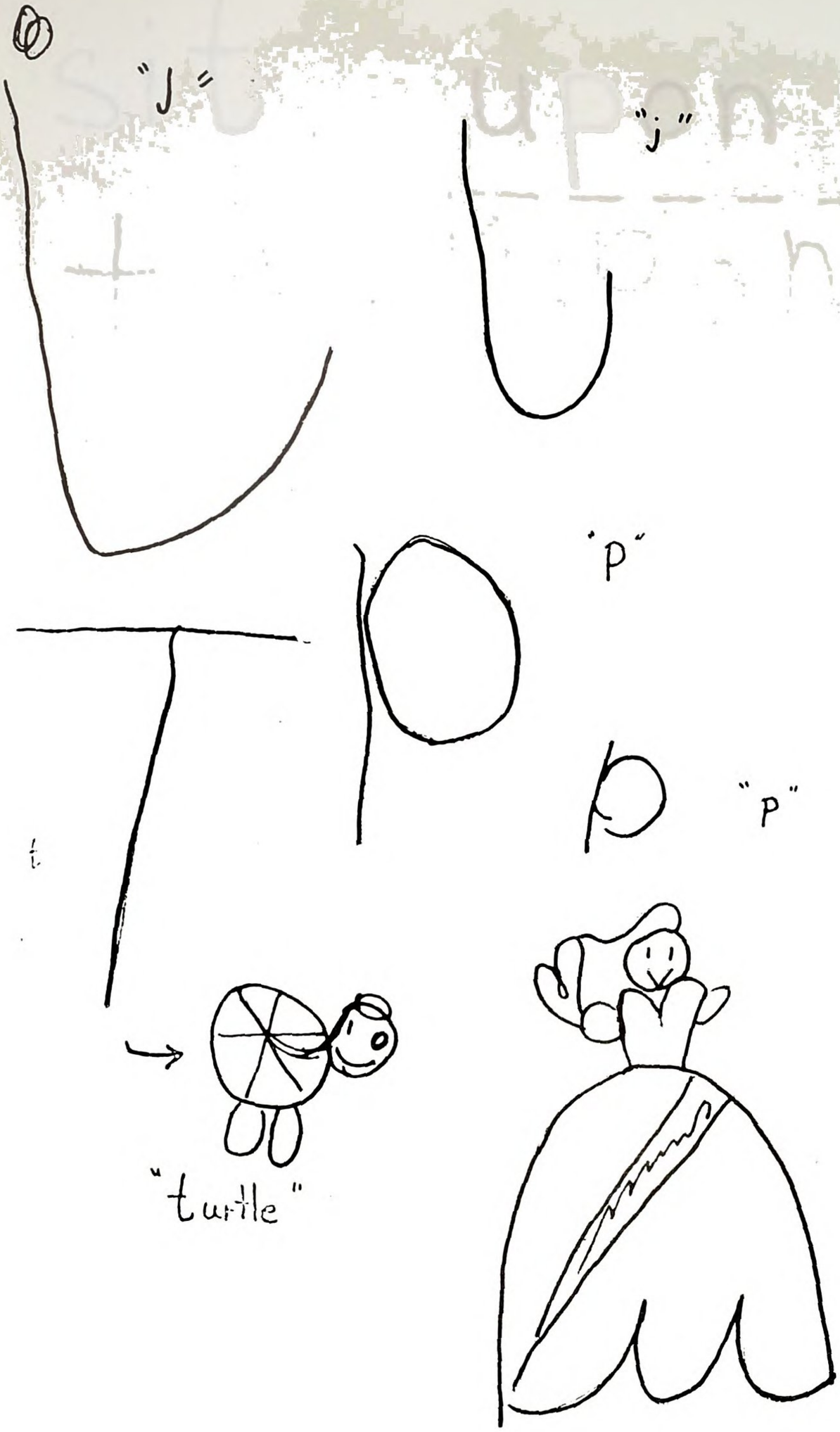


Figure 4.2.--(Continued).

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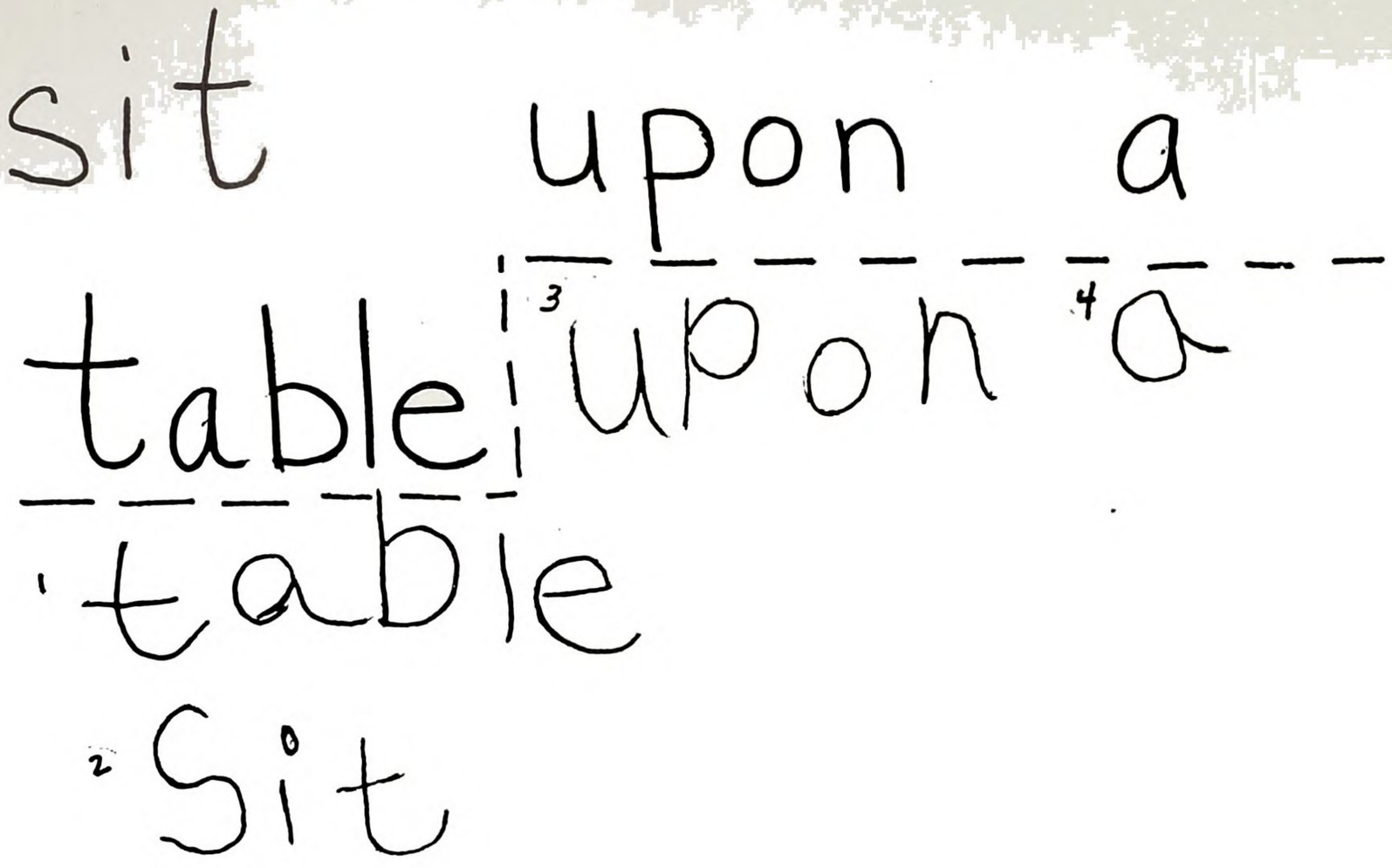


Figure 4.3.--Copying, First Period

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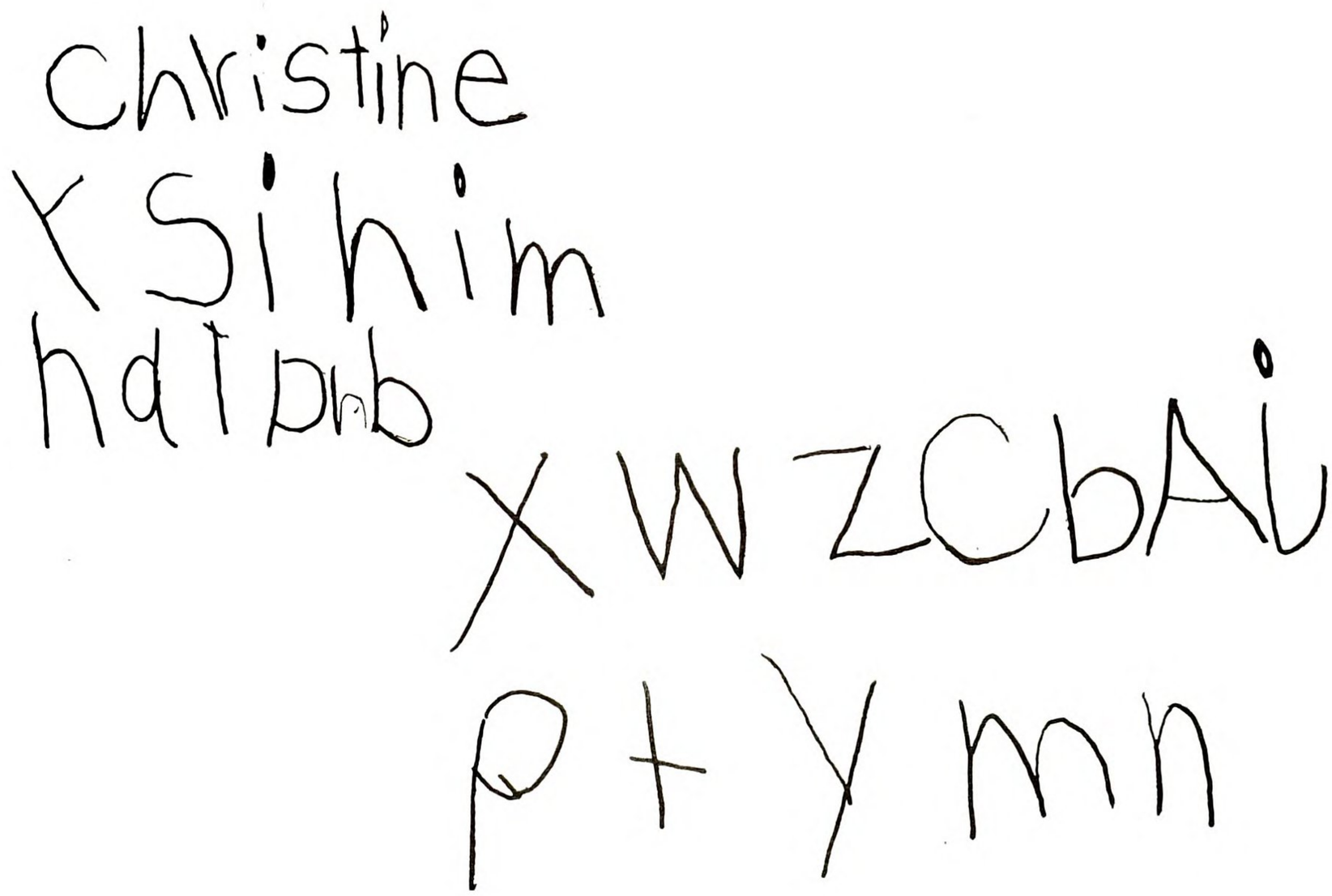


Figure 4.4.--Handwriting, Second Period.

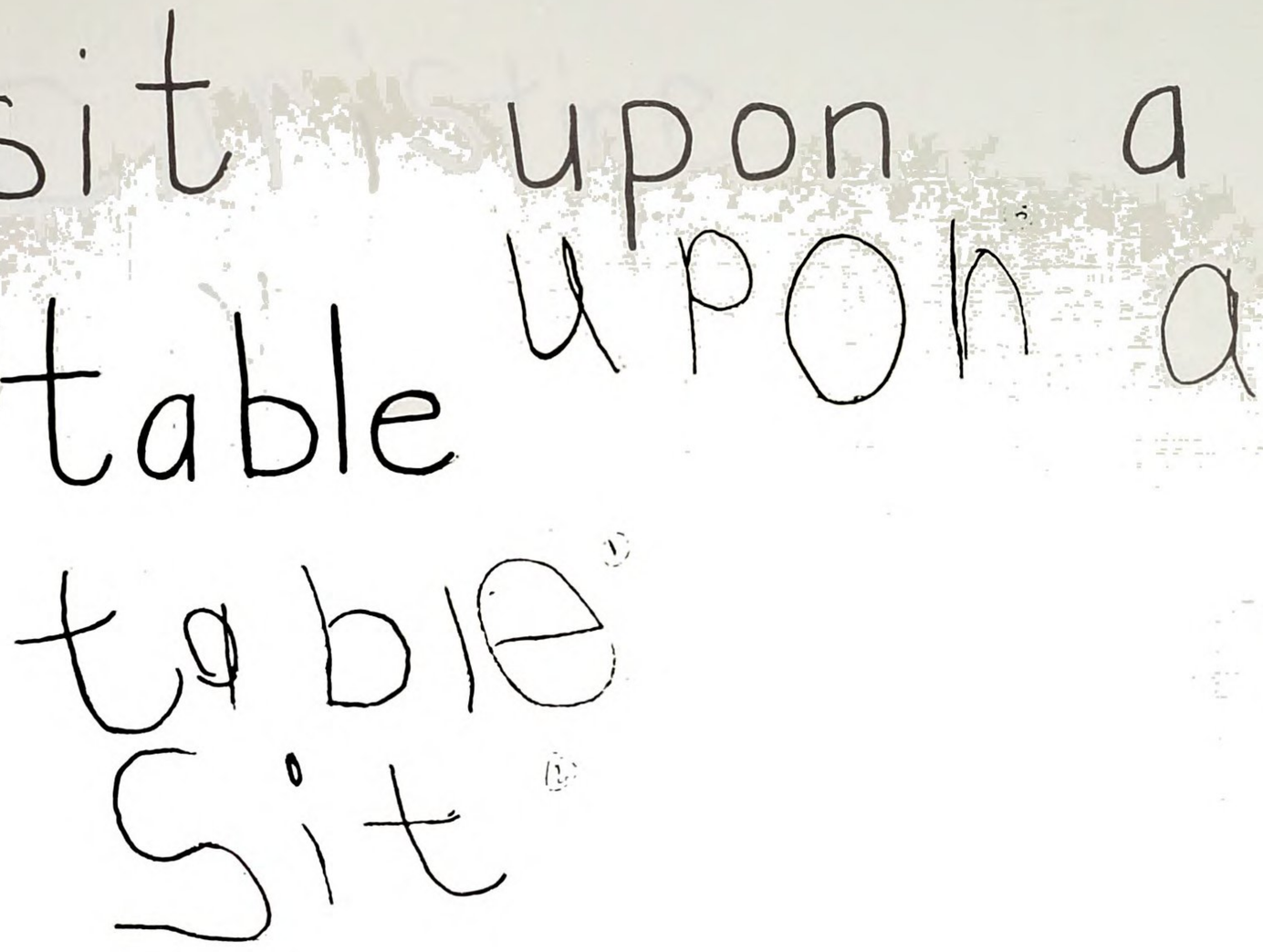


Figure 4.5.--Copying, Second Period.

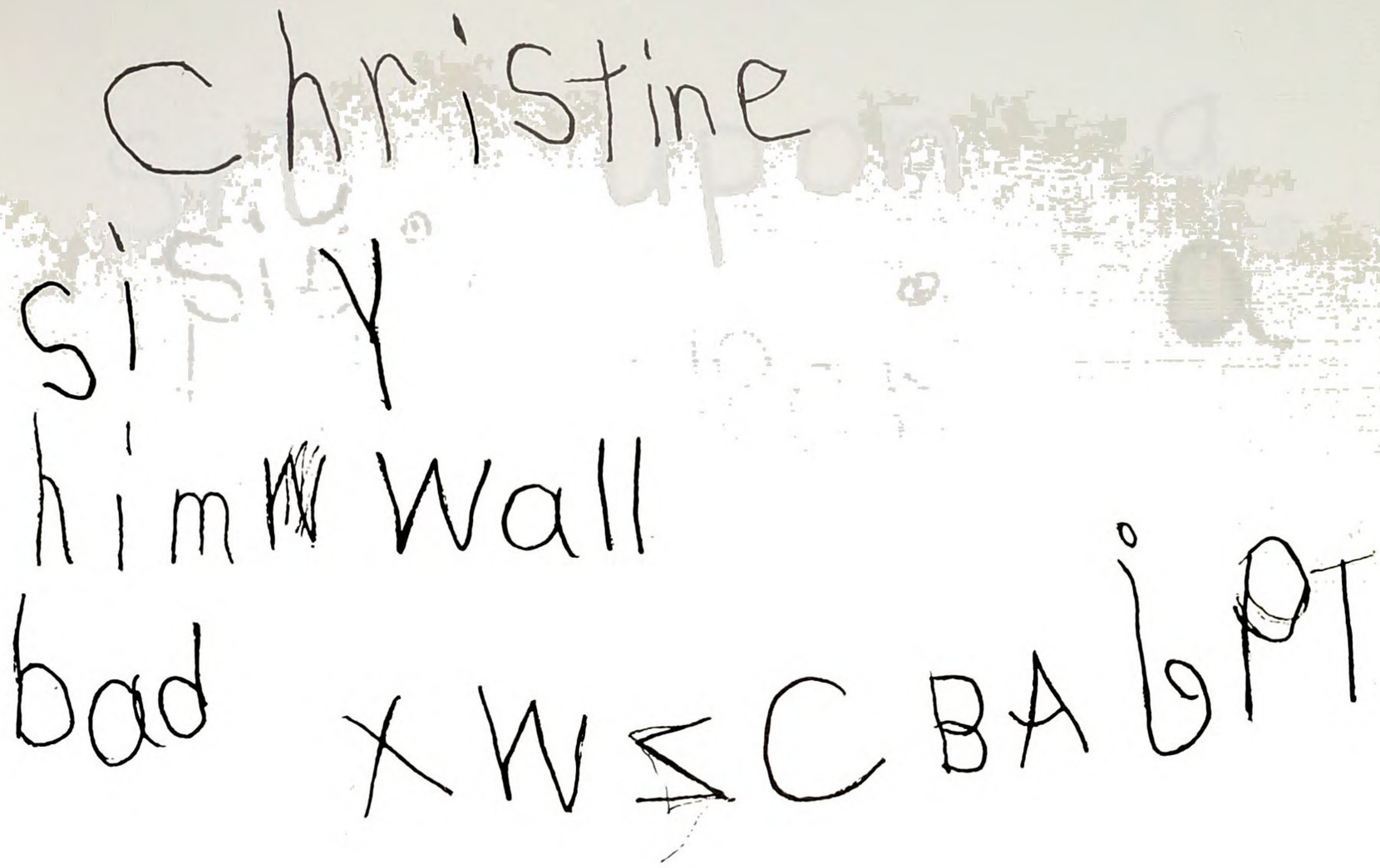


Figure 4.6.--Handwriting, Third Period.

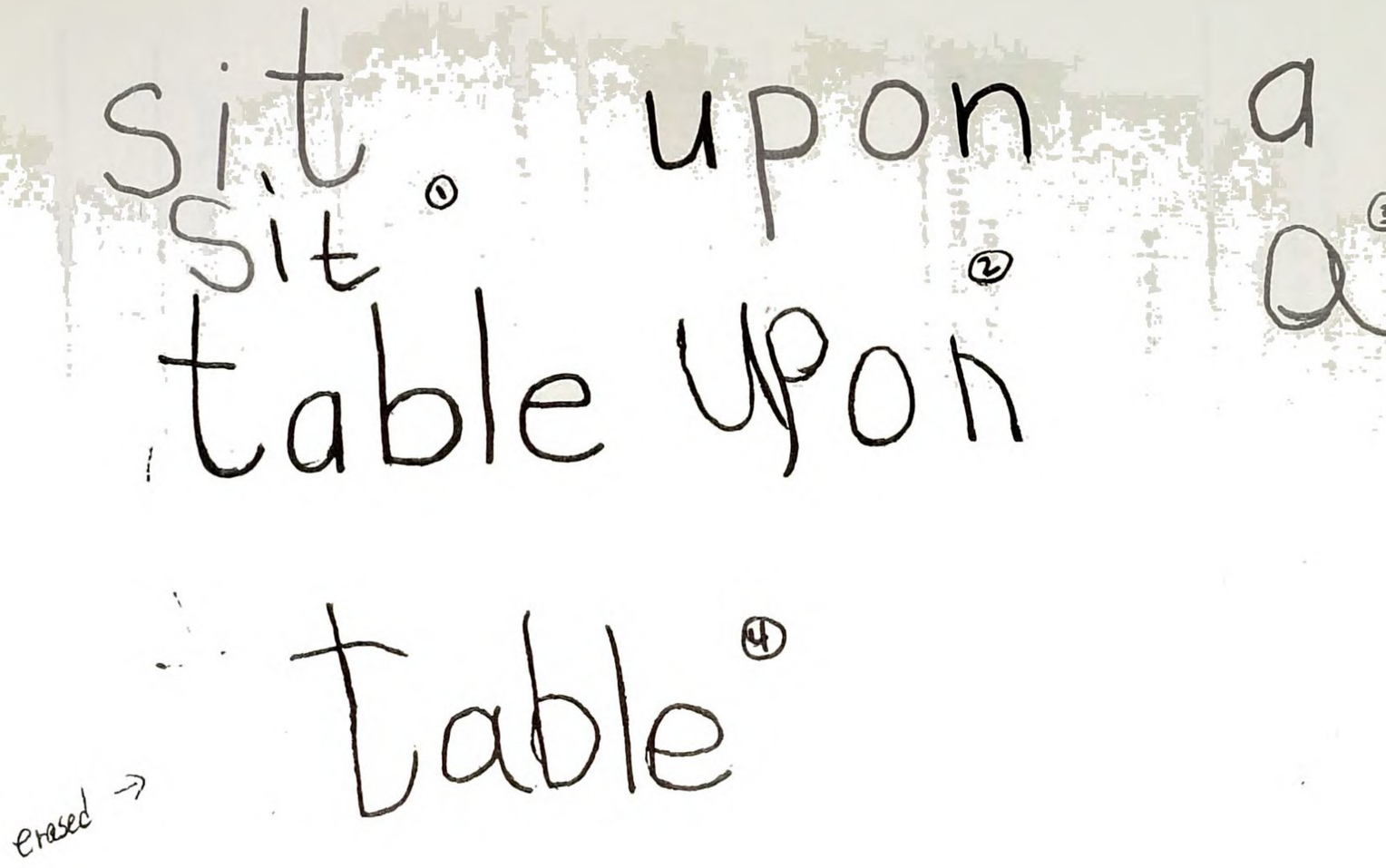


Figure 4.7.--Copying, Third Period.

TABLE 4.7.--Analysis of Handwriting During Three Baseline Periods.

	A_1	A_2	A_3

TABLE 4.7.--Analysis of Handwriting During Three Baseline Periods.

	A_1	A_2	A_3
Visual-Motor Sequencing	"is," "his," "and," reversed Order phrase copied: table, sit, upon, a	"and," "is," reversed Order phrase copied: table, sit, upon, a	"is" reversed, "and" becomes "bad" Order phrase copied: sit upon a table
Structure of Symbolic Forms	Write-overs, ("will") crossed-out letters mistakes in making "z" Phrase copying acceptable	No evidence of "will" "hat" included Phrase copying acceptable	Mistakes in making z and p "wall" substituted for "will" Phrase copying acceptable, one erasure
Perception of Size	w, x, y, a, C, A, B, J, j, t, p, out of proportion to rest of letters Phrase: relatively appropriate copying	Size becomes proportionally larger as task progresses. Twelve letters disproportionate Phrase: copied words somewhat larger than stimulus words, also disproportionate to each other	J, p, t, disproportionate Phrase: copied words similar in size to stimulus words
Spatial Relationships	y tail going wrong way, z reversed three times "n" looks like "h" "a" "j" reversed twice "will" looks confusing	Y tail going wrong way d, a, reversed in "and" j, reversed "n" looks like "h," and is sandwiched in between a and d Phrase copying acceptable	Error in writing "w" to begin word; too close, child corrected z, j, reversed Phrase copying acceptable
Organizational Abilities	Random display, name appears in middle of page letters not produced in sequential or ordered manner. Little organization. Needed second page to complete.	Name appears first at the middle of page. Three lines of words organized on left; two lines of letters on right of page. Some organization.	Name appears at top left. Words and then letters organized left to right and top to bottom. Good organization.

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TABLE 4.8.--Results of Picture Construction Tests.

	A_1	A_2
Originality	2*	3*
Elaboration	60	9

*One point for title originality.

she was drawing the picture, she talked quite a bit about the "VAL-A-BLE" fairy and how horrid it was to be kept locked up. She had to be stopped when the 10 minute time limit was up.

In the second test, her first comments related to the fact that she wanted another shape to work with. When she was told the teardrop shape was the only shape, she seemed disappointed, but began immediately. She then asked "How do you spell egg?" She said she was writing "She's a egg." After writing, she said "That's all." Encouraged to do more, said "There isn't any more to do." Her final production was an interesting but unelaborate "Egg Lady" that took only six minutes to complete.

On these two forms of the test, the scores represent a confusing image. Based on observation and her comments, the drop in elaboration can probably be accounted for by the assumption that she was not as interested in the second stimulus shape. Both titles, however, were given one point for title originality.

On the two forms of the Incomplete Figures Test, are the scores of diagnostic value relative to learning style?

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TABLE 4.9.--Results of Incomplete Figures Tests.

	A_1 Form A				A_2 Form B			
	Flex. Categ.	Orig.	Elab.	Title* Orig.	Flex. Categ.	Orig.	Elab.	Title* Orig.
	58	2	6	2	8	1	10	0
	27	2	4	0	12	0	11	1
	63	1	2	1	7	0	6	1
	37	0	4	1	12#	1	9	1
	45	0	6	0	21	2	5	3
	4	2	6	1	59	0	18	3
Totals	6	7	28	5	5	4	59	9

*Title originality counted in verbal score.
#Indicates duplication.

Totals	A_1	A_2
Fluency	6	6
Flexibility	6	6
Originality	7	4
Elaboration	28	59

In flexibility, the only duplication of categories between and among the tests occurred in the second test in which she created a "Spook House" and a "Fun House" (Category 12).

In originality, there was a slight decrease in figural originality with a corresponding increase in title or verbal originality (which is not counted as part of the figural score, and is not included above).

The elaboration score more than doubled in the second test.

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The first test was finished in six minutes, the second took slightly over ten minutes.

The consistent diagnostic clues from this measure indicate sufficient flexibility and fluency, some originality (balanced between figural and verbal) and high elaboration.

On both Form A and Form B, three of the six figures were closed immediately, indicating at least some tendency toward early closure.

On the two forms of the Circles and Squares Test, are the scores of diagnostic value relative to learning style?

TABLE 4.10.--Results of Circles and Squares Tests.

	A_1 Circles				A_2 Squares			
	Flex. Categ.	Orig.	Elab.	Bonus Orig.	Flex. Cate.	Orig.	Elab.	Bonus Orig.
	33	2	15	2	10	2	4	0
	33#	2	11	5	29/8	3	1	0
	31	0	5	0	41	1	3	0
	33#	2	9	10	6	0	1	0
	33#	1	3	0	15/57	2	7	2
					68	0	3	0
					31	3	6	10
Totals	2	7	43	17	9	11	25	12

#Indicates duplication.

Totals	A_1	A_2
Fluency	5	7
Flexibility	2	9
Originality	24	23
Elaboration	43	25

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There were additional irrelevant figures created in both tests which were not scored since they appeared not to have the appropriate stimulus element as an integral part: in the first test there was one; in the second test there were six irrelevant, and hence unscorable, responses.

Originality scores appear large because of the extra bonus points. Bonus points were awarded because in the first test she combined circles three times; in the second test, squares twice. As described in Chapter III, this combining is considered a very unusual and original way of responding. Three of the twelve responses were not scored as original.

Elaboration scores were higher in the first period; but there were consistent elaboration during the second test, even on the unscorable responses.

In each test, the child took the entire amount of allotted time to do this activity, and expressed a desire to continue working when time was called.

On all three of the figural measures of creativity, are the scores of diagnostic value relative to learning style?

TABLE 4.11.--Total Scores on Figural Measures of Creativity.

	A_1				A_2			
	Flu.	Flex.	Orig.	Elab.	Flu.	Flex.	Orig.	Elab.
Picture Construction	N.A.	N.A.	2	60	N.A.	N.A.	3	9
Incomplete Figures	6	6	7	28	6	5	4	59
Circles and Squares	5	2	24	43	7	9	23	25
TOTALS	11	8	33	131	13	14	30	93

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When the total scores for the figural measures given during two baseline periods are compared to ascertain strengths according to learning style, the following profile emerges:

Characteristic	Comparison Criteria
Fluency	relatively stable, but low
Flexibility	increasing, but low
Originality	stable and high
Elaboration	fluctuating according to measure, but still highest

Verbal Measures

On the two forms of the Unusual Uses Test, are the scores of diagnostic value relative to learning style?

In the first test, after a few minutes the child said "nothing else." After a pause, however, she came up with another response. This same process (i.e., "nothing else"--and then another response) was repeated four more times before she finally refused to think of any more uses. The total time in the first period was five minutes.

A similar thing happened in the second test when she said "That's all" (instead of "nothing else") five times. The second test took seven and one-half minutes. Torrance's suggestion of urging the child to continue appears to have some merit when applied to a learning disabled child.

In the first test, three of the five responses given an originality weight of 2 are questionable. They were "unusual," however, and Torrance (1966) suggests giving the benefit of the doubt.

TABLE 4.12.

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	3
	1
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	2
	2
Totals	

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TABLE 4.12.--Results of Unusual Uses Tests.

A_1			A_2		
Flex. Categ.	Orig.	Elab.	Flex. Categ.	Orig.	Elab.
7	1	0	3	0	0
13	2	0	3#	0	0
35	2	0	3#	0	1
35#	0	0	3#	0	0
16	2	0	15#	0	0
23	1	0	1	0	0
35#	0	0	2	0	0
7#	2	0	4	0	1
23#	1	0	20	0	0
23#	0	0	1#	1	0
35#	1	0	18	0	0
35#	0	0	18#	0	1
35#	1	0	6	0	1
3	2	0	2#	0	0
18	1	0	13	0	0
			12	1	1
			12#	0	0
Totals 8	16	0	10	2	5

#Indicates duplication.

Totals	A_1 Tin Cans	A_2 Cardboard Boxes
Fluency	15	17
Flexibility	7	10
Originality	16	2
Elaboration	0	5

On the two forms of the Product Improvement Test, are the scores of diagnostic value relative to learning style?

TABLE 4.13.--

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TABLE 4.13.--Results of Product Improvement Test.

	A_1			A_2	
Flex. Categ.	Orig.	Elab.	Flex. Categ.	Orig.	Elab.
1	0	0	20	0	0
1#	1	0	11	0	0
4	0	1	11#	0	0
11	0	0	1	1	0
11#	1	1	2	1	1
17	1	0	19	1	0
17#	0	1	17	0	0
4#	0	0	1#	0	0
2	0	0	4	1	1
1#	0	0	4	1	1
1#	0	0	4#	1	1
4	0	0			
16	1	0			
20	0	0			
4#	0	0			
1#	0	0			
4#	0	1			
1#	1	0			
2#	1	0			
2#	0	0			
4#	0	0			
4#	0	0			
Totals 7	6	4	7	5	3

# Indicates duplication.

Totals	A_1 Toy dog	A_2 Toy monkey
Fluency	21	10
Flexibility	7	7
Originality	6	5
Elaboration	4	3

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TABLE 4.14

| Questions | | |

The child took seven minutes on the first test and five and one half minutes on the second test before she stated "for the last time" that she couldn't think of anything else. She seemed to become bored on the toy monkey task. That may have influenced her total output (fluency) but didn't appear to affect the other scores.

On the three forms of the Ask and Guess Activity, are the scores of diagnostic value relative to learning style?

TABLE 4.14.--Results of Ask and Guess Activities.

	A_1			A_2			A_3		
	Flu.	Adeq.	Time	Flu.	Adeq.	Time	Flu.	Adeq.	Time
Questions	4	4	3	13	13	4.5	15	15	1.5
Causes	7	5	5	5	4	1.5	6	6	2
Consequences	3	3	2	3	1	1.5	9	8	3
TOTALS	14	12	10	21	18	7.5	30	29	6.5
Percentage of Adequate Responses		86%			86%			97%	

The total time necessary to accomplish the task decreased.

Both the fluency of responses and the adequacy of responses increased.

The percentage of adequate responses increased in the last period.

On the three forms of the Imaginative Stories activity, are the scores of diagnostic value relative to learning style?

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TABLE 4.15.--Results of Imaginative Stories Activities.

	A_1[a]	A_2[b]	A_3[c]
Number of Words	339	683	559
Time (in minutes)	6	10	6.5
Scoring			
I. Organization			
1. Balance (Integration)	0	0	1
2. Arrangement (order)	1	1	1
3. Consistency	0	0	1
4. Conciseness	1	0	1
5. Clarity (communication)	0	1	1
II. Sensitivity			
1. Stimulus Perception	1	1	0
2. Association	0	0	1
3. Relevancy of ideas	0	0	1
4. Specificity	1	1	1
5. Empathy	0	1	0
III. Originality			
1. Choice of topic	0	0	1
2. Ideas	1	1	1
3. Organization	0	0	0
4. Style	0	1	1
5. Sense of humor	0	1	1
IV. Imagination			
1. Imagination	1	1	1
2. Fantasy	0	1	1
3. Abstraction	0	0	0
4. Identification	1	0	1
5. Reasoning	1	0	1
V. Psychological Insight			
1. Causal Explanation	1(f)*	0	1(o)**
2. Perspective	1	0	0
3. Meaningfulness	1	1	1
4. Ego-involvement	0	0	0
5. Understanding	1	1	1
VI. Richness			
1. Expression	0	1	1
2. Ideas	1	1	1
3. Emotion	1	1	1
4. Curiosity	0	1	0
5. Fluency	1	1	1
TOTALS	15	17	23

[a]The Dog That Doesn't Bark
[b]The Flying Monkey
[c]The Horse that Won't Run
*(f) functional cause
**(o) organic cause

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In the first activity she stated: "I don't think none of them are interesting." She ended by telling the story of "The Dog that Doesn't Bark" and "The Lion that Doesn't Roar." The latter story was long, complicated and involved. Only the first story was scored, however.

In "The Flying Monkey" (second baseline) she sang most of the story for the first two minutes. She sang things like "Swush, swush... swish, swish...I went around, round, round..." when describing the flying monkey. She also wanted to draw while she was telling the story--in fact, insisted upon it. She was allowed to draw the story after she had told it, while listening to the playback on the recorder.

In the third period, she really wanted to "tell an interesting story" with a "fairy" in it. She compromised finally, and the third story became: "The Horse that Won't Run and a Fairy too..."

The scores indicate an increasing tendency to improve in organization, sensitivity, originality, imagination. There appears to be more of an observable gain in organization.

On all of the verbal measures of creativity used during all three baseline periods, are the scores of diagnostic value relative to learning style?

TABLE 4.16.

| | | |

TABLE 4.16.--Total Scores on Verbal Measures of Creativity Administered During two Baseline Periods.

	A_1					A_2				
	Flu.	Flex.	Orig.	Elab.	Title* Orig.	Flu.	Flex.	Orig.	Elab.	Title* Orig.
Unusual Uses	15	7	16	0	(1)	17	10	2	5	(1)
Product Improvement	21	7	6	4	(5)	10	7	5	3	(9)
TOTALS	36	14	22	4	(6)	27	17	7	8	(10)

*The scores for Title Originality are taken from two figural measures of creativity. Picture Construction: scores of (1) and (1); Incomplete Figures: scores of (5) and (9).

When the total scores for the verbal measures given during the two baseline periods are compared to ascertain strengths according to learning style, the following profile emerges.

Characteristic	Comparison Criteria
Fluency	fluctuating according to measure, but highest
Flexibility	stable, possibly increasing, relatively high
Originality	fluctuating according to measure, relatively high
Elaboration	relatively stable; lowest

The remaining two measures (i.e., Ask and Guess and Imaginitive Stories) do not lend themselves to this type of comparison scoring. In addition, they were both given during all three baseline periods. The following table represents the total scores obtained on these two measures.

TABLE 4.17.

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TABLE 4.17.--Total Scores on Verbal Measures of Creativity Administered During Three Baseline Periods.

	A_1		A_2		A_3	
	Flu.	Adeq.	Flu.	Adeq.	Flu.	Adeq.
Ask and Guess	14	12	21	18	30	29
Imaginative Stories*	33.9	15	68.3	17	55.9	23
TOTALS	47.9	27	89.3	35	85.9	52

*The Fluency score for Imaginitive Stories was obtained by counting the total number of words and dividing by ten. The Adequacy score is the total score taken from Table 4.15.

When the total scores for the verbal measures of creativity given during the three baseline periods are compared to ascertain strengths according to learning style, the following profile emerges:

Characteristic	Comparison Criteria
Fluency	increasing, remains highest
Adequacy	apparently increasing a great deal, becomes relatively high

Verbal Responses: Clarifying Questions and Clarifying Comments

Is there an effect on the number of clarifying questions asked during the entire period?

Is there an effect on the number of clarifying comments offered during the entire period?

Figures 4.8 and 4.9 on the following pages represent a visual trend analysis of the mean frequency of clarifying questions and clarifying comments per minute (x 100) over time.

TABLE 4.18.-

Day	Clari Quest
1	18
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32	
33	
Totals	
Descr	
Raw	
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Ran	

TABLE 4.18.--Frequency of Clarifying Questions and Comments by Child During Entire Study.

	Raw Scores			Mean f per minute (x 100)		
Day	Clarifying Questions	Clarifying Comments	Time	Clarifying Questions	Clarifying Comments	
1	18	38	88	20	43	
2	10	31	61.5	16	50	
3	7	14	43	16	33	A_1
4	8	11	49	16	22	
5	5	5	46.5	11	11	
6	8	29	31	26	94	
7	13	23	74.5	17	31	
8	20	32	90.5	22	35	
9	3	7	50.5	6	14	
10	17	18	48.5	35	37	
11	16	35	60	27	58	B
12	6	23	55	11	42	
13	38	18	57	67	32	
14	21	33	77	27	43	
15	4	22	53.5	7	41	
16	6	17	57	11	30	
17	3	12	45	7	27	
18	9	19	42	21	45	
19	17	23	54.5	31	42	A_2
20	23	27	58	40	47	
21	17	30	56	30	54	
22	17	23	70.5	24	33	
23	12	52	67.5	18	77	
24	23	51	79.5	29	64	
25	31	57	76.5	41	74	C
26	17	48	76	22	63	
27	8	37	65.5	12	56	
28	19	54	60	32	90	
29	24	34	52.5	46	65	
30	21	37	59	36	63	
31	21	32	83.5	25	38	
32	18	34	46.5	39	73	A_3
33	38	52	79.5	48	65	
Totals	501	978	2014.5 minutes or 33 1/2 hours			
Descriptive data for entire period						
Raw score mean f. per day				15.2	29.6	
Mean f. per min. (x 100) for study				25	48	
Range of mean f. per min. (x 100)				6-67	11-94	

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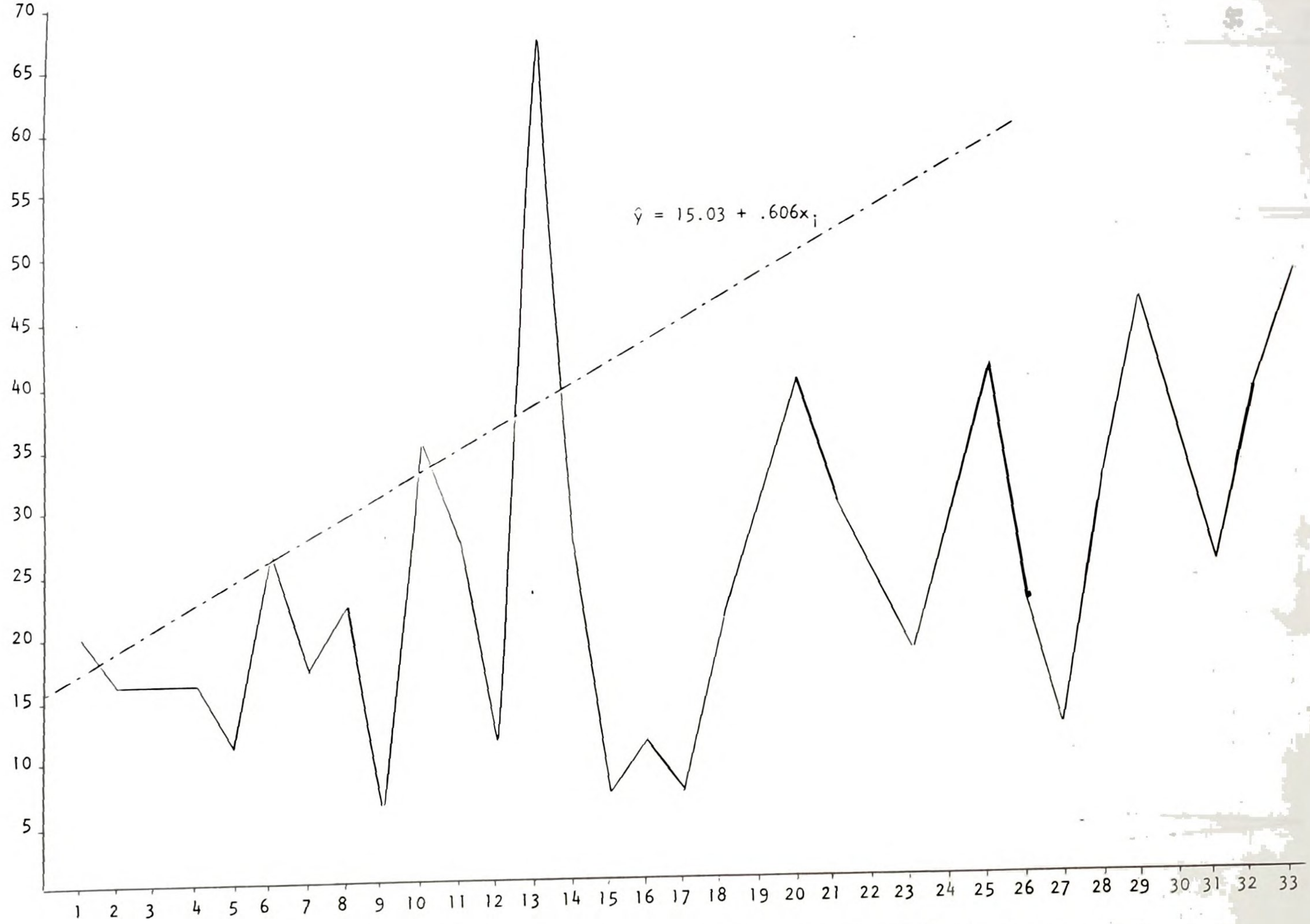
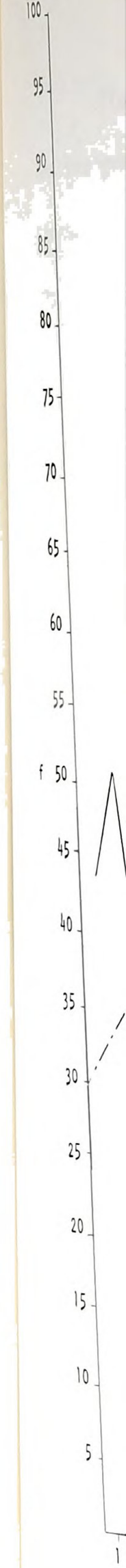


Figure 4.8.--Mean Frequency of Clarifying Questions per Minute (x 100) Over Time and Regression Equation for Clarifying Questions.



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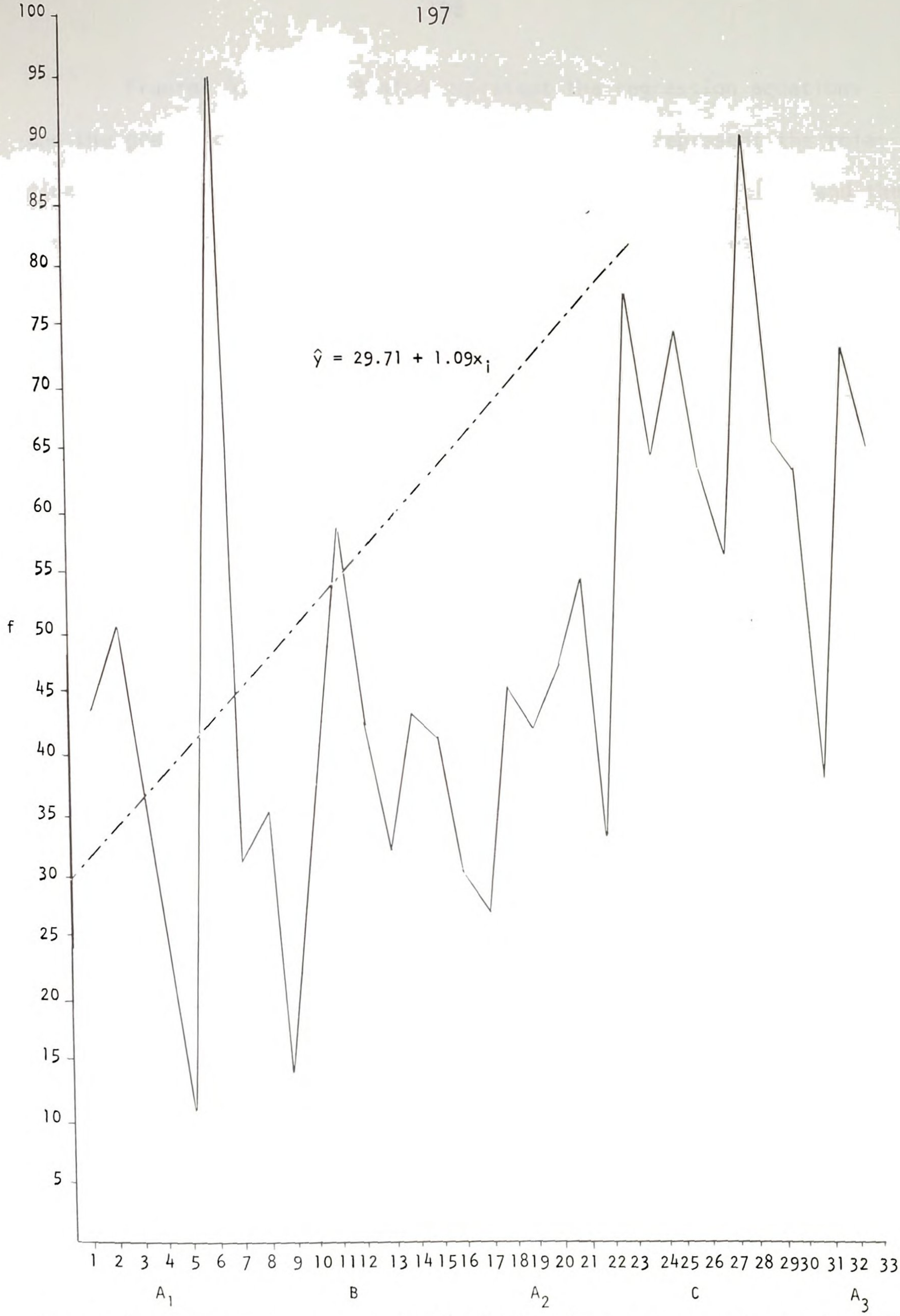


Figure 4.9.--Mean Frequency of Clarifying Comments per Minute (x 100) Over Time and Regression Equation for Clarifying Comments.

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Figures 4.8 and 4.9 also represent the regression equations and the graphs of these equations. These figures represent the relationship of the two variables (frequency of response and time) and the trend of long term change in the data for each type of response (i.e., clarifying questions and clarifying comments).

The least squares regression equation for clarifying questions is: $\hat{y} = 15.03 + .606\ x_i$ and for clarifying comments: $\hat{y} = 29.71 + 1.09\ x_i$.

Interpretation of the data presented on the preceeding pages suggests that for clarifying questions and clarifying comments the following trend exists:

Clarifying questions: overall moderate increase

Clarifying comments: overall moderate increase.

To further analyze the data regarding the trend of long term change, it was possible to determine the variation about the trend. Table 4.19 represents the mean ($\bar{y}$), variance (σ^2) and standard deviation (σ) for both types of responses for each baseline and treatment period.

The data in Table 4.19 demonstrates no consistent pattern concerning variation about the increasing trend. For clarifying questions, the variance and standard deviation are smallest in the first baseline period. The variance and standard deviation increase during the first treatment, and then appear to stabalize somewhat for the remainder of the time. The mean gradually and steadily increases.

TABLE 4.19.

	Clarifying Questions	Clarifying Comments
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TABLE 4.19.--Means, Variances and Standard Deviations for Clarifying Questions and Comments per Period.

	A_1	B	A_2	C	A_3
Clarifying Questions					
$\bar{y}$	17.5	23.0	24.75	29.0	37.33
σ^2	25.5	331.33	150.19	108.44	134.33
σ	5.05	18.2	12.26	10.41	11.59
Clarifying Comments					
$\bar{y}$	42.17	36.3	40.25	63.9	58.67
σ^2	842.0	131.9	82.25	230.32	336.33
σ	29.02	11.48	9.07	15.176	18.34

For clarifying comments, the variance and standard deviation are large during the first baseline period. There is a decline during the first treatment period and second baseline, which is followed by an increase in the second treatment and last baseline. The mean fluctuates, but there is a trend which is increasing.

Evaluation by Child

Is there an effect on the number of judgemental questions asked during the entire period?

Is there an effect on the number of extraneous questions asked during the entire period?

TABLE 4.20.

Day	Judg
1	12
2	13
3	30
4	12
5	6
6	11
7	10
8	33
9	10
10	14
11	20
12	1
13	3
14	2
15	1
16	1
17	
18	
19	
20	
21	
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TABLE 4.20.--Frequency of Judgemental and Extraneous Questions Asked by Child During Entire Study.

	Raw Scores			Mean f of questions per minute (x 100)		
Day	Judg.	Ext.	Time (in min.)	Judg.	Ext.	
1	12	14	88	14	16	
2	13	4	61.5	21	7	
3	30	27	43	70	63	
4	12	6	49	24	12	A_1
5	6	3	46.5	13	6	
6	11	4	31	35	13	
7	10	6	74.5	13	8	
8	33	16	90.5	36	18	
9	10	14	50.5	20	28	
10	14	19	48.5	29	39	
11	20	21	60	33	35	B
12	17	14	55	31	25	
13	38	18	57	67	32	
14	26	2	77	34	3	
15	13	11	53.5	24	21	
16	16	6	57	28	11	
17	1	11	45	2	24	
18	7	7	42	17	17	A_2
19	3	8	54.5	6	15	
20	3	2	58	5	3	
21	8	16	56	14	29	
22	8	4	70.5	11	6	
23	7	15	67.5	10	22	
24	7	5	79.5	9	6	
25	5	5	76.5	7	7	C
26	5	5	76	7	7	
27	4	1	65.5	6	2	
28	4	8	60	7	13	
29	2	8	52.5	4	15	
30	10	4	59	17	7	
31	4	4	83.5	5	5	
32	0	0	46.5	0	0	A_3
33	5	3	79.5	6	4	
Totals	364	291	2014.5 minutes or 33 1/2 hours			

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Is there an effect on the number of judgemental comments offered during the entire period?

Is there an effect on the number of extraneous comments offered during the entire period?

TABLE 4.21.--Frequency of Judgemental and Extraneous Comments Offered by Child During Entire Study.

Raw Scores				Mean f of Comments per Minute (x 100)		
Day	Judg.	Ext.	Time (in min.)	Judg.	Ext.	
1	43	15	88	49	17	
2	40	17	61.5	65	28	
3	31	38	43	72	88	
4	48	9	49	98	18	A_1
5	9	7	46.5	19	15	
6	26	15	31	84	48	
7	24	13	74.5	32	17	
8	42	35	90.5	46	39	
9	11	17	50.5	22	34	
10	27	24	48.5	56	49	
11	34	23	60	57	38	B
12	13	21	55	24	38	
13	23	13	57	40	23	
14	21	18	77	27	23	
15	21	7	53.5	39	13	
16	29	10	57	51	18	
17	13	12	45	29	27	
18	21	4	42	50	10	
19	13	2	54.5	24	4	A_2
20	20	5	58	34	9	
21	20	16	56	36	29	
22	29	9	70.5	41	13	
23	31	5	67.5	46	7	
24	34	2	79.5	43	3	
25	38	12	76.5	50	16	C
26	49	4	76	64	5	
27	14	4	65.5	21	6	
28	14	11	60	23	18	
29	9	6	52.5	17	11	
30	10	3	59	17	5	
31	12	1	83.5	14	1	
32	11	1	46.5	24	2	A_3
33	12	1	79.5	15	1	
Totals	772	380	2014.5 minutes or 33 1/2 hours.			

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For comparative purposes, judgemental questions and comments will be analyzed first and then extraneous questions and comments.

TABLE 4.22.--Descriptive Data on Judgemental Questions and Comments.

For Entire Period	Judgemental Questions	Judgemental Comments
Raw score mean f. per day	11	23.4
Mean f per min. (x 100) for study	19	40
Range of mean f per min. (x 100)	0-70	14-98

Figures 4.10 and 4.11 on the following pages represent a visual trend analysis of the mean frequency of judgemental questions and judgemental comments per minute (x 100) over time.

Figures 4.10 and 4.11 on the following pages also represent the regression equations and the graphs of these equations. These figures represent the relationship of the two variables (frequency of response and time) and the trend of long term change in the data for each type of response (i.e., judgemental questions and judgemental comments).

The least squares regression equation for judgemental questions is: $\hat{y} = 35.64 + (-.98)\ x_i$ and for judgemental comments: $\hat{y} = 60.39 + (-1.18)\ x_i$.

Interreptation of the data presented on the preceeding pages suggests that for judgemental questions and judgemental comments, the following trends exist:

Judgemental questions: overall moderate decrease
Judgemental comments: overall moderate decrease.

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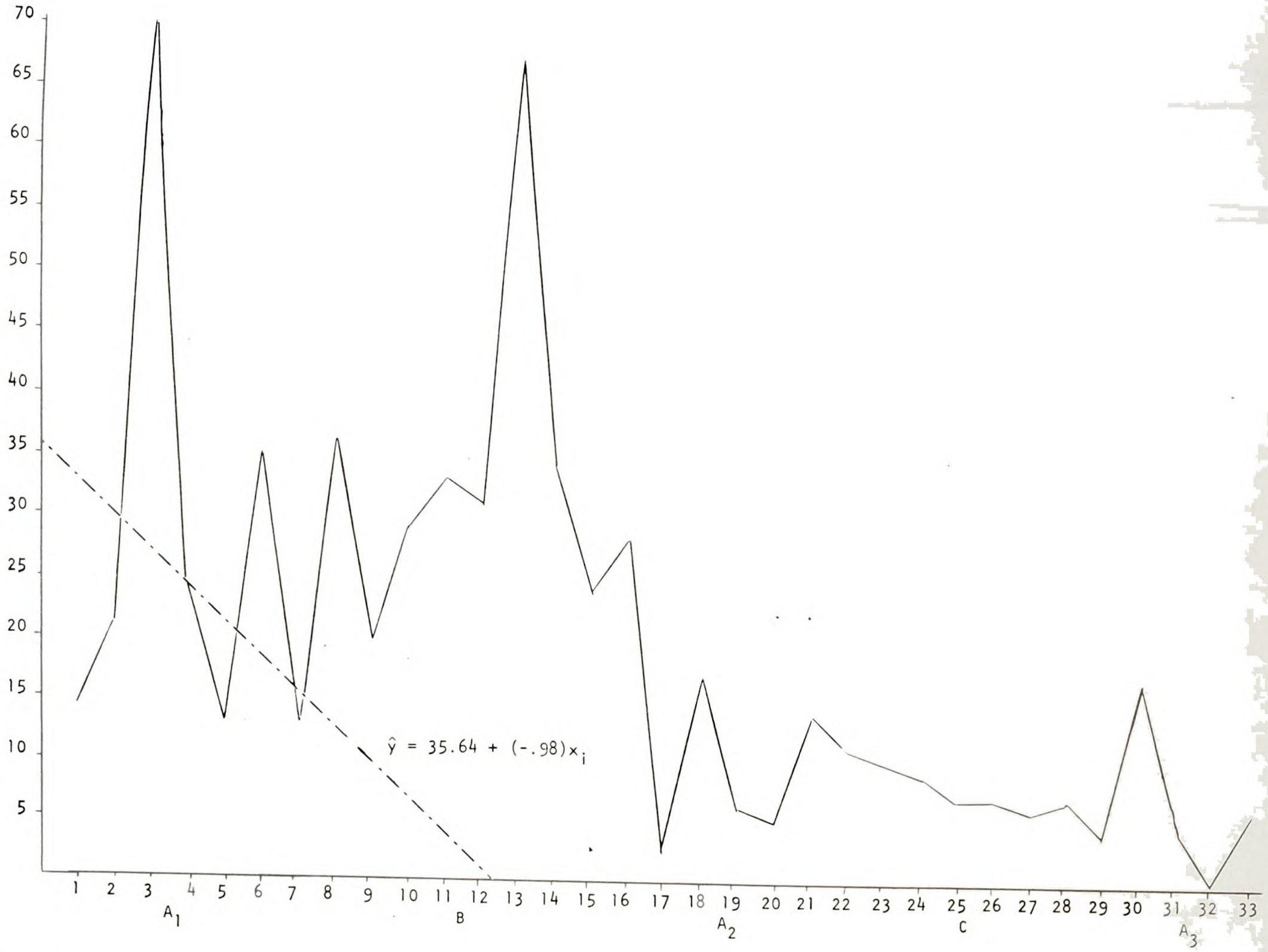
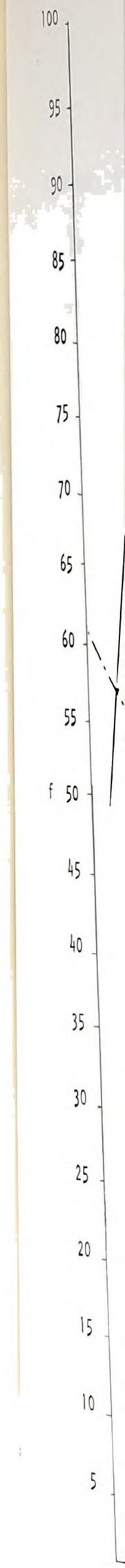


Figure 4.10.--Mean Frequency of Judgemental Questions per Minute (x 100) Over Time and Regression Equation for Clarifying Questions.



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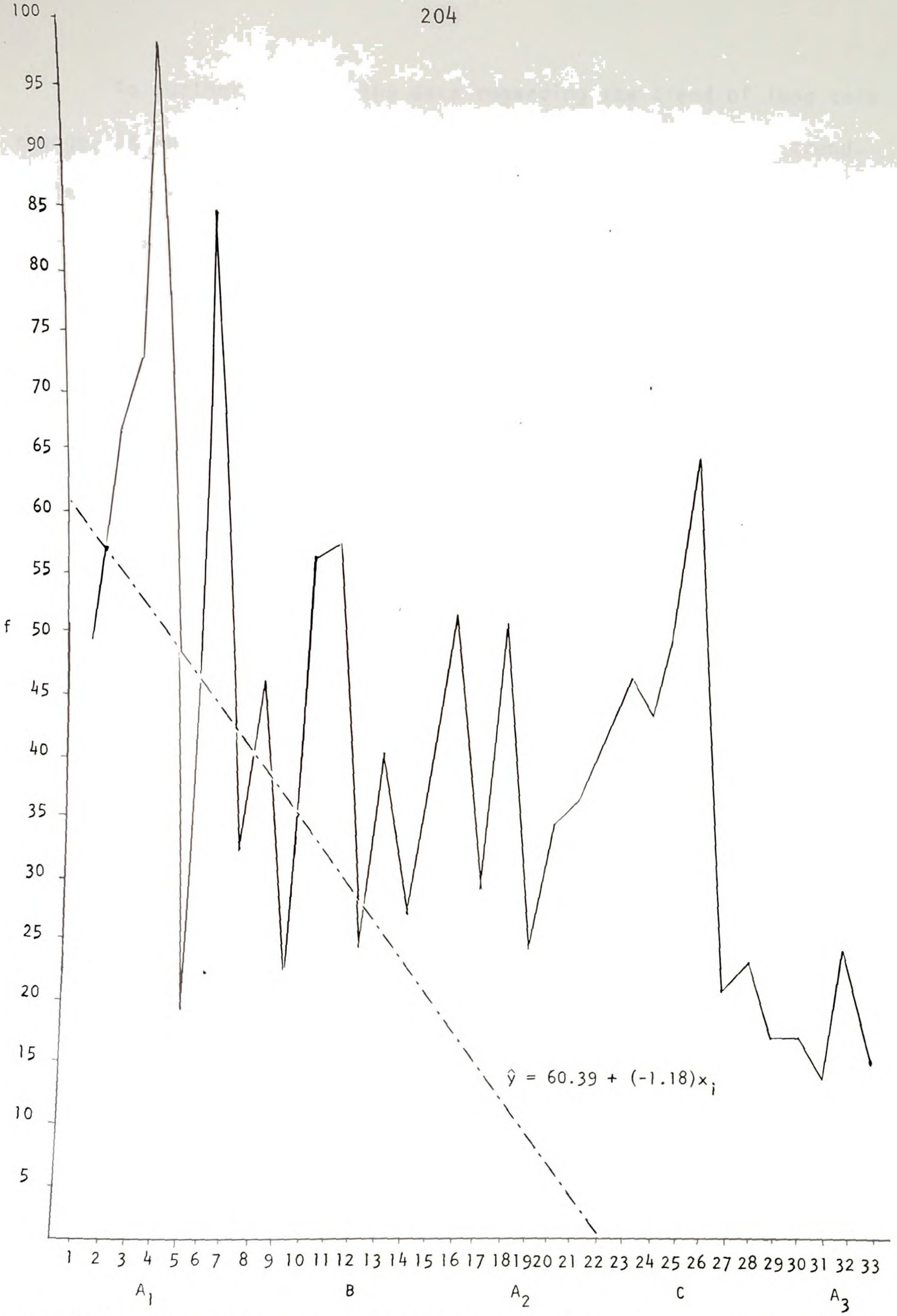


Figure 4.11.--Mean Frequency of Judgemental Comments per Minute (x 100) Over Time and Regression Equation for Judgemental Comments.

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To further analyze the data regarding the trend of long term change, it was possible to determine the variation about the trend. Table 4.23 represents the mean ($\bar{y}$), variance (σ^2) and standard deviation (σ) for judgemental questions and comments for each baseline and treatment period.

TABLE 4.23.--Means, Variances and Standard Deviations for Judgemental Questions and Comments per Period.

	A_1	B	A_2	C	A_3
Judgemental Questions					
$\bar{y}$	29.5	31.5	7.5	9.2	3.67
σ	457.1	204.28	43.0	15.51	10.33
σ^2	21.38	14.29	6.56	3.94	3.21
Judgemental Comments					
$\bar{y}$	64.5	39.4	34.25	35.8	17.67
σ	773.9	168.04	126.92	252.18	30.33
σ^2	27.82	12.96	11.27	15.88	5.51

As can be seen in the data presented above, for judgemental questions the variance and standard deviation are relatively large during the first baseline period. For the remainder of the time, however, the variance and standard deviation decrease rapidly. The mean also decreases steadily, indicating overall a decrease both in the trend and in the variation about the trend.

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For judgemental comments, there is an overall decrease in the variance and standard deviation, even though they both increase somewhat in the second treatment period. The mean also steadily decreases indicating a steady decrease both in the trend and in the variation about the trend.

In Table 4.24, the descriptive data for extraneous questions and extraneous comments is presented.

TABLE 4.24.--Descriptive Data on Extraneous Questions and Comments.

For Entire Period	Extraneous Questions	Extraneous Comments
Raw score mean f per day	9	11.5
Mean f per min. (x 100) for study	16	20
Range of mean f per min. (x 100)	0-63	1-88

Figures 4.12 and 4.13 on the following pages represent a visual trend analysis of the mean frequency of extraneous questions and extraneous comments per minute (x 100) over time.

Figures 4.12 and 4.13 on the following pages also represent the regression equations and the graphs of these equations. The figures represent the relationship of the two variables (frequency of response and time) and the trend of long term change in the data for each type of response (i.e., extraneous questions and extraneous comments).

The least squares regression equation for extraneous questions is: $\hat{y} = 26.04 + (-.607)\ x_i$ and for extraneous comments: $\hat{y} = 41.12 + (-1.22)\ x_i$.

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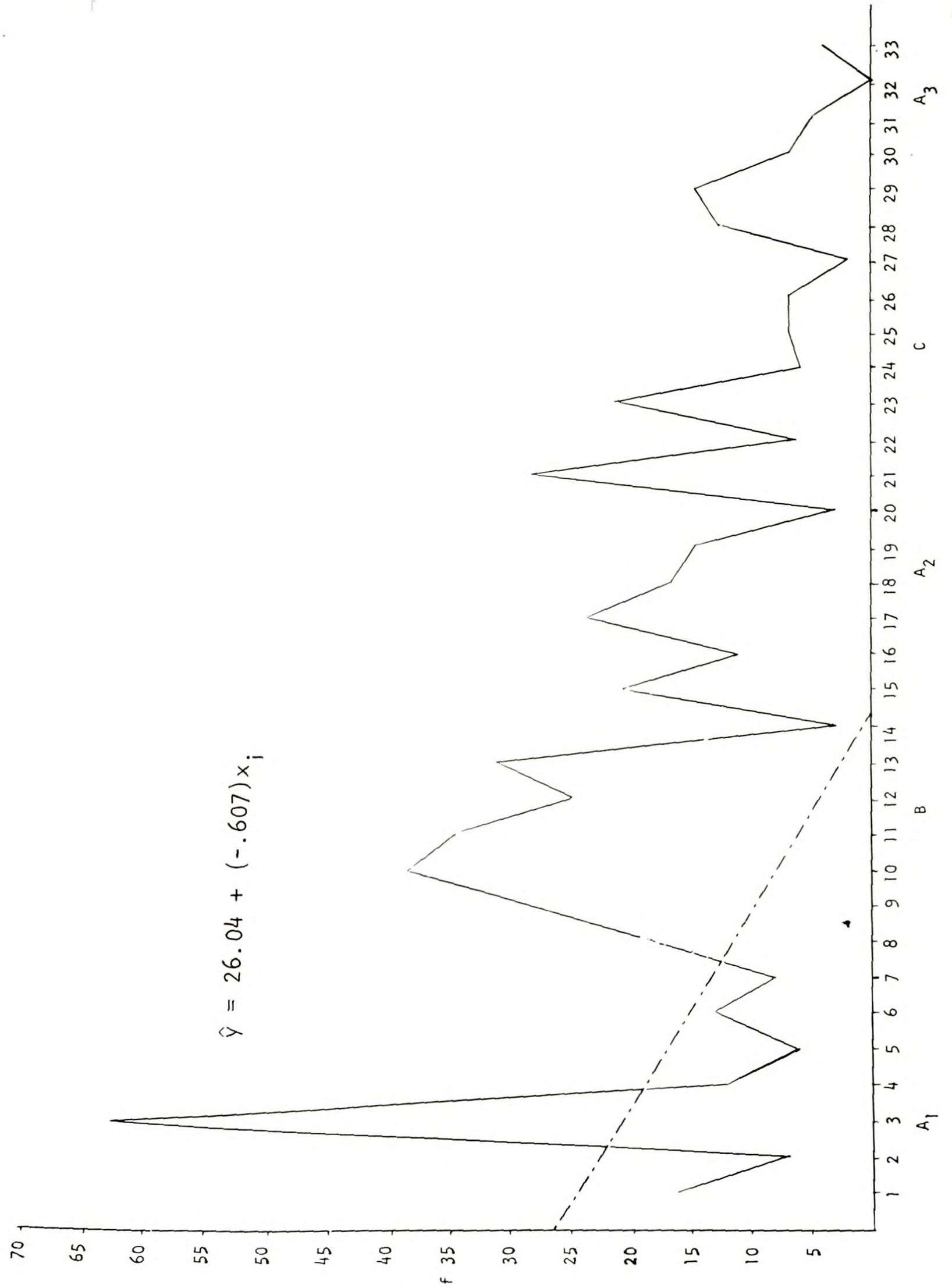
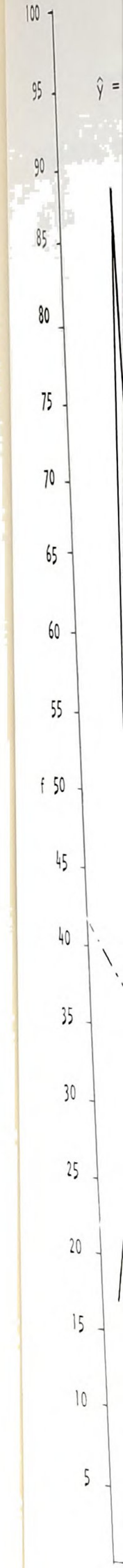


Figure 4.12.--Mean Frequency of Extraneous Questions per Minute (x 100) Over Time and Regression Equation for Extraneous Questions.



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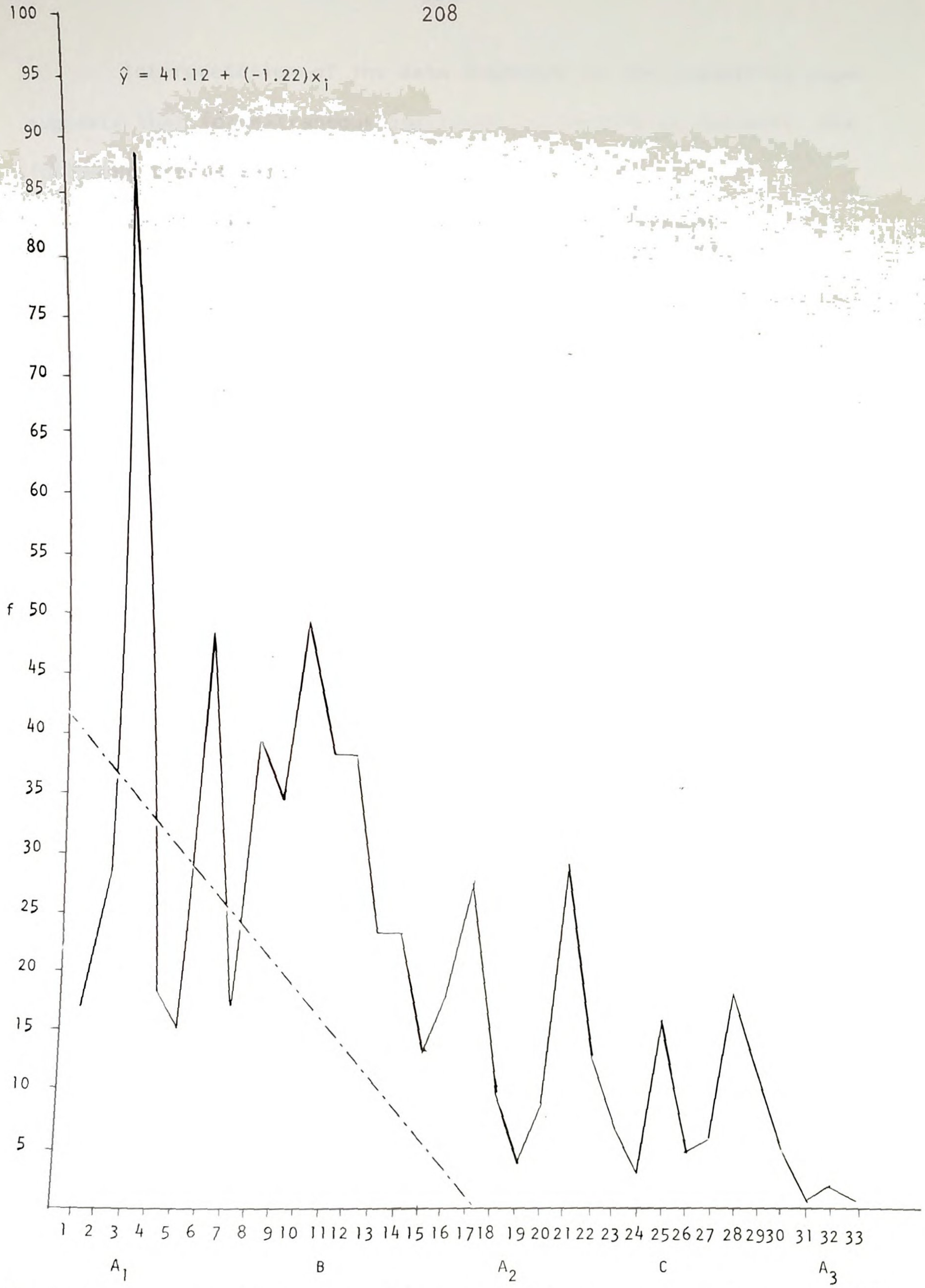


Figure 4.13.--Mean Frequency of Extraneous Comments per Minute (x 100) Over Time and Regression Equation for Extraneous Questions.

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Interpretation of the data presented on the preceeding pages suggests that for extraneous questions and extraneous comments, the following trends exist:

Extraneous questions: overall moderate decrease
Extraneous comments: overall moderate decrease.

To further analyze the data regarding the trend of long term change, it was possible to determine the variation about the trend. Table 4.25 represents the mean ($\bar{y}$), variance (σ^2) and standard deviation (σ) for extraneous questions and comments for each baseline and treatment period.

TABLE 4.25.--Means, Variances and Standard Deviations for Extraneous Questions and Comments per Period.

	A_1	B	A_2	C	A_3
Extraneous Questions					
$\bar{y}$	19.5	22.0	14.75	11.4	3.0
σ^2	468.3	144.22	76.25	71.38	7.0
σ	21.64	12.01	8.73	8.45	2.65
Extraneous Comments					
$\bar{y}$	35.67	29.2	12.5	11.3	1.33
σ^2	807.47	142.18	100.33	64.23	.33
σ	28.42	11.92	10.02	8.01	.58

As can be seen in the data presented above, for extraneous questions the variance and standard deviation are relatively large during the first baseline period. For the remainder of the time,

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however, the variance and standard deviation decrease rapidly. The mean also decreases steadily, indicating overall a decrease both in the trend and in the variation about the trend.

In extraneous comments, the variance and standard deviation are even larger in the first baseline period, and show a much greater rate and amount of decline. The variance of .33 is certainly small. The mean for extraneous comments decreases as steadily and indicates, with the decrease in variance and standard deviation, a decrease in the trend and a large decrease in the variation about the trend.

What is the effect per period on the number of clarifying, judgemental and extraneous questions asked?

TABLE 4.26.--Frequencies of Questions Asked by Child per Period.

	A_1	B	A_2	C	A_3
Total time (in minutes)	319	623.5	199.5	663	209.5
Total					
Clarifying	56	144	52	189	77
Judgemental	84	197	14	60	9
Extraneous	58	127	28	71	7
Mean frequency (x 100)					
Clarifying	18	23	26	29	37
Judgemental	26	32	7	9	4
Extraneous	18	20	14	11	3

Figure 4.14 illustrates this trend visually. It can easily be seen that the mean frequency of clarifying questions increased per period,

☒ Clarifying
☒ Judgemental
☐ Extraneous

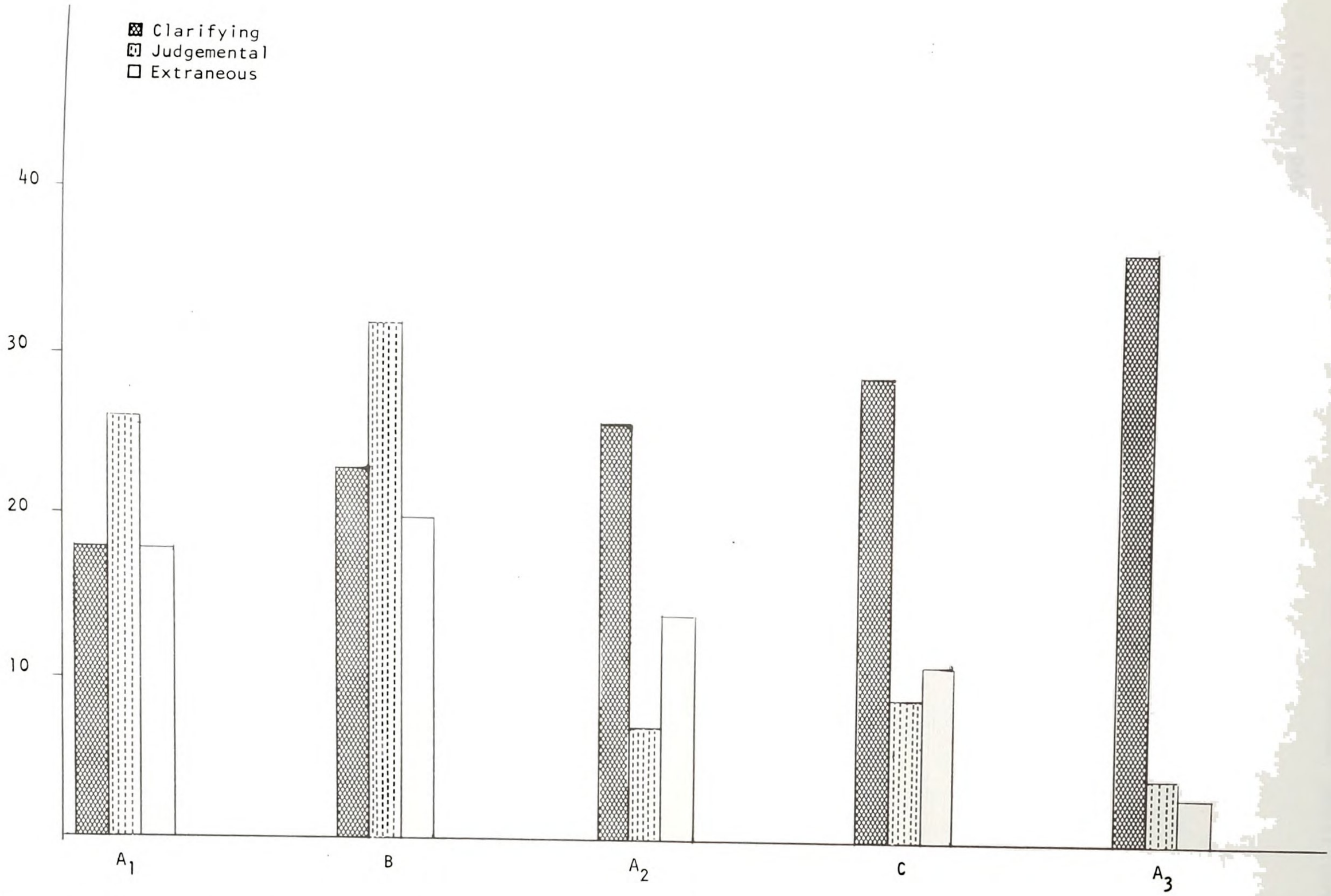


Figure 4.14.--Mean Frequency of Clarifying, Judgemental and Extraneous Questions per Period.

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while the mean frequency of judgemental and extraneous questions decreased per period.

> What is the effect per period on the number of clarifying, judgemental and extraneous comments offered?

TABLE 4.27.--Frequencies of Comments Offered by Child per Period.

	A_1	B	A_2	C	A_3
Total time (in minutes)	319	623.5	199.5	663	209.5
Total Comments					
Clarifying	128	228	81	423	118
Judgemental	197	245	67	248	35
Extraneous	101	181	23	70	3
Mean Frequency (x 100)					
Clarifying	40	37	41	64	56
Judgemental	62	39	34	37	17
Extraneous	32	29	12	11	1

In Figure 4.15 the comparison between the mean frequencies of the three types of comments per period can be made. Extraneous comments became rather small in comparison with clarifying and judgemental comments.

> Is there an effect on the accuracy of the child's responses when recognizing 155 selected sight words?
>
> Is there an effect on the congruency of the child's evaluation with that of another evaluator when recognizing 155 selected sight words?

Figu



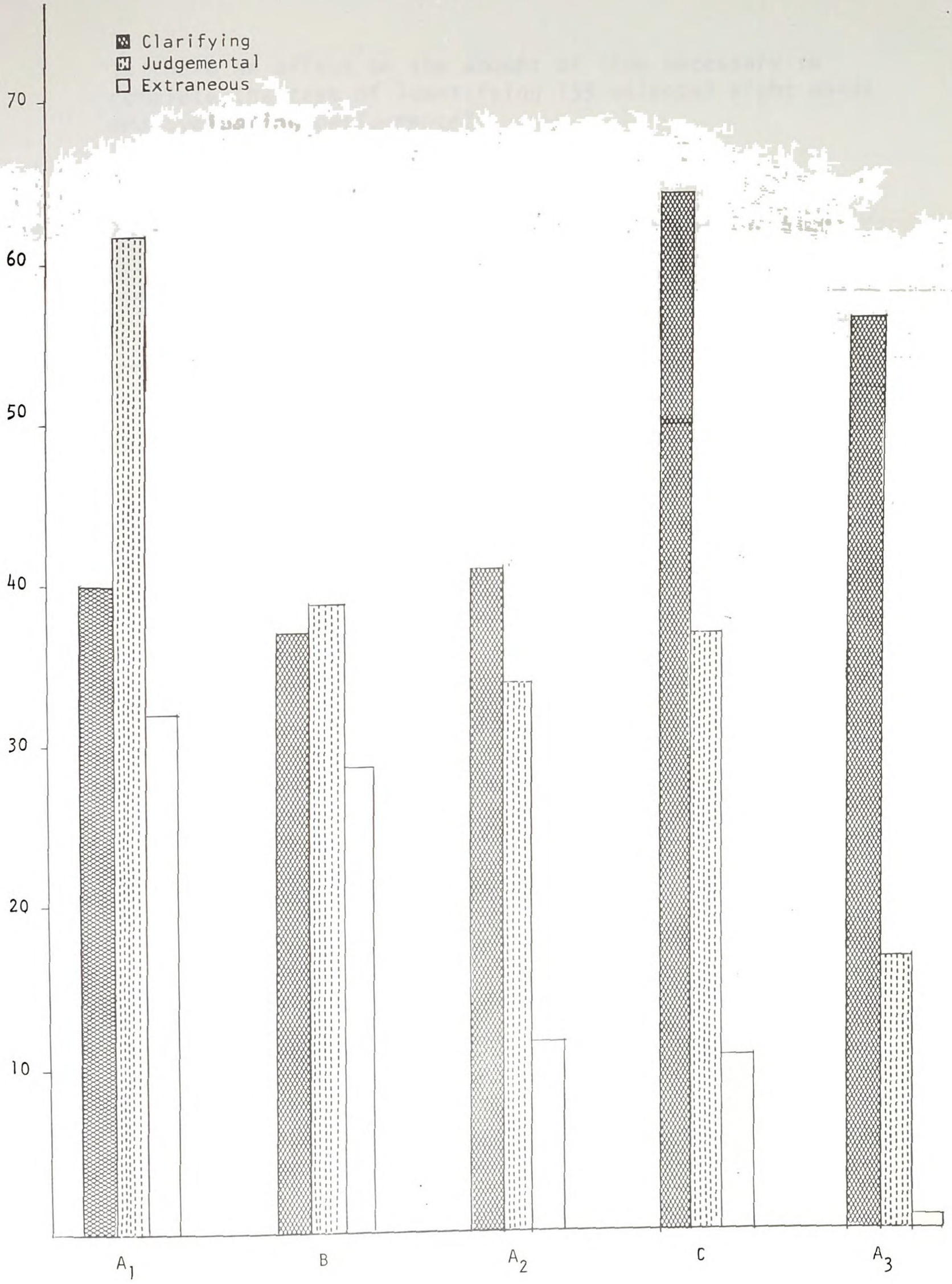


Figure 4.15.--Mean Frequency of Clarifying, Judgemental and Extraneous Comments per Period.

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Is there an effect on the amount of time necessary to complete the task of identifying 155 selected sight words and evaluating performance?

TABLE 4.28.--Accuracy, Congruence and Time per Period for Sight Word Recognition Task.

	A_1	A_2	A_3
Accuracy	69%	65%	84%
Congruency	94%	96%	100%
Time (in minutes)	68	47	27.5

In Table 4.28 one can see that accuracy in identifying sight words did increase. Congruence in the last baseline period was 100 percent indicating that there was no difference in the perceptions of the experimenter and the child on how the task was performed. It should also be noted that the time required to accomplish the same task was 40 minutes less during the final baseline period.

It was also interesting to look at the types of verbal responses given by the child during the total sight word recognition activity. Table 4.29 lists the frequencies of the six different types of responses per baseline period.

TABLE 4.29.--Frequencies of Six Types of Verbal Responses on Sight Word Recognition Task.

	A_1			A_2			A_3		
	Clar.	Jud.	Ext.	Clar.	Jud.	Ext.	Clar.	Jud.	Ext.
Questions	13	36	4	13	3	2	12	0	0
Comments	23	66	21	21	21	1	15	9	0

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Clarifying questions and comments remained relatively stable. Judgemental questions decreased considerably (to zero). Judgemental comments, (highest during the first baseline period) also decreased. Extraneous questions decreased to zero, but there were fewer throughout. Extraneous comments were high during the first baseline period, but decreased to one and zero in the last two baseline periods.

Is there an effect on the accuracy of the child's responses when solving five simple mathematics problems?

Is there an effect on the congruency of the child's evaluation with that of another evaluator when solving five simple math problems?

Is there an effect on the time necessary to complete the task of solving the math problems and evaluating performance?

TABLE 4.30.--Accuracy, Congruency and Time per Period for Math Problem Task.

	A_1	A_2	A_3
Accuracy	60%	80%	40%
Congruency	40%	40%	80%
Time (in minutes)	6	10.5	4

Three of the problems were addition problems, and the child attempted to solve these by counting on her fingers. During the second and third baseline periods, she asked and was allowed to check her responses on a mini-calculator. The time in minutes for the second baseline period includes the time to check on the calculator. For the last baseline period, the checking was counted separately.

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It appears from the above figures, that her accuracy decreased, but the congruence of her perceptions with that of the experimenter's increased. The time to accomplish the task decreased.

The types of verbal responses given by the child during the math problems activity are listed in Table 4.31. The frequency of occurrance per baseline period is given.

TABLE 4.31.--Frequencies of Six Types of Verbal Responses on Math Problem Task.

	A_1			A_2			A_3		
	Clar.	Jud.	Ext.	Clar.	Jud.	Ext.	Clar.	Jud.	Ext.
Questions	4	5	0	2	2	0	2	0	0
Comments	6	10	0	4	5	0	3	0	0

The frequencies of responses in all cases are not high, but there is a decrease to zero in the judgemental column, and a relatively stable clarifying column, while extraneous questions and comments never appear.

Discussion of Results

This section focuses primarily on a discussion relating to the specific overall objectives of this study:

1. To evaluate change in academic achievement
2. To confirm the profile of creative thinking abilities (creative positives)
3. To evaluate change in evaluative effort by the child.

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The data (raw scores, test scores, and the like) relating to the specific research questions has already been presented in the first section of this chapter. In this section, the research data has been summarized in three tables to help organize the information for discussion purposes. In two cases, there were certain general criteria applied to assist in decision making. These criteria are described also.

In each of the following sections (Academic Achievement, Creative Thinking Abilities and Evaluation by Child), the following format has been followed:

1. Restatement of objective
2. Presentation of summary table
3. Discussion of results.

Academic Achievement

OBJECTIVE: To evaluate change in academic achievement.

Criteria 4.1

Criteria for Evaluating Data from Academic Achievement Measures

Rating	General Criteria
Minimal (Min.)	Minimal or no competency Less than 75% of task done adequately Frustration level of instruction
Instructional (Inst.)	Appropriate instructional level At least 75% of task done adequately Where child should be working
Competency (Comp.)	Child has mastered the skill 90-100% of task done adequately Not appropriate for instruction, maintenance only

TABLE 4.

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N.A.	Not applicable--either measure not administered or judgement is inappropriate
+	Performance change in positive direction--i.e., improvement on post test basis
-	Performance change in negative direction--i.e., worse on post test basis
0	Essentially no change in performance.

TABLE 4.32.--Summarized Results of Measures Relating to Academic Achievement.

Measure	A_1	A_2	A_3	Performance Change
Gates-MacGinitie				
Vocabulary	Min.	N.A.	Min.	0
Comprehension	Min.	N.A.	Min.	0
Durrell				
Oral Reading	Min.	Min.	Inst.	+
Silent Reading	Min.	N.A.	Min.	0
Listening Comp.	Comp.	N.A.	N.A.	N.A.
Naming Letters	Comp.	N.A.	N.A.	N.A.
Informal Assessment				
Sight Word Recog.	Min.	Min.	Inst.	+
Listening Comp.	Inst.	Inst.	Comp.	+
Developmental Test of Visual-Motor Integrat.	Min.	Min./ Inst.	Inst./ Comp.	+
Handwriting	Min.	Min./ Inst.	Inst.	+

In no case was there a change in performance in a negative direction.

In three measures, post test performance was no better than pre test performance. Performance on the Gates-MacGinitie was poor in both instances. Perhaps this was a function of the test itself; group

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measures of performance offer the least information about individual change in performance. It may also be that her word analysis skills broke down after analyzing the beginning sound. Silent Reading on the Durrell was also poor in both instances. Given that the child was reading near the pre-primer level and had difficulty decoding, minimal level performance in silent reading was anticipated, and is probably appropriate.

The child was already performing at competency level in Listening Comprehension (paragraph) and Naming Letters on the Durrell. Assessing change in performance is not appropriate.

On five measures, however, there was improvement in academic achievement. These improvements are greater than one could have expected given normal maturational development over a period of thirty days, and typical "regression to the mean" effect. The performance change of almost two years on the Developmental Test of Visual-Motor Integration is certainly remarkable. The simultaneous improvement in sequential ordering and handling of the pencil was meaningful.

The reader can judge for himself the change in performance in handwriting. It is dramatic. All handwriting samples improved during the last two baseline periods; organization and ordering became quite acceptable, reversals and proportion errors were decreased considerably. In handwriting, the last example was not without error, but it became within an acceptable range for a first grader. In copying, the last example was ordered and written correctly and acceptably. Since there were no reversals in copying, reversal errors may indicate a dysfunction in unassisted visualization of symbolic forms.

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The decision about change in Listening Comprehension for stories was primarily based on the large number of unassisted memories that the child retrieved during the last baseline period. Her performance on this measure indicates a consistent potential reading level well above her present reading level. In retelling and rephrasing the stories in this measure, the child occasionally quoted significant conversational elements of the story. According to Yamomoto (see scoring guide in Appendix) conversational quoting is an indicator of creativity.

Sight word recognition improved remarkably from the second to the third baseline period. In Oral reading, by the last baseline period, the child was finally able to handle pre-primer level material. Her performance in that period indicates more attention to detail.

In summary, it can be said that there was an effect on academic achievement, as measured by specific research instruments, and this effect was in the direction of improvement; in all probability, more than could have been expected with no intervention. The above statement still remains, however, at the level of a generalized clinical impression.

Creative Thinking Abilities

OBJECTIVE: To confirm profile of creative positives.

The profile on the figural measures yields creative positives in elaboration and originality, with elaboration being consistent across measures.

The profile on the verbal measures indicates a strong tendency to be fluent.

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TABLE 4.33.--Summarized Results of Creativity Measures (Given During Baseline Periods) in Terms of Creative Positives.*

	Fluency	Flexibility	Originality	Elaboration
Figural Measures				
Picture Construction				+
Incomplete Figures				++
Circles and Squares			++	
Figural Totals	0	0	2	5
Verbal Measures				
Unusual Uses	++			
Product Improvement	+			
Ask and Guess	++			
Imaginitive Stories	+++	+	++	++
			(Title)	
Incomplete Figures			+	
Verbal Totals	8	1	3	2
Figural and Verbal Totals	8	1	5	7

*A description of "creative positives" appears in the Definitions section of Chapter I.

Combining the creative positive profiles of both the figural and verbal measures yields a somewhat balanced profile of abilities except for flexibility. This particular child probably can't be depended upon to be flexible. However, she could probably be depended upon to be fluent verbally and elaborate and somewhat original in both nonverbal and verbal tasks.

To confirm this profile, the two verbal responses (clarifying questions and clarifying comments) were used. Analysis of these responses over the entire period suggested that they were tending to increase over time, even though the other types of verbal responses were decreasing. In fact, a clarifying question could be seen as an adequate

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or acceptable verbal response, and therefore a measure of fluency (similar to the process used in scoring Ask and Guess). In this study, the child did indeed increase the number of clarifying questions throughout the study, and there did seem to be a large number of them. At the same time, if clarifying comments can be understood to be an indicator of elaboration, she was consistently verbally elaborate throughout the study, with the frequency of this type of response also increasing.

In summary, it was possible to create a profile of creative positives or strengths by using the figural and verbal standardized measures of creativity. This profile was substantiated by the findings described under the child's verbal responses: clarifying questions and clarifying comments. The profile for this child thus obtained is:

Fluency:	A dependable strength
Elaboration:	A dependable strength
Originality:	A strength occasionally
Flexibility:	Seldom a strength

Evaluation by Child

OBJECTIVE: Evaluate change in evaluative effort by child.

The data presented previously is somewhat difficult to interpret because it was standardized on mean frequency per minute (x 100). In Table 4.34, however, it is easier to conceptualize the type of change that occurred.

For example, in the first baseline period (6 days) the child averaged 17 judgemental questions an hour. In other words, she asked: "Is this right?" "Do you want me to do it this way?" and questions like

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TABLE 4.34.--Summarized Results of Judgemental and Extraneous Verbal Responses for First and Last Baseline Periods.

	Average number of responses per hour*	
	A_1	A_3
Judgemental Questions	17	2
Judgemental Comments	38	10
Extraneous Questions	11	1+
Extraneous Comments	21	.8

*Figured by dividing the mean f by 100 and multiplying by 60.

this fairly often. The variance and standard deviation were high also, indicating that there were times she asked many more than 17, as well as times that she asked less. However, in the last baseline period, she averaged only 2 per hour, and because of the small variance and standard deviation, could probably be expected to ask about that many judgemental questions during an hour of instruction and not many more or less.

This same analysis holds true for judgemental comments. Judgemental comments are her reflections on how she felt about what was happening. They started high (38 per hour average, with a very high variance) but decreased to ten per hour average with the possibility of a few more or less. Since they remained high in comparison with the other types of responses, she probably felt her feelings were important and wanted to continue to share them, although she shared them quite a bit less frequently.

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The qualitative nature of the judgemental comments changed also toward the end of the second treatment period. For example, some of the comments offered on the 26th day were: "I think I'll put these words aside," "It's kinda sloppy," "I won't guess any more." This type of response could perhaps be seen as more insightful or goal-directed than "I don't want to do this," or "I don't like this," which are examples taken from the first baseline period.

For some reason, although extraneous questions and comments started out rather high (with a correspondingly high variance and standard deviation) they decreased to almost nothing in the final baseline period. These distractions or manipulators or whatever they can be pictured as, virtually disappeared. Considering the small variance, they can be assumed to be almost eliminated. The slope of the regression lines for extraneous questions and extraneous comments was negative or downward, indicating a decreasing tendency to stray from the task, or an increasing tendency to stay "on target."

The two measures (Dolch Words and Math Problems) which were employed to assess accuracy, congruence and time, yielded somewhat similar results. In the recognition of sight words, the child became more accurate in the last baseline testing and her judgements of performance were exactly the same as the experimenter's. The most remarkable change, however, was in the amount of time necessary to accomplish the task. It is only when one has spent 66 minutes on 155 words, that one can truly appreciate having to spend only 27.5 minutes to accomplish the same task. Her performance in the last baseline period was not distinguished by instances of "off target" behavior.

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The same can be said for the math problems. In the last baseline period, she seemed to perceive fairly accurately how she was solving the problems, and seemed much more consistent in her attack. However, she missed three problems; she knew she didn't know two of them, and the third error was on one that she did know how to solve and had solved correctly on the two previous occasions. In fact, she thought she had the answer correct; she later stated that haste on the last problem had made her careless.

In summary, the measures used to assess evaluative effort on the part of the child seemed to indicate a rather substantial change in her behavior. She asked for less external evaluation or judgement, she strayed from the task less often, the nature of her comments became more goal-directed and she seemed to have more perceptions that were similar to the experimenter's.

Summary

The major findings presented in this chapter are summarized according to the three areas to which the objectives relate:

1. Evaluate change in academic achievement
2. Confirm profile of creative positives
3. Evaluate change in evaluative effort by child.

Academic Achievement

Of the ten measures used in this study to assess change in academic achievement, five gave results indicating a change in a positive direction--i.e., improvement; three gave results indicating

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no change in performance, and with two, the child was performing at competency level on the pre test.

Creative Thinking Abilities

It was possible to create a profile of creative positives or strengths by using the figural and verbal standardized measures of creativity. This profile was substantiated by the findings described under the child's verbal responses: clarifying questions and clarifying comments. The profile for this child thus obtained was:

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CHAPTER V

SUMMARY AND CONCLUSIONS

Discussion

The objectives for this study have been met. It was possible to discuss the measured gain in academic achievement, the creation and probable confirmation of a creativity profile, and to make some statements about the probable gain in evaluative abilities of a learning disabled child.

But all of these objectives were met by planning and implementing two procedures that were quite different from the more traditional diagnostic/remedial approach generally used in the field of learning disabilities. In the process of doing the exploratory research and collecting the "hard data" essential to answering the research questions, it was impossible not to form some clinical impressions about these two treatments and about the diagnostic battery that became the basis for answering the research questions.

Since even these "impressions" are data-based, it seems appropriate to share them in this chapter. The discussion in the following section, therefore, relates to the major purposes of this study. One purpose was to identify a diagnostic battery which will provide sufficient information to plan an academic treatment program with an emphasis on the learner's strengths rather than weaknesses.

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In addition, the first treatment program was designed to set an environment that stimulated the child's creative thinking abilities and the second treatment program was designed to set an environment that allowed utilization of creative thinking abilities to activate evaluative effort on the part of the child.

Thoreson (1972) believes the purpose of using the intensive design is to determine more effective ways of helping individuals change. The basis for this type of research is careful observation and critical description. Altering the conditions in the two treatment programs certainly seemed to change this child's behavior in a direction that can be assumed to be helpful. It is, therefore, the responsibility of the researcher to examine this intervention carefully, to suggest why and how the variability (i.e., change) occurred.

The purposes described above are the focus of the discussion in the following sections: (1) Diagnostic Battery, (2) Treatment I and (3) Treatment II. This discussion section quite naturally leads to Implications for Future Research. This chapter is ended by the major summary.

Diagnostic Battery

Often the diagnostic batteries that are recommended for determining a child's abilities, achievement, and disabilities are pre-set --i.e., some outside source recommends (or in some cases demands) that they be given. The outside sources vary from school psychologists to school boards and even include university professors.

The recommendations contained in this discussion section, however, are organized somewhat differently. It became apparent, after

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the administration of many batteries, that there are a number of variables that could influence a recommendation. As soon as these variables became apparent, it seemed important to communicate them. Therefore, the diagnostic measures used in this study will be discussed in terms of the following variables: (1) Test variables, (2) Teacher variables, (3) Child variables and (4) Information analysis.

Test Variables

Reliance on group achievement measures only for a learning disabled child seems totally inappropriate. Although there is no doubt that the one group measure administered (Gates MacGinitie) was the easiest to score, it also gave information that was the least helpful. Even after extracting other relevant information by individual analysis, it was not that helpful.

Another factor of concern in a diagnostic battery is whether or not alternate forms of the same test are necessary. Perhaps one way of making this decision is to decide if the task can be considered a criterion-referenced task. For example, recognition of basic sight words, adequate handwriting, and copying of specific forms can be considered tasks that a child needs to accomplish for adequate school achievement. Performance on these measures is <u>like</u> school related tasks. Therefore, improvement on the same form of this type of measure can be considered to be individually assessed improvement toward a school-related objective. The child serves as his own control. In this study, the child improved tremendously on this type of task.

On the Durrell, the clinical analysis of this child's improvement in the last baseline period over previous baseline periods was

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more helpful than the guidelines given in the manual which compare the child with norm-referenced criteria. In other words, it was more helpful to listen several times to the tapes of the oral reading task than to just mark the number of errors and the time to read. Without having to carefully account for and describe the nature and type of improvement, it is far too easy to rely only on tables given in the manual.

Rather than diverge into a discussion of the value of norm-referenced versus criterion referenced measures, perhaps it would be appropriate to remind ourselves that the purpose of a diagnostic test in this study was to assess where the child was presently functioning in order to plan an appropriate treatment program. At various intervals, then, it seemed appropriate to readminister the same or a similar measure to assess progress toward treatment goals. Any measure which can satisfy the requirement of being an academically relevant task would therefore seem appropriate. Of the Academic Achievement measures administered in this study, the Dolch Words (and the procedure under which they were administered), the Developmental Test of Visual-Motor Integration and the Informal handwriting analysis provided the most information over time.

The purpose in administering the creativity tests was different. Alternate forms of the measures were administered, not to demonstrate improvement, but to assess whether a profile of strengths would emerge over time. That purpose was accomplished, but analysis of performance on the alternate forms is interesting. In three instances, the child did not score as well on the second form. The reasons cannot

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be "known" but she implied that she didn't like them, and suggested other alternatives. Perhaps she had become used to making suggestions for improvement due to the first treatment period, or perhaps that particular stimulus wasn't to her liking.

For a learning disabled child, particularly this child, one way to remedy such an event occurring again would be to have many different types of measures available, and to provide more alternatives.

In this study, the measures that proved the most helpful were: in the figural measures, the jelly-bean shape in Picture Construction, Incomplete Figures (both forms) and Circles; in the verbal measures, Unusual Uses (cardboard boxes) Ask and Guess (three forms) and Imaginitive Stories (three forms). These measures seemed to capture the interest and imagination of the child. The measure that seemed to yield the most amount of information about the child was the Ask and Guess activity. It is also one that seemed to lend itself quite well to assessing improvement over time.

The "extras" that the scoring guide offers are one of the most useful parts of the procedure. For example, when Torrance (1966) states that (in Circles and Squares) it is "rare" to find a child who has the ability to synthesize and put together separated pieces into an integrated whole, and then to find the child in this study doing just that, it's a big plus. Title originality is another "extra" that seems to help the child. Even if the child does not do well on the figural part of the task, he still has the opportunity to pick up some extra points for an original or clever title.

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The creativity tests themselves are fun to administer and to take. There is no feeling of a one right answer. In fact, most of the tests stress many, many responses. The difficulty, of course, comes in scoring, but that can be overcome.

The verbal Response Form was the most helpful in gaining insight about the child's performance. True to Thoreson's objectives, "the frequency, magnitude and variability of the individual's actions can be examined continuously during each phase and between phases of the investigation." However, the Response Form was also the most tedious to score and analyze. It is doubtful whether a classroom teacher or even another devoted researcher could ever spend the amount of time and effort necessary to gain the information this measure yields over time. That does not decrease its value, however, just its practicality, and that is unfortunate.

In summary, it seems important to choose and administer measures which give as much information as possible and have the potential to be used over time.

Teacher Variables

In this study, the diagnostic measures chosen were many and the administration, scoring and analysis took a major amount of effort and time. Creativity measures are not easy to score--the decision making may be quite difficult. Analysis of criterion-referenced measures is not easy. In short, it takes a lot of teacher dedication to gain the kind of information that will help the teacher and the child.

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It has been mentioned repeatedly that variability in behavior is a key characteristic of a learning disabled child. At a cognitive level, that concept is easy to handle for a teacher. But what happens when the child's "off day" happens to fall at the same time that several critical post tests are being administered? The seventeenth day of this study was truly an "off day" for this child. It also happened to be the first day of the second baseline period, and four tests were to be given that day. A number of "causes" could explain the behavior --i.e., not enough sleep, the (to her) radical change from the first treatment period creative atmosphere, and so forth. Understanding helped some, but patience was the key to getting through the scheduled activities. A key teacher variable, therefore, is concern for the child, rather than just for the results on the test.

Child Variables

We seem to overlook one of the most important principles of learning when we administer diagnostic tests to children. That principle is that in order for learning to occur, the material must be meaningful to the child. If the child does not perceive the material as meaningful (no matter how clever or manipulative the examiner) he will not be motivated to perform.

That principle was well demonstrated in the second form of the Picture Construction Test. This child had done extremely well on the first form (jelly bean shape) creating a very imaginitive and delightfully drawn and well told story about a "Disgusting Mermaid" who kept a "Beautiful Fairy" locked in a bottle. The total score for

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elaboration was 60 points. She did very poorly on the second test; either because she didn't like the second stimulus form, or didn't feel like creating, or was having another "off day." She quite obviously had the potential, but lacked the desire to perform as well as she could. As she said: "There just isn't anything else to do!" One cannot help but wonder what would have happened if she had only been given the second form and not the first also.

It also seems important to give feedback to the child. This child asked quite often at the beginning "Am I doing it right?" "Is this the way I'm supposed to do it?" Even under rigid test conditions, and under the conditions imposed by the second treatment, this child still needed feedback on her performance. She stated she could do better, given knowledge of what she was presently doing. That seems to make a great deal of sense.

Another child variable is the way the child reacts to structure. On the second form of the Imaginitive Stories Activity, she wanted to draw while telling the story of "The Flying Monkey." She seemed quite upset that she wasn't to be allowed to draw until a compromise was suggested. The solution allowed her to draw the picture while listening to the playback of the story. That story was the longest (683 words) of the three Imaginitive Stories.

Some of the measures used in this study provided an excellent vehicle to get at the child's thinking. While not wanting to employ psychoanalytic techniques or projective analysis, it has long been known that art is a medium to release submerged or hidden feelings and

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emotions. Torrance's figural measures provide this outlet. In the Circles test, for the entire ten minutes that she was creating an elaborate, imaginitive and original creation, she was also carrying on a conversation about "being blamed." She talked about being blamed in school for things she didn't do, about being blamed at home for things her sister did, and she told quite elaborate stories to support her contention, including many conversational quotes. She seemed quite content to just talk, and when the time for the test was up, the dialog stopped also. One can assume that many children quite often feel this way. Perhaps it helps, just to be able to say what you're feeling in an accepting atmosphere.

Information Analysis

Although most clinicians would not presently consider a tape recorder to be an essential diagnostic tool, it does have the potential to be one of the most accurate and hence meaningful diagnostic tools available.

Each session in this study was tape recorded and later transcribed. This permanent and complete record of all verbal transactions was and is invaluable. It was possible long after the sessions were completed to recall significant conversations or certain aspects of performance. In fact, it was because of the recording that the additional help of an outside expert could be obtained for the meaningful analysis of the child's improvement in oral reading. The test scores did not of themselves tell the whole story.

An additional advantage that has already been mentioned was that the child was able to have immediate feedback on her performance. Without this unbiased record, she would have had to rely on external judgement and would not have been able as easily to make her own judgements about her performance.

One of the most interesting pieces of diagnostic information was gained as a result of analyzing the data long after the sessions were ended, and as a result having the permanent record. It had been noted several times during the study that this child sang quite often or hummed while doing some task. Sometimes the words or tune were identifiable, sometimes they were not. The problem during the study was in determining when it was going to happen. For instance, in a test situation, she sang much of the first two paragraphs of the story of "The Flying Monkey." What does one do with that type of data? What prompts it to happen, or is it just a facet of her personality?

In the miscellaneous section of the Response Form, the outside evaluator had recorded all instances of singing and humming. It was therefore possible to list the specific task that she was doing when the singing and/or humming occurred. This list of all the tasks for the entire study was divided into convergent tasks and divergent tasks. It was felt that a divergent or creative task might be more likely to stimulate singing or humming. But an equal number of convergent and divergent tasks were found. So the convergent and divergent tasks were further divided into verbal and non-verbal tasks. Perhaps the

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non-verbal (copying or drawing) would be more likely to elicit singing. Again, an approximately equal number (i.e., 12 and 13) were in each subdivision. The total number of times singing or humming occurred was not inordinantly large (50 occurrances), but the fact that it didn't seem to be prompted by any one type of task was very interesting. It does seem to suggest that this child has some unique personality attributes that function independent of the stimulus task. This information, however, could not have been gained without accurate and complete recording of all that transpired in the sessions.

It goes without saying that the key information available from the Response Form could not have been analyzed in the detail presented in Chapter IV if this same recording system had not been used. It would have been close to impossible to have said anything at all about her change in evaluative abilities without the taped recordings of the session, which led to the data analysis presented.

In summary, the tape recorder is an inexpensive but invaluable diagnostic tool that should not be overlooked.

Treatment I

It is difficult to formulate a discussion around the goal of planning and implementing an environment to stimulate creative thinking abilities in a learning disabled child. What type of data is acceptable when discussing "openness" and "responsiveness?" Duckworth (in Piaget, 1973) mentions that the most difficult thing to do in an open environment is to evaluate it.

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Several clinical impressions do stand out, however, and they relate to the type of behavior one might expect from a child who has learning problems, given the type of environment described theoretically in Chapter II and specifically in Chapter III of this study.

One aspect that immediately stands out (and that must be dealt with, given the semi-current "Pygmalian in the Classroom" syndrome) is the self-fulfilling prophecy. In Treatment I, a given was that the child was creative. She was expected, therefore, to perform creatively. She was encouraged, occasionally cajoled, interacted with and reinforced to do this consistently. So the self-fulfilling prophecy came true. But far better the creative prophecy that one which says: "Here's a disabled kid. She's got problems here and here and here, and she probably won't get any better in ten days." It apparently didn't hurt her to be expected to perform consistently and well. The difference, of course, was that the push was always toward more or different or unusual or elaborate responses and not toward one correct response.

One behavior occurred with this child quite often, although not consistently or even repeatedly on the same day. It had to do with a "learning set." Perhaps it is related to the expression "functional fixedness" to which several writers in the field of creativity refer (i.e., Parnes, Torrance, Guilford). Several times, when presented with a supposedly new task, she became rigid in her determination to stick with her first response. The best example was the first version of the Ask and Guess Activity. Her response to the "Tom, Tom the Piper's Son" stimulus picture was "I know what that is." And she refused to ask questions about it. She didn't want to

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and she stuck to her rather rigid declaration. Given another picture and the same structure, she responded beautifully.

Another day she was shown a picture of two baby seals (they didn't look like adult seals at all) and was asked to guess what they could be. She knew they were seals, and refused to guess at anything else. She did think it was amusing that two adults and one other child thought they were polar bears.

This "set" and rigidity happened often enough to consider it a characteristic. Perhaps occasionally children with learning problems exhibit this type of thinking. Torrance (1970a) has found with disadvantaged youngsters, "warm-up" activities (usually motor) help activate the children's creative thinking processes and decrease the learning "set" or tendency toward early closure. Warm-up activities seemed to work with this child also.

There are other clinical impressions that were formed during this treatment period. For instance, with this type of a structured environment it was much easier to discover what the child could do when given the opportunity to perform. The learning atmosphere seemed different. There was more excitement. There was more enthusiasm. How can that be supported by data? One interesting and novel piece of data was that every single day for the entire 33 days she awoke early, was ready at least an hour before 9 a.m. and came bouncing out to the car, often saying things like: "I can't wait to get to work." "What exciting things are we gonna do today?" Although the sessions were always over in the hour and a half contracted for,

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she never wanted to leave. It was impossible to sit back in that kind of atmosphere.

This type of learner-responsive, open atmosphere in which the subject serves as his own control lends itself very easily to change in strategy or stimulus based on feedback. Although the basic "remediation model" (see Chapter II) was not employed in this study, there were some pieces or parts of typical learning disability classification systems that were originally planned. One of these was a six-cell model which had row titles of visual, auditory and kinesthetic--the assumed primary imput modalities. The column titles were verbal and non-verbal. That meant that six separate and distinct cells were created. A number of tasks were planned to fit into this classification system. It looked good on paper. The purpose, of course, was to discover more diagnostic information regarding primary input-output abilities (also described as encoding-decoding, reception-expression, etc.). This six-cell theoretical paradigm was ultimately rejected because it did not lend itself diagnostically or humanistically to the purposes of this study. In trying to implement the system, structured, contrived situations were the result, which had little or no relevance to the objectives of academic achievement, creative thinking and evaluation by the child. The theoretical model was destroying the teacher/child interaction. In Chapter III, her aversion to the kinesthetic-non-verbal tasks (blindfold or hands in a bag) was described. And yet it had always seemed that she was a "haptic" individual in the widest sense of the word. Why, then, didn't she behave according to the model? Her behavior was consistent and could be described in situation after situation.

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But the six-cell model suggested neither a cause, a helpful classification of abilities or strengths, or a way to work from them. It may be that future work in learning disabilities will focus more on cognitive styles or preferences for learning. It may also be that future "remediation" programs will look more at strengths. Let us hope so, for that was the most exciting aspect of the first treatment period.

The words Fluency, Flexibility, Originality and Elaboration took on new meaning as a result of this treatment. This child's behavior during the first treatment period could be at least partially explained by a full understanding of the more gestalt meaning or interpretation of those words.

In the field of learning disabilities, there are many words or terms. In using these specific terms we are often striving for pinpoint accuracy. For example, "auditory figure-ground problem" has a specific meaning for many practitioners. The terms communicate a disability pattern to others that occasionally is helpful. However, the pinpointing, or even generic classification of strengths is missing in learning disabilities. The terms and meaning behind fluency, flexibility, originality and elaboration could serve as a partial solution to this problem.

In this study, the data presented in Chapter IV suggest that <u>for this child</u> fluency and elaboration are dependable strengths. That means that on many, many occasions the child exhibited behaviors which can be classified as fluent or elaborate. If given appropriate opportunities she will likely exhibit these behaviors consistently.

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Similarly, she is very likely to exhibit original or unique behavior. That can be considered a strength also, although it is not as dependable. (One is tempted to wonder if any human being is always original.) However, flexibility, the ability to shift categories and classifications, is not a strength. Perhaps it is a function of maturation. Perhaps this type of shift in thinking does not developmentally occur until a later age. Yet these explanations are doubtful since Torrance includes it and this child did improve consistently in flexible thinking. However, it is not a strength, nor can she be depended upon to exhibit flexible thinking unless it is appropriately structured for.

It can be predicted then, that fluent, elaborate and original behaviors will occur quite often. The problem comes in the value placed upon these behaviors by those around the child. A busy classroom teacher may not have the time, energy or patience to sit through an unusual and very drawn out idea. How many remedial reading teachers prefer to have the Dolch Words sung? How often can a child draw a picture of a turtle for the letter "t" and expect to get away with it? These are not insurmountable problems, as the reader will see upon reading the discussion relating to Treatment II.

With a full understanding of these terms and an understanding of the processes and procedures which are a part of an environment which is designed to stimulate this type of thinking, perhaps the reader can understand the excitement of being able to create a profile of a learning disabled child with an emphasis on the learner's strengths and not weaknesses.

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Treatment II

There are many clinical, data-based impressions relating to the goal of setting an environment that utilized the child's creative thinking abilities to activate evaluative effort on the part of the child. In terms of the criteria and analysis used in this study, the child did indeed use her own evaluative abilities. The data in Chapter IV is rather impressive.

However, in this type of design it is as imperative to describe the why of how it happened as it is to communicate the results. That is the most exciting part of the communication process.

The child decreased considerably the number of judgemental questions which asked for someone else to evaluate her work. That result is also possible if a teacher mandates against this type of behavior. But for a child of this age, the tendency to generalize would be overwhelming. In other words, all questions would decrease or cease. That did not happen with this child. Instead, the number of clarifying questions increased.

Therefore, we can assume that she became more selective in the type of question she felt she wanted or needed to ask. The how of this selective process of questioning and the how relating to the ultimate decrease of judgemental comments and all extraneous responses seems to be wrapped up in the structure of the evaluative environment.

The key to this treatment was in successfully involving the child in the process the whole time. Her abilities and creative strengths were drawn upon again and again in the planning, implementing

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and evaluating process of the second treatment. Once she had begun to get the feel for the structure of the environment, it was possible for the experimenter to take a facilitative role, rather than a didactic role in the teaching/learning situation.

Chapter III describes the three procedures or strategies which evolved to form the basis of the evaluative atmosphere. It should again be emphasized that the child herself took a major responsibility in the decision-making process.

It seems that the child as a thinking being is often overlooked when it comes to evaluation--and planning and teaching for that matter. This is particularly true with a learning disabled child. But evaluation with a child must be planned for from the beginning. It relates, of course, to objectives and when and how we can tell if objectives have been reached. The very idea of objectives and evaluation may make a concerned humanist shudder. How can one be wrapped up in specific objectives when there is a warm, loving child to be reached?

The key, to repeat, is involving the child. Her wants, her needs, her suggestions were very important. "On target" and "off target" were phrases she chose and used. "Flower growth" and "chicken pox decline" are not likely to occur in professional writing ever again. And yet, they <u>are</u> important. They communicate the concept of involving the child in evaluating her own performance.

Perhaps it was unusual to anticipate that a seven year old learning disabled child could learn to take responsibility for evaluating her own work. However, at the time the study was being planned,

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it appeared unlikely that there would be any possibility of continuing with any treatment program once school began in the fall. There were too many other things that would be happening. In addition, she was expected to continue with the remedial reading teacher and the learning specialist and the possibility of conflict in treatment strategies was bound to occur. The conflict would likely precipitate even more problems for this child.

Therefore, from the outset, the intention was to provide a program that would have maximum impact, would not be dependent upon the experimenter at the termination, and which would have built-in transfer to a school setting--any school setting. That meant that the child herself would have to assume responsibility for the control of her own behavior as a totally functioning, socially competent individual; distinct and unique from all others, but open, responsive and capable of evaluating.

It is futile to try to assess accurately what effect this total treatment program had on the child after school began. There are too many contaminants. She has a new classroom teacher and a new learning specialist. There are two constants, however: the remedial reading teacher and the parents. At an interview in November (three months after completion of the study) the remedial reading teacher expressed surprise at the progress the child had made over the summer and was continuing to make at a rapid rate. She had expected a decline, or at best continuation at the same level.

Her parents have also stated that they have seen several changes in behavior that are in a direction that is acceptable to all. Her new

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classroom teacher accepts and appreciates this child's individuality, and her peers have begun to accept her different behaviors more often.

The danger, of course, is that in learning "acceptable" behaviors, the child could loose some of the endearing and unique qualities that make her individuality so very real. Let us hope that does not happen.

Implications for Future Research

This exploratory study is extremely detailed. The motivation behind the careful detail is quite simple. It is hoped, implied and even urged that this study be replicated in whole or in part. We do not know enough about learning disabled children to appropriately plan treatment programs that yield positive results. The intensive design is extremely well suited to this type of research.

This study also demonstrated that it is possible to assess and profile a learning disabled child's creative strengths. The field of learning disabilities seems very much in need of a way to assess a learner's strengths. It is also hoped, implied and urged that future research in the field of learning disabilities will focus on a learner's strengths--perhaps, as in this case, the potential strengths in the creative thinking abilities of fluency, flexibility, originality and elaboration.

This study also looked closely at the ability of a learning disabled child to evaluate her own work. The potential obviously exists and it is possible to structure for this type of effort. This type of research is essential. It must be begun. It has the potential of being the most cost effective way of helping the multitude of children who have school learning problems.

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This study also demonstrated that a departure from the traditional diagnostic/remediation paradigm can have equally good--and perhaps better--results in terms of improvement in reading skills and visual-motor integration skills. Rather than criticizing the lack of results in traditional stimulus-response type training situations, perhaps the field would be better off with an alternate model to explore.

In this study, assessment instruments were examined from a diagnostic/treatment standpoint. Perhaps instead of continuously creating more and not better instruments to assess, diagnose or "fractionate" a child, we should examine the whole concept of diagnostic batteries. What do these tools really tell a researcher about a child? Have we not gotten ourselves into the bag of assessing so much we forget why we're assessing; that's it's really to help the child? Do the present assessment instruments have that as a purpose? Perhaps it is time for a good close look at the proliferation of instruments and the dearth of successful treatment programs.

The purpose of an exploratory study of this nature is to raise questions, to begin to look closely at issues, to challenge what is with what ought to be and perhaps to simulate definitive action on the part of those who can make change. That purpose has been met.

Summary

In the field of learning disabilities, the philosophy of treatment has primarily been based on a deficit model. In this dissertation an alternative treatment model with a focus on the learner's strengths and not weaknesses has been explored. This exploratory study focuses

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on the intensive look at a specific program, planned, implemented and evaluated with a young learning disabled child. By focusing on strengths in creative thinking abilities and activating evaluative effort on the part of the child, this child was expected to show gains in specific behaviors related to academic and social performance.

The intensive design which was followed in this study was diagrammed in terms of the multiple baseline-successive treatments model. In the three baseline periods, alternate or the same forms of fifteen research instruments were used to measure 34 research variables. The objectives to be met in using these research instruments were: (1) to evaluate change in academic achievement, (2) to confirm a profile of creative strengths (creative positives), and (3) to evaluate change in evaluative effort of the child. Thirty research questions were stated to assist in decision-making relating to the above objectives.

The two successive treatment programs were described in detail with exemplars and flow charts included to aid the description. In the first treatment the goal was to create an environment that would stimulate creative thinking abilities in the child; in the second treatment, the goal was to set an environment which allowed utilization of these creative thinking abilities to activate evaluative effort on the part of the child.

The rationale and procedures for administering, scoring and analyzing the measures were detailed to allow for later discussion relating to the usefulness of these measures in a diagnostic battery which might be used with a learning disabled child.

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Of the ten measures used in this study to assess change in academic achievement, five gave results indicating a change in a positive direction--i.e., improvement; three gave results indicating no change in performance, and with two, the child was performing at competency level on the pre test.

It was possible to create a profile of creative positives or strengths by using the figural and verbal standardized measures of creativity selected for this study. This profile was substantiated by the findings related to the child's verbal responses throughout, particularly the number of clarifying questions asked and clarifying comments offered, both seemingly related to creative behaviors. The profile for this child thus obtained was: fluency, a dependable strength; Elaboration, a dependable strength; Originality, a strength occasionally; and Flexibility, seldom a strength.

The measures used to assess evaluative effort on the part of the child seemed to indicate a rather substantial change in her behavior. She asked for less external evaluation or judgement, she strayed from the task less often, the nature of her comments became more goal-directed and she seemed to have perceptions that were similar to the experimenter's.

For a diagnostic battery that is to be used to plan and evaluate a treatment program, the most appropriate measures are those that give more information regarding academically and socially relevant tasks (particularly criterion measures) and that can be used over time. The creativity measures in this study provided useful information regarding creative thinking abilities and were fun to administer and to

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take. The verbal Response Form used in this study was the most useful as it provided information regarding the frequency, magnitude and variability of the child's verbal behaviors throughout the entire course of the study. It is, however, exceedingly time consuming to classify and analyze, but the patience and concern of the researcher will be rewarded. Tape recording and transcribing all sessions provided a permanent and complete record and was an invaluable tool in analysis of the data.

This learning disabled child's extreme variability in behavior at the beginning of the study decreased over time. The type of behavior that she could be expected to exhibit became much more predictable and appropriate during the course of the study.

Other characteristics of this learning disabled child's behavior are described: a rigid "learning set" or inability to be flexible; a tendency toward elaboration, fluency, and originality; involvement in the process of evaluation; ability to comprehend and use objectives and criterion-referenced standards of behavior.

Suggestions for future learning disability research include: research that focuses on a learner's strengths and not weaknesses; research that focuses on employing the child's evaluative abilities; research that would explore different treatment models than the traditional remediation model; research that focuses on the diagnostic and treatment usefulness of current assessment tools; and research that follows the intensive design or the careful observation and detailed and descriptive analysis of the performance of one individual.

APPENDICES

APPENDIX A

Checklists of

Learning Disability Behaviors

Creative Behaviors

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DIAGNOSTIC PROCEDURES

The asserted preponderance of learning difficulties exhibited by organically impaired children has been the mainstay of the argument presented by those professionals who view the education of these children as a distinct and separate process. The fact that some of the neurologically impaired children do not experience difficulties in the learning process and that some nonimpaired children do, is not sufficient justification to eliminate special teaching methodology. Insofar as the teacher is concerned, the disturbing behaviors demonstrated by these children, brain injured or not, must be eliminated or modified. The teacher will find no difficulty in recognizing that all is not well with a child who:

- Follows no logical pattern in his behavior.
- Never sticks with anything over a long period of time.
- Wanders aimlessly about the room apparently concerned with everyone else's business.
- Never sits still for a minute--always runs never walks.
- Acts before thinking--seldom considering the consequences of his behavior.
- Repeats, excessively, a task or movement.
- May be able to read but not comprehend the significance of what has been read.
- Experiences difficulties in arithmetic, performing at a level far below expectancy.
- Demonstrates visuomotor difficulties.
- Seems at times to be out of contact--does not hear you.
- Rapidly changes his mood or temperament.
- Performs inconsistently and with marked variability in the various school subjects.

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> These behaviors do not comprise a total list of indicators of potential organicity, however, they serve as specific examples of the many factors comprising the learning difficulty syndrome. It is not within the province of the school teacher's responsibility to make the diagnosis, but rather it is his duty to utilize techniques and methodologies which prove to alleviate the condition responsible for the inadequacy of the child's functioning. When the techniques at the teacher's disposal do not improve the situation, then it is time to request a diagnostic workup by the school psychologist. (Capobianco, 1971, pp. 285-286).

SYMPT

A.

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SYMPTOMS.--The following are presented as an attempt to classify some of the descriptive elements selected from 100 recent publications:

PRELIMINARY CATEGORIES OF SIGNS AND SYMPTOMS

A. Test Performance Indicators
   1. Spotty or patchy intellectual deficits. Achievement low in some areas; high in others.
   2. Below mental age level on drawing tests (man, house, etc.).
   3. Geometric figure drawings poor for age and measured intelligence.
   4. Poor performance on block design and marble board tests.
   5. Poor showing on group tests (intelligence and achievement) and daily classroom examinations which require reading.
   6. Characteristic subtest patterns on the Wechsler Intelligence Scale for children, including "scatter" within both Verbal and Performance Scales; high Verbal-low Performance; low Verbal-high Performance.

B. Impairments of Perception and Concept-formation
   1. Impaired discrimination of size.
   2. Impaired discrimination of right-left and up-down.
   3. Impaired tactile discriminations.
   4. Poor spatial orientation.
   5. Impaired orientation in time.
   6. Distorted concept of body image.
   7. Impaired judgement of distance.
   8. Impaired discrimination of figure-ground.
   9. Impaired discrimination of part-whole.
   10. Frequent perceptual reversals in reading and in writing letters and numbers.
   11. Poor perceptual integration. Child cannot fuse sensory impressions into meaningful entities.

C. Specific Neurologic Indicators
   1. Few, if any, apparent gross abnormalities.
   2. Many "soft," equivocal, or borderline findings.
   3. Reflex assymetry frequent.
   4. Frequency of mild visual or hearing impairments.
   5. Strabismus.
   6. Nystagmus.
   7. High incidence of left, and mixed laterality and confused perception of laterality.
   8. Hyperkinesis.
   9. Hypokinesis.
   10. General awkwardness.
   11. Poor fine visual-motor coordination.

D.

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D. Disorders of Speech and Communication
   1. Impaired discrimination of auditory stimuli.
   2. Various categories of aphasia.
   3. Slow language development.
   4. Frequent mild hearing loss.
   5. Frequent mild speech irregularities.

E. Disorders of Motor Function
   1. Frequent athetoid, choreiform, tremulous, or rigid movements of hands.
   2. Frequent delayed motor milestones.
   3. General clumsiness or awkwardness.
   4. Frequent tics and grimaces.
   5. Poor fine or gross visual-motor coordination.
   6. Hyperactivity.
   7. Hypoactivity.

F. Academic Achievement and Adjustment (Chief complaints about the child by his parents and teachers)

   1. Reading disabilities.
   2. Arithmetic disabilities.
   3. Spelling disabilities.
   4. Poor printing, writing, or drawing ability.
   5. Variability in performance from day to day or even hour to hour.
   6. Poor ability to organize work.
   7. Slowness in finishing work.
   8. Frequent confusion about instructions, yet success with verbal tasks.

G. Disorders of Thinking Process
   1. Poor ability for abstract reasoning.
   2. Thinking generally concrete.
   3. Difficulties in concept-formation.
   4. Thinking frequently disorganized.
   5. Poor short-term and long-term memory.
   6. Thinking sometimes autistic.
   7. Frequent thought perseveration.

H. Physical Characteristics
   1. Excessive drooling in the young child.
   2. Thumb-sucking, nail-biting, head-banging, and teeth-grinding in the young child.
   3. Food habits often peculiar.
   4. Slow to toilet train.
   5. Easy fatigability.
   6. High frequency of enuresis.
   7. Encopresis.

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K.

I. Emotional Characteristics
   1. Impulsive.
   2. Explosive.
   3. Poor emotional and impulse control.
   4. Low tolerance for frustration.
   5. Reckless and uninhibited; impulsive then remorseful.

J. Sleep Characteristics
   1. Body or head rocking before falling into sleep.
   2. Irregular sleep patterns in the young child.
   3. Excessive movement during sleep.
   4. Sleep abnormally light or deep.
   5. Resistance to naps and early bedtime, e.g., seems to require less sleep than average child.

K. Relationship Capacities
   1. Peer group relationships generally poor.
   2. Overexcitable in normal play with other children.
   3. Better adjustment when playmates are limited to one or two.
   4. Frequently poor judgement in social and inter-personal situations.
   5. Socially bold and aggressive.
   6. Inappropriate, unselective, and often excessive displays of affection.
   7. Easy acceptance of others alternating with withdrawal and shyness.
   8. Excessive need to touch, cling, and hold on to others.

L. Variations of Physical Development
   1. Frequent lags in developmental milestones, e.g., motor, language, etc.
   2. Generalized maturational lag during early school years.
   3. Physically immature; or
   4. Physical development normal or advanced for age.

M. Characteristics of Social Behavior
   1. Social competence frequently below average for age and measured intelligence.
   2. Behavior often inappropriate for situation, and consequences apparently not foreseen.
   3. Possibly negative and aggressive to authority.
   4. Possibly antisocial behavior.

N. Variations of Personality
   1. Overly gullible and easily led by peers and older youngsters.
   2. Frequent rage reactions and tantrums when crossed.
   3. Very sensitive to others.
   4. Excessive variation in mood and responsiveness from day to day and even hour to hour.
   5. Poor adjustment to environmental changes.
   6. Sweet and even tempered, cooperative and friendly (most commonly the so-called hypokinetic child).

0. Disorders of Attention and Concentration
   1. Short attention span for age.
   2. Overly distractible for age.
   3. Impaired concentration ability.
   4. Motor or verbal perseveration.
   5. Impaired ability to make decisions, particularly from many choices.

Paper distributed by Lansing Mental Health Clinic, November, 1970.
(Original work done by Sam Clements.)

A CHECKLIST OF CREATIVE BEHAVIORS

1. Not bothered by mess or disorder
2. Likes adventure
3. Affectionate
4. Interested in others
5. Frequently puzzled by something
6. Likes things which are mysterious
7. Tries to do things which are very difficult
8. Appears to be bashful
9. Able to give constructive criticism
10. Courageous
11. Sometimes not courteous
12. Has strong beliefs
13. Likes to be best
14. Determined
15. Sometimes discontented
16. Sometimes disturbs the group
17. Emotional
18. Full of energy
19. Finds fault
20. Likes working with ideas
21. Full of curiosity
22. Sometimes likes to be alone
23. Likes to be independent
24. Hardly ever bored
25. A non-conformist
26. Hardly ever hostile
27. Not popular
28. Has some odd habits
29. Gets lost in a problem
30. Likes complicated ideas
31. Asks many questions
32. Likes to hear other people's ideas
33. Acts childish or silly sometimes
34. Not always tring to act "proper"
35. A self-starter
36. Self-confident
37. Good sense of humor
38. Sees beauty in some things
39. Sincere
40. Will disagree strongly sometimes
41. Works for goals in the future
42. Sometimes stubborn
43. Persistent
44. Not timid
45. Not trying to get power

46. Stubborn
47. Willing to take risks
48. Seeks change
49. Sometimes sloppy
50. Sometimes acts without planning
51. Questions authority and rules
52. Tolerant
53. Open-minded
54. Enjoys taking things apart
55. Tries to find the meaning of new words
56. Has a hobby
57. Cannot write fast enough to keep up with thoughts
58. Sometimes questions or disagrees with statements made by the teacher
59. Sticks with a project to completion
60. Seen by some students as being different
61. Looks for new ways of doing things
62. More interested in learning than in getting good grades
63. Usually does not give in or change mind even if others disagree
64. Usually first to suggest an activity for a group
65. Likes to do free hand drawings or designs rather than following someone else's pattern
66. Raises questions in class if something is not clear
67. Not afraid of being thought to be different

Paper given to participants in creativity session at the National Council for Exceptional Children Convention, Dallas, Texas, April, 1973.

Indicators of Creative Behavior

Intense absorption in listening, observing or doing
Intense animation and physical involvement
Use of analogies in speech
Bodily involvement of an intense nature in writing, drawing, etc.
Tendency to challenge ideas of authorities
Habit of checking many sources
Taking a close look at things
Eagerness to tell others about discoveries
Continuing in creative activities after the scheduled time for quitting
Showing relationships among apparently unrelated ideas
Follow through on ideas set in motion
Various manifestations of curiosity, of wanting to know, digging deeper
Spontaneous use of discovery or experimental approach
Excitement in voice about discoveries
Habit of guessing and testing outcomes
Honesty and intense search for truth
Independent action
Boldness of ideas
Low distractability
Manipulation of ideas and objects to obtain new combinations
Tendency to lose awareness of time
Penetrating observations and questions
Self-initiated learning
Tendency to seek alternatives and explore new possibilities
Willingness to consider or toy with a strange idea

Taken from Torrance, E. P. Creativity, San Rafael, California: Dimensions Publishing Co, 1969, p. 36.

APPENDIX B

Learning Contract

Ordered Dolch Words and Scores per Baseline Period

LEARNING CONTRACT

I, _____, PROMISE TO WORK WITH

_____FOR ONE HOUR TO ONE AND

A HALF HOURS EVERY DAY I CAN UNTIL SCHOOL STARTS.

FOR THIS WORK, I WILL GET GIVE TEN SURPRISES

PLUS ONE BONUS SURPRISE THAT WE WILL DECIDE LATER.

SIGNED_____

JULY 25, 1973

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Ordered Dolch Words and Scores per Baseline Period.

	Word	A_1	A_2	A_3
	and	1	1	1
	on	3	1	5-1
	a	1	1	1
	at	2	1	1
	it	1	1	2
	is	1	1	1
	the	1	1	1
	in	1	1	1
	you	3	1	1
	will	3	1	1
	me	1	1	1
	do	1	1	1
	so	1	1	1
	he	1	1	1
	go	1	2	2
	see	1	1	1
	no	3	2	2
	she	2	1	1
	we	1	1	1
	not	1	1	1
	of	3	1	1
	be	1	1	1
	but	1	1	5-2
	this	1	1	5
	your	1	1	1
	my	1	1	1
	good	1	1	5-1
	up	2	1	1
	all	1	1	1
	out	1	1	1
	us	2	1	1
	little	1	1	1
	him	2	1	5-4
	an	2	4	1
	old	1	4	1
	have	2	4	1
	are	1	1	1
	had	1	2	5-1
	like	2	1	2
	by	1	1	1
	make	2	4	1
	come	1	1	5-2
	did	1	1	1
	three	2	1	1
	eat	1	1	1

Ordered Dolch Words and Scores per Baseline Period.--Continued.

Word	A_1	A_2	A_3
to	1	1	1
as	1	2	2
for	1	4	1
I	1	1	1
one	1	1	1
some	4	1	2
can	6	4	2
ate	6	1	5-4
fly	1	1	1
over	1	2	1
ten	1	1	1
big	1	1	1
or	1	4	1
who	2	1	1
two	1	1	1
far	3	4	5-4
hot	2	3	1
why	1	1	1
cut	3	4	5-4
new	1	3	1
run	1	1	1
how	3	4	1
her	1	4	1
if	2	2	5-4
them	2	4	4
was	1	1	2
his	1	2	2
now	1	4	1
am	3	2	1
red	1	1	1
into	1	1	1
look	1	1	1
long	1	4	1
both	5	6	1
when	5	4	1
about	6	4	1
much	6	4	1
tell	6	4	1
just	6	4	1
today	6	6	1
must	5	4	1
live	5	4	1
let	5	4	1
has	6	1	1

Ordered Dolch Words and Scores per Baseline Period.--Continued.

Word	A_1	A_2	A_3
may	5	4	2
any	5	4	1
six	1	1	1
work	1	1	1
play	1	1	1
stop	1	1	1
that	1	1	1
down	1	1	1
what	1	1	1
give	1	1	1
four	1	1	1
with	1	2	1
away	1	1	1
fall	4	4	1
right	4	4	1
upon	4	4	1
want	2	2	2
read	4	2	6
put	1	1	1
say	1	1	5
its	1	1	1
too	1	1	1
sit	2	2	1
ask	2	4	1
use	4	4	1
try	2	1	1
got	2	2	5
ran	1	1	1
own	4	2	5
buy	1	2	5
yes	1	4	1
our	2	3	1
they	2	1	1
saw	2	3	4
off	1	1	5
went	2	2	2
made	4	4	2
find	4	2	1
open	4	2	4
came	2	1	1
get	2	1	1
gave	5	3	2
hurt	3	4	1
jump	1	1	1

Ordered Dolch Words and Scores per Baseline Period.--Continued.

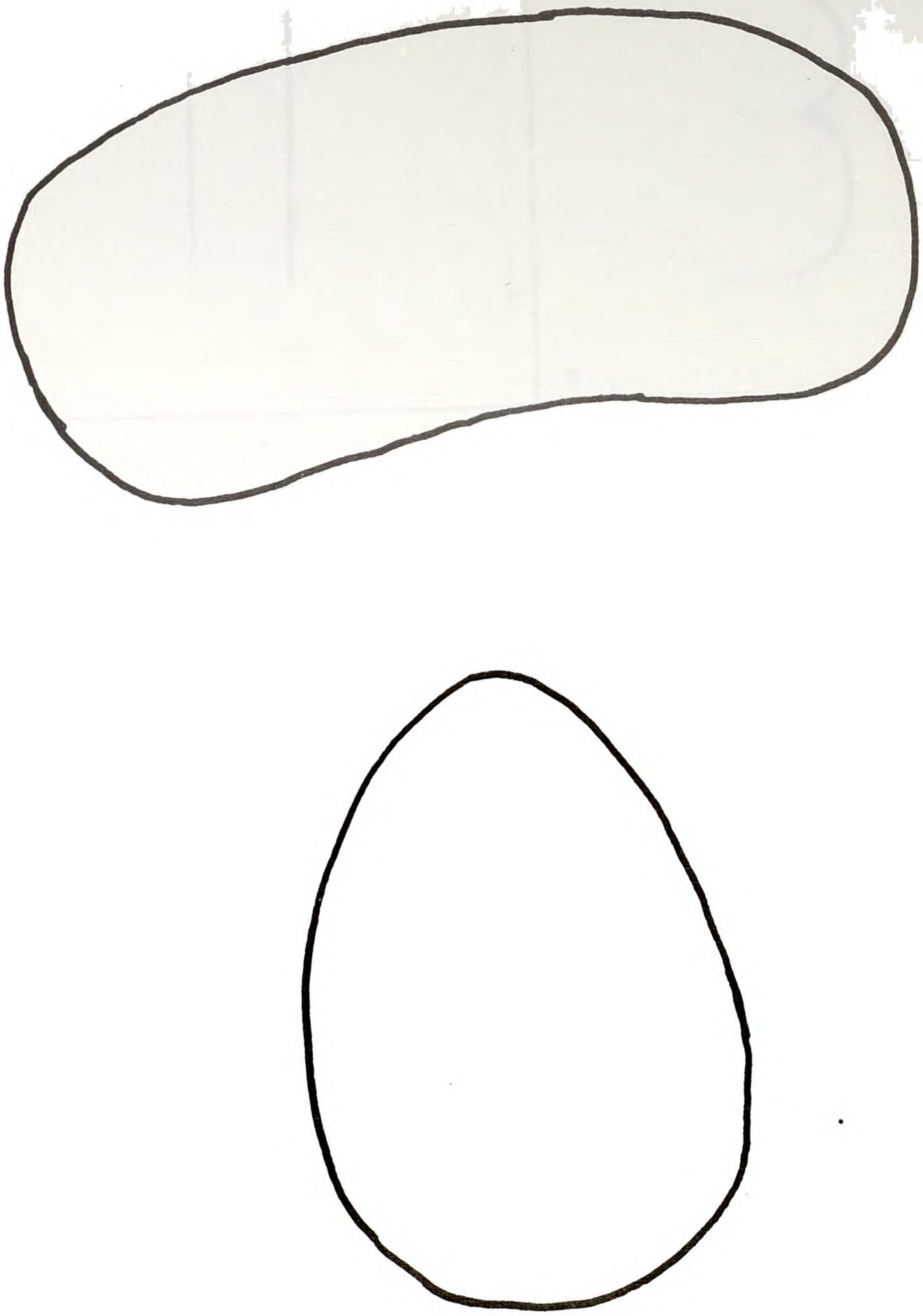
Word	A_1	A_2	A_3
cold	1	2	1
don't	1	1	2
best	4	4	1
wish	2	4	1
well	6	4	1
keep	1	1	1
five	2	4	5
from	1	4	1
pick	4	4	1
does	4	4	5
been	6	3	1
show	5	4	1
pull	5	4	1
know	1	4	1
wash	5	4	6
were	5	4	1
walk	4	2	5
goes	4	4	1
take	4	4	1
sing	2	4	4
then	2	2	1
laugh	4	1	2

Dotted line indicates cut-off between words administered each day of the three days.

APPENDIX C

Figural Measures of Creativity

Picture Construction (two shapes)
Incomplete Figures (Forms A & B)
Circles and Squares



Picture Construction

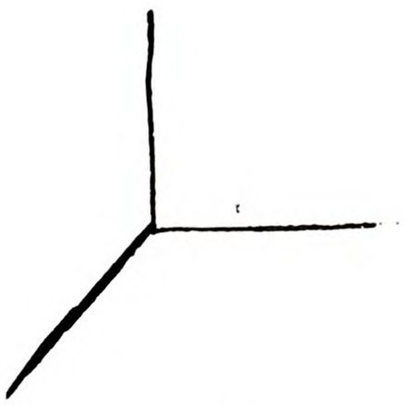
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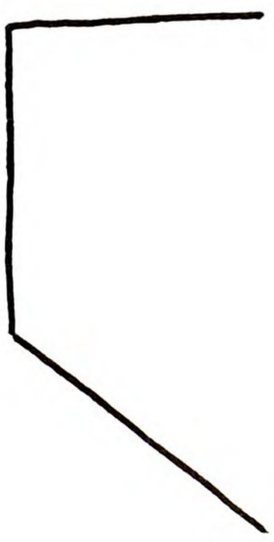
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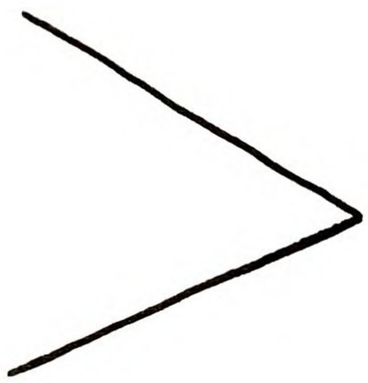
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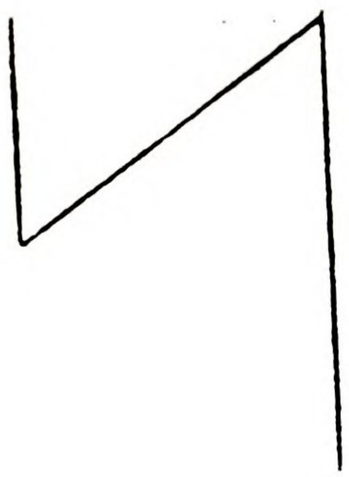


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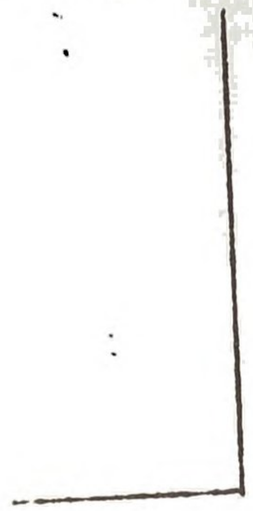
— Incomplete Figures
Form A



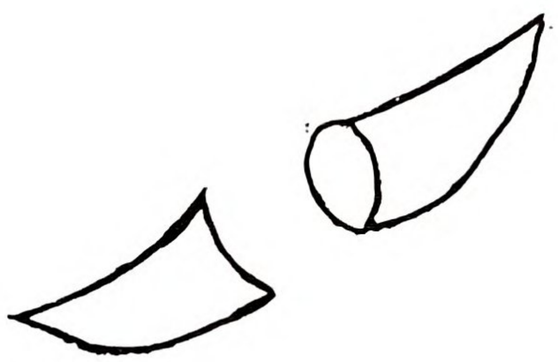
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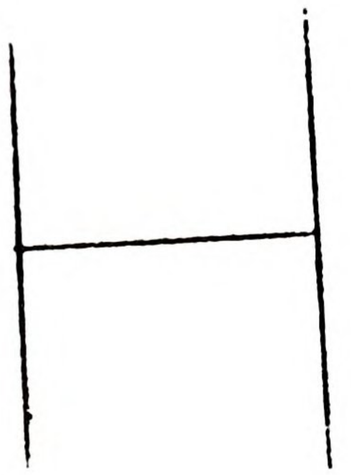
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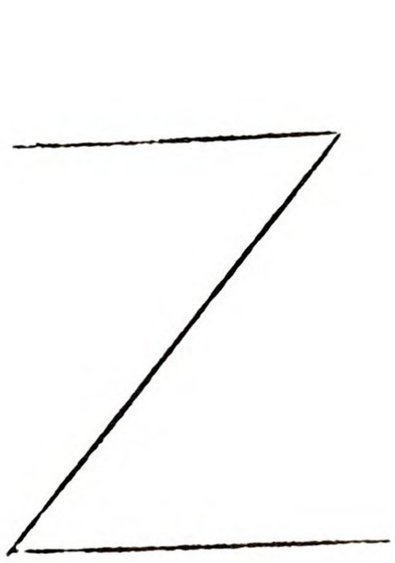
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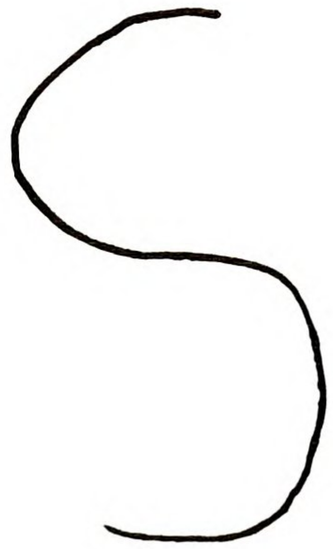
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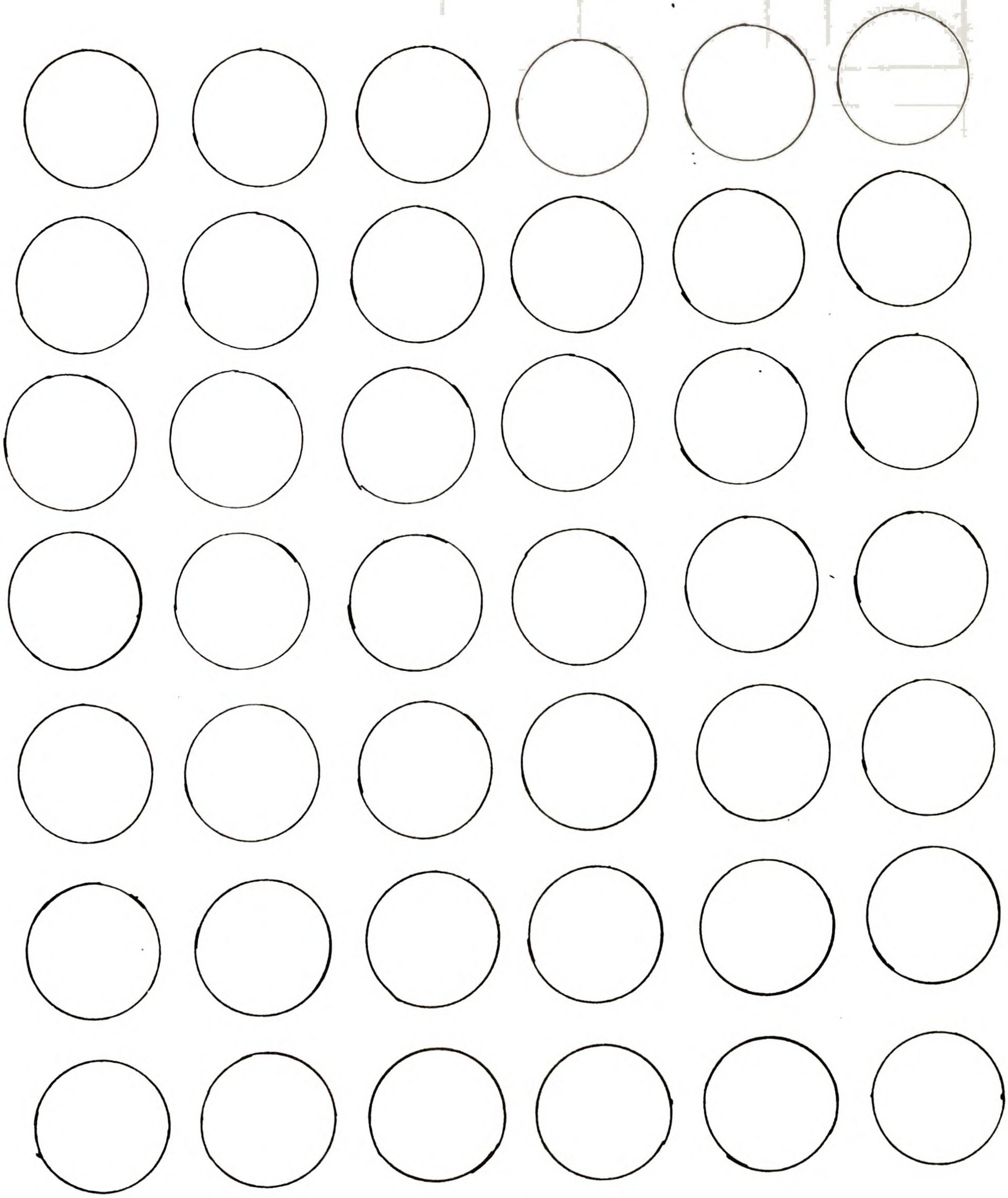


6

Incomplete Figures
Form B

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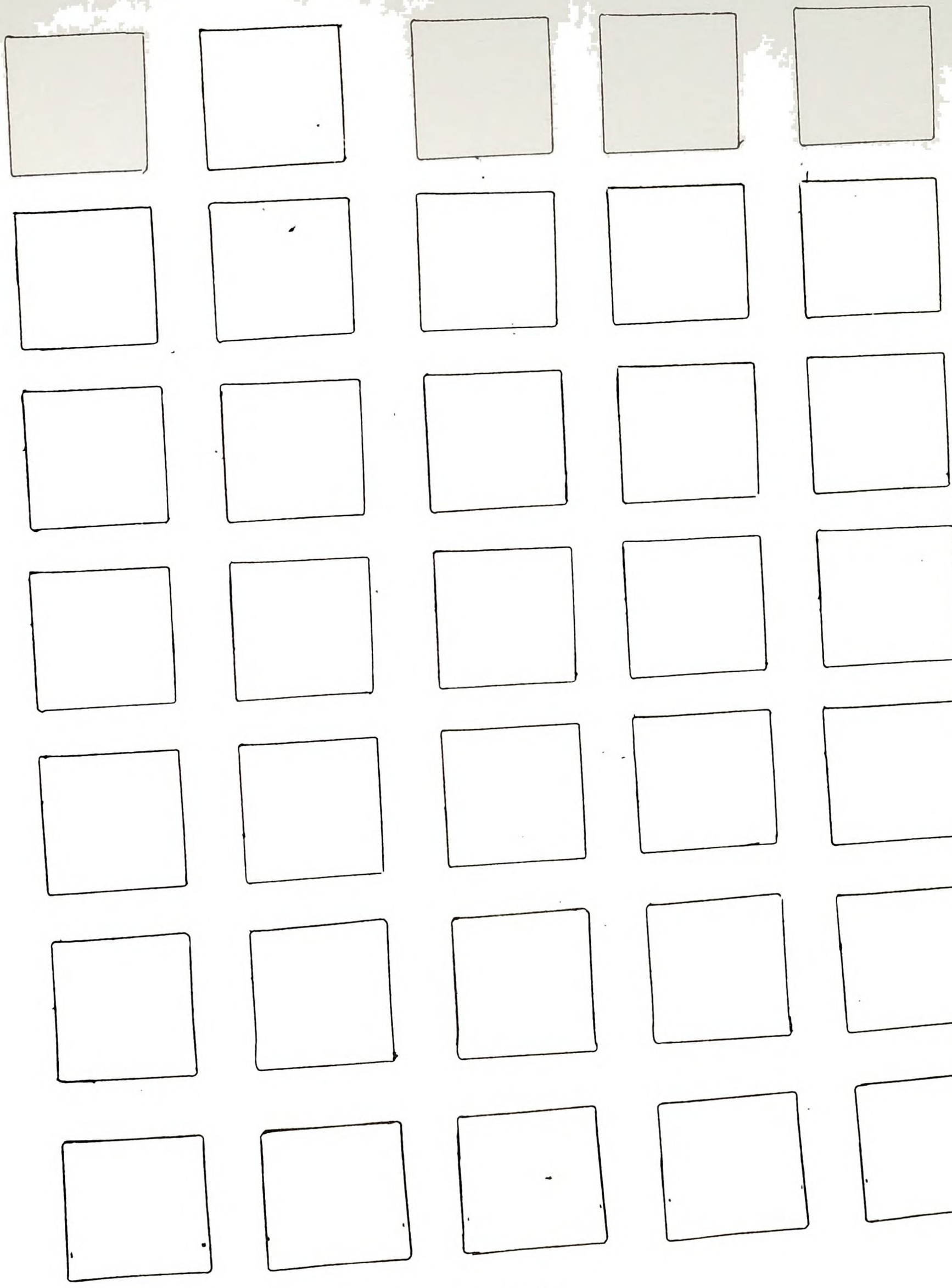
Name _____ Date _____



Circles

Name

Name _____ Date _____



Squares

APPENDIX D

Titles for Imaginitive Stories

Scoring Guide for Imaginitive Stories

TITLES USED FOR IMAGINITIVE STORIES

First Baseline Period (Form A)

The Dog That Doesn't Bark
The Man Who Cries
The Woman Who Can But Won't Talk
The Cat That Doesn't Scratch
Miss Jones Stopped Teaching
The Docotor Who Became a Carpenter
The Rooster That Doesn't Crow
The Horse That Won't Run
The Duck That Doesn't Quack
The Lion That Doesn't Roar

Second Baseline Period (Form B)

The Teacher Who Doesn't Talk
The Hen That Crows
The Dog That Won't Fight
The Flying Monkey
The Boy Who Wants to Be a Nurse
The Girl Who Wants to Be an Engineer
The Cat That Likes to Swim
The Woman Who Swears Like a Sailor
The Man Who Wears Lipstick
The Cow That Brays Like a Donkey

Third Baseline Period (Combination A & B)

The Man Who Cries
The Woman Who Can But Won't Talk
The Cat That Doesn't Scratch
Miss Jones Stopped Teaching
The Doctor Who Became a Carpenter
The Rooster That Doens't Crow
The Horse That Won't Run
The Duck That Doesn't Quack
The Dog That Won't Fight
The Cow That Brays Like a Donkey

SCORING GUIDE FOR IMAGINITIVE STORIES

One of the more elaborate scoring schemes is one developed by Yamamoto (1961) and includes scales for the following six general criteria: organization, sensitivity, originality, imagination, psychological insight, and richness. Each of these six general criteria was then divided into five components. The more detailed guide provides a definition of each component and gives illustrative scoring examples. Only the definitions of the components will be given here.

ORGANIZATION (Score one point for the presence of each component)

1. Balance (Integration). Is the production well balanced in its organization? Is it well integrated in that all of the parts contribute something to the story?

2. Arrangement (Order). Is the production skillfully arranged in terms of its temporal and/or special sequence? Here score one point whenever the author reports events in the order in which they would be expected to occur. If the production is very short (arbitrarily, less than fifty words), score zero on this dimension. A production need not be well balanced to rate high here.

3. Consistency. Is the production consistent in its efforts to give a story about one of the topics presented? Here score zero only in those cases where there is explicit contradiction or inconsistency in any part or parts of the production.

4. Conciseness. Is the production wordy or parsimonious? It is not the length of the production itself which is to be considered but rather its length in relation to its meaningfulness--how much it says.

5. Clarity (Communication). Does the production clearly convey the writer's idea? Is the communication good? If you understand what the author is trying to say, score one point here.

SENSITIVITY (Score one point for the presence of each component)

1. Stimulus perception. Is the subject sensitive to the original stimulus, namely the presented title? Did he grasp what is required of him? Here also pay attention to the way the subjects responded to the verb(s) used in the suggested topic. Remember that the dog is a dog that does not bark, not a dog that will not bark or cannot bark. The woman is a woman who can but won't talk, not a woman who simply cannot talk. When the subject ignores or overlooks this subtle but important phase, give him a zero score.

Scoring Guide for Imaginitive Stories (Continued).

2. Association. Did the subject react adequately to the stimuli which came up in his own production? Did he permit one thing to lead naturally to another? Was his association smooth and relevant? Usually score one point unless the production is unusually queer or incoherent in its association.

3. Relevancy of ideas. Is the idea presented relevant? Are the ideas contributing something to the over-all production? Are they essential? Are they marginal, peripheral, or totally irrelevant, or are they central? If most of the presented ideas are relevant, score one here.

4. Specificity. Is the production specific in its important details? Is it detailed in its exposition of the central ideas?

5. Empathy. Does the subject show some empathy with the principal character in his production? Score one here whenever there is explicit description of how the character feels or felt (He was very sad. She was afraid of . . .). When some emotion or feeling is explicitly ascribed to a character in the story, or when the character in direct narration, expresses his emotion, a score of one is given.

ORIGINALITY (Score one point for the presence of each component)

1. Choce of topic. Scoring of this criterion is entirely dependent upon the frequency of each topic chosen out of the ten possible choices (based on a sample of 1061 subjects in the third through sixth grades). In Form A, the most common titles for boys are numbers 1, 2, 6, 8, and 10, and the use of any of these titles is scored zero. The most common titles used by girls are 1, 2, 3, 5, 8, and 10. In Form B, the most common titles for boys are 1, 3, 4, 7, 8, and 9. The most commonly used by girls are 1, 4, 7, and 9. The remaining topics and self-produced topics are scored one point.

2. Ideas. Is the main idea novel or unusual? Is it stereotyped? The following recurring ideas and schemes seem to be so obvious and commonplace as to rate a score of zero and can be used as a guide until a more detailed one can be developed:

The dog couldn't bark. He tried and tried but he couldn't bark.
The doctor quit medicine because he didn't like it. He became a carpenter.
The man cries because he peeled onions.
The lion got so mad he finally roared.
The lion could only squeak and everybody made fun of him.
Miss Jones stopped teaching because she couldn't stand her naughty, noisy, unruly children.
The man wears lipstick because he couldn't get it off.

3. Organization. Is the writer's way of organizing his materials governed by traditional story-telling form? A score of zero should be given whenever some stereotyped form (Once upon a time there was . . . . and they lived happily ever after, or So this is the end of the story) is used in the production. (About 80 percent of the productions of children from the third through the fifth grades use at least one of these common forms.)

4. Style of writing. Are there any signs of an original style of writing? This dimension has no objective rationale yet and is sometimes difficult to judge. Give a score of one whenever the subject uses direct narrative sentences or quoted dialogues.

5. Sense of humor. Is the production humorous or surprising? There could be much discussion on what constitutes humor. Granted this criterion is fairly subjective, we construe it as meaning surprising, pleasantly surprising, escape from the pedestrian and trivial aspects of reality, or the juxtaposition of the incongruous.

IMAGINATION

1. Imagination. Does the subject show rich imagination or is his imaginative ability scarce and limited? Is the subject able to "associate away from" the original stimulus, or is he bound to it? Score one whenever the subject develops the topic to some extent and does not appear to be "in a rut."

2. Fantasy. Is the production strictly on a factual basis or is it rich in fantasy? The question to be asked in scoring this dimension is Could this really happen? A production in which animals talk to each other or to people is worth a score of one. It must be pointed out that there may be "imagination" without "fantasy," but by definition, "fantasy" implies "imagination."

3. Abstraction. Is the production high on the abstraction ladder? Is it attached to natural phenomena or is it logically more abstract? Give a score of one to all generalizations (All lions roar, or Cats don't like water). Also score one when the characters involved are named in a manner symbolic of their roles. For example, a nurse might be named Miss Getwell, or the lion that does not roar might be named Silence or Roarless.

4. Identification. Did the subject identify the principal character(s) in his story with proper name(s)?

5. Reasoning. Did the subject give any reason for the phenomenon described in the stimulus sentence, or did he simply accept it as it was? In some self-developed topics this dimension may not be applicable. In such cases, give a score of zero.

PSYCHOLOGICAL INSIGHT

1. Causal explanation. Did the subject give a physical (organic) cause to explain the phenomenon described in the stimulus sentence or a nonphysical (functional) reason? There is often some doubt as to whether a given reason is organic or functional. In such a case, give a score of zero.

2. Perspective. Did the subject show any perspective in terms of how and when--"the dog that doesn't bark" would start barking again? This might be termed "restoration of equilibrium." Also score a point whenever the subject states the long-term perspective about his principal character(s), whether this "normalizes" or not. "Living happily ever after" is not enough, incidentally, unless the subject shows how this is possible.

3. Meaningfulness. Is the production meaningful as a whole? Here we are most dramatically confronted with a choice situation between social and psychological, or adult and child, criteria of creativeness, and, unfortunately, we have no clear-cut answer. Score, therefore, one point here unless the production is totally incoherent and nonsensical. The following and similar stereotypes should, however, be scored zero on this dimension.

Once there was a man who cried. He didn't know why. Then all of a sudden he stopped crying.

There was a lion who couldn't roar. He tried and tried but he couldn't.

4. Ego-involvement. Is there any self-reference? Does the subject speak of his own experience?

5. Understanding. Does the production show deep understanding of the life situation described? Here the subject is judged for his insight into complex interpersonal (be it expressed in terms of animals involved) relationships. This calls for a kind of reality testing on the part of the subject.

RICHNESS

1. Expression. Literally speaking, is the production rich in its expression? Does it describe things carefully and/or colorfully?

2. Ideas. Is the subject rich in ideas? Does he have a large number of ideas? The number, rather than quality or integrity, of ideas is to be considered here.

3. Emotion. Is the production rich in its expression of emotion? Score one point here whenever the subject shows a commiseration with his characters and/or his story. On the empathy dimension, we look for explicit emotion ascribed to principal characters, but on emotion we are interested primarily in direct expression of the subject's own emotion. Expression of emotion might be either explicit or implicit.

4. Curiosity. Does the production show keen curiosity? Is anyone in the story chiefly concerned with finding out why, what, how, or when?

5. Fluency. Is the subject fluent in his production? Here we are interested in fluency in the sense of number of words, and an arbitrary cutting score of 150 words has been established for the twenty-minute time limit. As the scale is developed, it will probably be necessary to establish different cutting scores for each grade.

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