DOCUMENT RESUME

ED 185 769 EC 123 924

| | |
|---|---|
| AUTHOR | Deno, Stanley L.: And Others |
| TITLE | Behavioral Perspectives on the Assessment of Learning Disabled Children. |
| INSTITUTION | Minnesota Univ., Minneapolis. Inst. for Research on Learning Disabilities. |
| SPONS AGENCY | Bureau of Education for the Handicapped (DHEW/OE), Washington, D.C. |
| REPORT NO | IRLD-Mono-12 |
| PUB DATE | Nov 79 |
| CONTRACT | 300-77-0491 |
| NOTE | 94p.: See also EC 123 901-925. |
| EDRS PRICE | MF01/PC04 Plus Postage. |
| DESCRIPTORS | Behavioral Sciences: *Evaluation Methods: *Identification: *Learning Disabilities: Program Development: *Program Evaluation: Research: Student Evaluation |

ABSTRACT

The monograph considers four issues in behavioral assessment of learning disabled (LD) students: primary assumptions of the behavioral approach, identification of LD students, program planning for identified students, and program evaluation. Among factors examined in the first section are the components of experimental analysis of behavior, including direct observation and recording and single subject research designs. The section on identification of LD Ss reviews the basis for creating service programs that use behavioral assessment techniques to identify LD Ss and speculates on effects of person centered and situation centered orientations. The use of behavioral assessment in making program planning decisions (including developing individualized education programs) is the focus of the third section. The final part reviews the role of behavioral assessment procedures in both formative and summative evaluation. (CL)

IRLD

Director: James E. Ysseldyke

Associate Director: Phyllis K. Mirkin

The Institute for Research on Learning Disabilities is supported by a contract (300-77-0491) with the Bureau of Education for the Handicapped, Department of Health, Education, and Welfare, U. S. Office of Education, through Title VI-G of Public Law 91-230. Institute investigators are conducting research on the assessment/decision-making/intervention process as it relates to learning disabled children. Research activities are organized into eight major areas:

I. Adequacy of Norm-Referenced Data for Prediction of Success

II. Computer Simulation Research on the Assessment/Decision-making/Intervention Process

III. Comparative Research on Children Labeled LD and Children Failing Academically but not Labeled LD

IV. Surveys on In-the-Field Assessment, Decision Making, and Intervention

V. Ethological Research on Placement Team Decision Making

VI. Bias Following Assessment

VII. Reliability and Validity of Formative Evaluation Procedures

VIII. Data-Utilization Systems in Instructional Programming

Additional information on these research areas may be obtained by writing to the Editor at the Institute.

Monograph No. 12

# BEHAVIORAL PERSPECTIVES ON THE ASSESSMENT OF LEARNING DISABLED CHILDREN

Stanley Deno, Phyllis Mirkin, and Mark Shinn

Institute for Research on Learning Disabilities

University of Minnesota

November, 1979

Table of Contents

# Behavioral Perspectives on the Assessment of Learning Disabled Children

The purpose of this paper is to identify the major perspectives on a behavioral approach to assessing learning disabled children. Fortunately extensive works have already been published which describe "behavioral assessment" (Cimenero, Calhoun, & Adams, 1977; Hersen & Bellack, 1976), its applications to the education of exceptional children in general (cf. Gardner, 1977), and to teaching learning disabled children specifically (Haring & Bateman, 1977; Lovitt, 1967). Those efforts will not be duplicated here. Instead of selectively identifying the major behavioral perspectives on the assessment of children with learning problems, we hope to provide professionals responsible for educating those children an opportunity for examining their own perspectives on assessment, and for considering the implications of those perspectives for educational programming. Also, by attempting to specify what is known regarding the behavioral assessment of learning disabled students we hope to identify areas in which research and development must yet be done. To accomplish our purpose the paper is organized into four major sections. Each section consists of a set of perspectives, including the behavioral literature upon which each perspective is based.

The first section, entitled "Perspectives on the Behavioral Approach to Assessment," is an attempt to specify the major perspectives which we believe are rooted in the primary assumptions of the behavioral approach and in its research methodology. Since the focus of this paper is on assessment, we will consider primarily those propositions of the basic behavioral systems which may have implications for assessing children with learning disabilities.

The second section of the paper, entitled "Perspectives on Behavioral Assessment Procedures in the Identification of Learning Disabled Children," addresses the problem of how to identify those children ordinarily referred to as learning disabled when a behavioral approach is used.

Section III is entitled "Perspectives on Behavioral Assessment Procedures in Planning Programs for Learning Disabled Children" and shifts attention from the problem of identification to the problem of how behavioral assessment data are used to plan educational programs for children who have been identified.

Finally, in Section IV, entitled "Behavioral Assessment Procedures in Evaluating Programs for Learning Disabled Children," we seek to determine how behavioral methodology has been used in both formative and summative evaluation of programs designed to improve the education of learning disabled children.

Before moving to the body of this paper a word needs to be said about the term "assessment." Assessment, as it is used throughout this paper, refers broadly to the process of information gathering for purposes of decision making. In this sense it is synonymous with how some have used the term evaluation (Klein, Fenstermacher, & Aiken, 1971). The term is used broadly to include all information gathering activities and emphasizes the relationship between information gathering and decision making. When used in this way, the term assessment requires not only an understanding of what information might be gathered or how it might be gathered, but also specification of the decisions which must be made throughout developing an instructional program.

Sections II through IV of this paper are organized around the three major decisions made in developing programs for learning disabled children represented by the following questions:

1. What is (are) the problem(s) which must be solved by providing special educational services?
2. What special educational program represents the most appropriate education in the least restrictive alternative?
3. Has the special educational program been effective?

## Section I

### Perspectives on the Behavioral Approach to Assessment

The purpose of this section is to identify those elements of the behavioral approach which have primary relevance for the assessment of learning disabilities. We will not present a summary of the principles of operant psychology, since more knowledgeable presentations of the principles can be obtained elsewhere (cf. Bijou & Baer, 1961; Ferster, Culbertson, & Perrott, 1975; Honig & Staddon, 1977; Skinner, 1953). While we believe the principles of behavior such as reinforcement, punishment, extinction, and stimulus control are of major importance in understanding the behavior and improving the lives of learning disabled children, we are restricting our attention here to the contributions of the behavioral approach to the development of assessment practices.

Perspective #1

Assessment of "problem" behavior should be approached from the point of view that it has evolved from, and is governed by, the same laws which determine the development of "normal" behavior.

Children's behavior varies greatly both between individuals and within individuals. Nevertheless, behavioral psychologists assume all behavior is determined by the following three sets of variables:

a) Genetic constitution

b) Prior training (or reinforcement history)

c) Present environment (or current contingencies of reinforcement)

The first set of variables allows behavioral psychologists to work from the position that the initial (neo-natal) behavioral reper-

toires of children may be quite unique (i.e., the operant levels of behaviors like sucking, crying, motor movement, may be quite different among different children). When such variation in responding does exist at birth, behavioral psychologists take the position that the variables determining that difference are the primary concern of biology (although prenatal conditioning does occur) and, instead, turn their attention to studying the effects of subsequent interactions between the individual and the environment. Those subsequent interactions are then conceptualized by Skinner (1969) as follows: "(1) The occasion upon which a response occurs, (2) the response itself, and (3) reinforcing consequences. The interrelationships among them are the 'contingencies of reinforcement'." While heavy emphasis has been given to the final two terms of the analysis (i.e., behavior and its contingent consequences) it would be well to remember that the first term of the contingency (the "occasion" or discriminative stimulus event) is as much a part of the analysis as the second and third terms. Rarely are we who intervene concerned with strengthening or weakening behavior without regard for the occasion upon which that behavior occurs. In fact we cannot judge behavior as appropriate or inappropriate in a social system unless we know the situation (the preceding events) in which the behavior has occurred.

H. S. Terrace (1970), in reviewing Skinner's book Contingencies of Reinforcement: A Theoretical Analysis, likened the functional utility of the three term contingency relation in the analysis of behavior to that of the cell in biology:

> Indeed, just as the cell or the atom can each assume a variety of forms by changes in the nature of their components, so can the character of a discriminative operant be modified by changes in the nature of the discriminative stimulus, the response, and the reinforcing consequences. Most readers are probably familiar with the variations that are possible with the reinforcement term. Reinforcement can be positive or negative, and, depending upon the schedule, reinforcement may follow only a small fraction of the responses that have been emitted. Less familiar are the ways in which the first two members can vary. Discriminative stimuli can derive from either the external or the internal environments. Likewise the response may be overt or covert. It is mainly from contingencies in which a stimulus from the internal environment controls either an overt or covert response that Skinner formulates the examples which encompass activities normally referred to as mental. Internal stimuli and covert responses are assumed to be potentially measurable in the same physical units applied to external stimuli and overt responses. (p. 532)

That the analysis of behavior is an approach to understanding the controlling relations of all behavior regardless of its character and does not require the denial that covert behavioral events actually occur is evident from Terrace's further discussion of Skinner's analysis.

> Much of Skinner's analysis of the activities of the mind is directed at showing how awareness of feelings, of thoughts, or of the external world, result from contingencies of reinforcement. In chapters 6 and 8 of Contingencies Skinner tries to show that private events can and should be conceptualized in much the same way in which we conceptualize conditioned overt behavior. Skinner is quite explicit about the amenability of private events to scientific analysis and about the validity of contingencies as the unit of analysis. "It is particularly important that a science of behavior face the problem of privacy... an adequate science of behavior must consider events taking place within the skin of the organism not as physiological mediators of behavior but as part of behavior itself...private and public events have the same kinds of physical dimensions. So far as we know, the same process of differential reinforcement is required if a child is to distinguish among the events occurring within his own skin." (p. 532)

As Terrace has made clear, then, the seemingly simple structural and functional relationships represented by the three terms of the reinforcement contingency become exceedingly complex as they are elaborated to include all possible instances of each term and the relationships among those terms. The extent to which these elaborated contingencies of reinforcement can be used to account for an individual's behavior, then, constitutes the subject of the behavioral researcher's attention.

The behavioral psychologist, it is sometimes said, is less interested in why a bird emits a behavior like "turning over a leaf" than whether or not upon doing so the bird finds a worm. The point of the statement is that for the behavioral scientist the existence of a behavior in the individual's present repertoire is typically of less concern than the effect of current contingencies on future occurrences of that behavior. The behavioral psychologist is typically more interested in empirically examining changes in behavior which occur once interactions between the organism and the environment begin rather than speculating on the idiosyncratic history of interactions which may have produced the present behavior. At the same time, however, it is important to distinguish between differences in the behavioral repertoire which are present at birth and those which may exist after some training history can be specified. The children entering public school programs who significantly differ from one another in their behavioral repertoires have already interacted with their environments for five years and the reinforcement contingencies which they have experienced during that period have significantly determined their

repertoires. Since each of those children has experienced a unique training history, that history will necessarily interact with current contingencies to determine the effects of those contingencies on the development of new behavior. This model of human development, and its implications for the education of exceptional children has been described by Bijou (1977) as interactional.

> The interactional model consists of two basic concepts. The first is that there is a continous interaction between biologically developing children and the progressive changes in their environments. The second one is that these interactions change the individual (develop a person with a unique personality) on the one hand, it may change the environment on the other." (Bijou, 1977, p. 6)

The implications of this model of human development for making identification, planning, and evaluation decisions for learning disabled children will be considered more completely in later sections of this paper. The general implication of the conception just described is that each child will arrive at school with a unique behavioral repertoire which has developed as a result of a unique interaction between the child's behavior and the environment. Some of these individuals will be exceptional because their behavioral repertoires do not match the behavioral requirements for succeeding on the tasks desired by the schools. In many cases where a mismatch exists a search begins for "the handicapping conditions" assumed to be responsible for the insufficient behavioral repertoire. To the extent that constitutional factors can be clearly identified as the basis for an insufficient repertoire (as is often the case for sensory handicaps), little disagreement seems to exist that an individual is handicapped. In the case of learning disabilities, however, where

constitutional factors influencing behavior cannot be easily identified, the role of past and current environmental contingencies looms larger in the identification process. Eventually, the issue arises as to whether or not a six year old child who fails to "attend to and complete tasks," and who "can't sit still" is "really handicapped" or simply has developed these behavioral characteristics through prior training. The question of whether a constitutional basis for behavioral difference must be identified before a child can receive service as learning disabled has never been definitively answered. It is doubtful that a neurophysiological basis for atypical behavior could be reliably identified for a very large proportion of children currently categorized as learning disabled, and the authors of virtually all major texts in the field concede that the population is heterogeneous rather than homogeneous. A quote from Wallace and McLoughlin (1975) makes this clear:

> There are obviously many factors which might contribute to learning disabilities. The educator's primary responsibility is to teach the child and to identify information about the child which will help to better teach him or her. Consequently, teachers have had their own valid perspective concerning the study of learning disability causes. While we have indicated some of the elements involved in this perspective earlier, let us consider two particularly crucial aspects: (1) the lack of an homogeneity in the learning disability population and (2) the diagnostic procedures for learning disabilities.
>
> Learning disabled children seem to defy efforts to be arranged in neat categories or syndromes. Ross (1969), McCarthy (1969), and Bloom and Jones (1970) have all struggled with the issue of classifying LD children. Our inability in this chapter to identify a consensus of opinion about these children underscores the heterogeneity of the population. This actually necessitates individual analysis of learning problems. Etiological factors in the learning disabilities of one child may not have the same significance in another child.

> The other obvious implication of etiology is that teachers must order their diagnostic procedures by priority. There are few school systems in this country that can possibly mount a diagnostic process which explores all of the possible factors influencing a child's learning disabilities.
>
> Consequently, educators must first examine the most educationally relevant factors in learning disabilities. The teacher must focus on the actual areas of underachievement (reading, writing, etc.) and the surrounding educational environment. Other professionals will often subsequently examine the physiological or psychological factors influencing the learning disability.
>
> The issue is not whether we close our eyes to some real considerations involved in learning and disregard a multidisciplinary approach to learning disabilities. Rather, the educator must take stock of the situation and proceed efficiently and expeditiously to deliver instruction to the learning disabled child. (Wallace & McLoughlin, 1975, p. 52)

Perspective #2

Behavioral assessment requires first, a precise description of the level and direction of a behavior and, second, an empirical analysis of the variables in the current environment which control the level and direction of that behavior.

In Science and Human Behavior, Skinner (1953) clearly articulated the view that the purpose of a behavioral science was to specify the variables of which behavior is a function; and to assert the position that "the practice of looking inside the organism for an explanation of behavior has tended to obscure the variables which are immediately available for scientific analysis. These variables lie outside the organism, in its immediate environment and in its environmental history" (p. 31).

In the experimental and applied work which is based on Skinner's

view, the focus is on behavior itself, particularly its rate of occurrence, rather than on behavior as a sign or indicator of inner events or processes (cf. Rimm & Masters, 1974). Terms such as "intelligent," "hyperactive," "aggressive," or "learning disabled" are viewed by behaviorally oriented psychologists as references to broad categories which include behaviors emitted more frequently by some children than by others. As such, the terms describe rather than explain the high rates at which those categories of behavior are emitted. For the behavioral psychologist, terms such as "auditory memory" refer to the rate at which an individual repeats or imitates an aural stimulus which is no longer present, rather than to the individual's "ability" to remember what has been presented aurally. Explanations for the differences among individuals and individual behavior described as auditory memory are sought in the sets of variables previously identified (i.e., prior training or present environment of the individual), and major constructs from other psychological theories are viewed as potentially interesting behavioral phenomena which may be experimentally analyzed. A "cognitive structure" is converted to a description of a "response class" and the set of occasions upon which the class of behaviors occurs (i.e., to the "discriminated operants"). For the behavioral psychologist the question, then, is "what are the contingencies of reinforcement of which that particular cognitive structure (sic. "class of discriminated operants") is a function?", rather than, "What cognitive structure or process can account for the occurrence of this behavior?"[1]

[1]A point needs to be emphasized here: we are attempting to characterize the behavioral approach and not to evaluate or advocate that approach. As we attempt our characterization and consider its implications the reader may wish to make his/her own judgments about its accuracy and its value.

To specify the variables which control a given behavior, behavioral psychologists have developed a methodology referred to as "the experimental analysis of behavior." The features of the experimental analysis of behavior which have the most direct implications for assessment are first directly observing and recording repeated instances of a class of behaviors, and second, the using of single subject research designs to describe the variables of which behavior change is a function.

Direct observation and recording. In behavioral assessment, quantification is accomplished through directly observing and recording the frequency with which the behavior of interest occurs when specific stimulus events that immediately precede and follow the behavior are presented and removed. The purpose of direct observation and recording of behavior is to determine the rate of responding, which is the dependent variable of interest (Honig, 1966). As Skinner has said, "We construct an operant by making a reinforcer contingent upon a response, but the important fact about the resulting unit is not its topography but its probability of occurrence, observed as rate of emission" (Skinner, 1969, p. 7). While most researchers accept this dictum, not all do. Schoenfeld (1976), for example raises a variety of issues concerning the definition of the "response" in behavior theory, and suggests that to simply count occurrences of a "punctuate event" is not to measure at all. As we shall see later, applied behavioral psychologists routinely quantify other dimensions of behavior such as duration, accuracy, latency, and topography.

In the original experimental research conducted by Skinner and

his followers with pigeons and rats, the particular behavior recorded and analyzed was not one which would be commonly emitted by the organism in its natural environment (e.g., lever pressing or key pecking). Direct observation and recording of behavior which is socially significant has, however, become a part of what is known "applied behavior analysis" that we discuss in subsequent sections of this paper. Concern for behavioral data is so prominent in the experimental methodology that some have argued that Skinner's primary contribution to psychology and education is in the area of behavioral measurement (Hall, 1971).

Single subject research designs. An experimental analysis of behavior involves not only a quantitative description of behavior, but also the effect on behavior of manipulating preceding and following stimulus events in different contingent arrangements. In the behavioral approach, understanding why a behavior occurs as often as it does requires experimentation to determine which events in the current environment control the behavior. The implication of such an experimental approach for assessing children with learning problems is clear: a complete assessment of a child's behavior involves not only observing and recording, but also conducting an experiment to determine what variables control the behavior.

The experimental study of the behavior of individual subjects has only been made possible by application of time series research designs (Glass, Willson, & Gottman, 1975). In contrast to more conventional group research designs, the assumption made by behavioral psychologists is that since behavior is exhibited by individual subjects it should be explained in the context of single subjects (Sidman, 1960).

The point of view is that large group trends may mask or obscure the behavior patterns of individual subjects. For that reason the research methodology of behavioral psychologists would perhaps be better referred to as idiographic rather than nomothetic. The application of time series research designs for studying individual behavior makes a quantitative analysis of the variables controlling individual behavior possible. While the "classic" time series research design used by behavioral psychologists (i.e., the "reversal" and "multiple baseline" designs) are used to identify functional relationships between behavior and the environment, derivatives of time series analysis have become commonplace in the evaluation of general treatment programs. More than ten years ago Lovitt (1967) described how behavioral research methodology could be used to assess learning disabled children, yet it would be an overstatement to say that direct observation, frequent measurement, and time series data analysis is a widely accepted approach to assessment. As we shall see later, time series data analysis can be used in identification of children for service, for program planing, and for the evaluation of program changes. Finally, we shall see that direct observation, recording, and display of time series data can become part of the treatment programs.

Perspective #3

The critical steps in applying the experimental analysis of behavior to assessing children with learning disabilities are: a) defining the behavioral differences which represent the problem called learning disabilities, and b) developing practicable procedures for observing, recording, and evaluating the effect of interventions designed

to reduce those behavioral differences.

The basic behavioral system developed and tested within the context of the experimental laboratory has been more recently applied to understanding and studying the development of behavior in the natural environment. Skinner's Science and Human Behavior (1953) is the landmark attempt to consider the behavior of individuals and societies through the concepts of behavioral psychology. Bijou and Baer's subsequent book on Child Development (1961) provided an integrated and comprehensive view of human development from the standpoint of behavior theory. A substantial number of derivatives from the basic system more closely related to education have developed as well, however, and, though generically referred to as "behavior modification," are substantively differentiated.

Applied behavior analysis. Kazdin (1975) has identified four major characteristics which he believes all applications of the behavioral approach to human problems have in common. They are: (1) a focus on observable behavior, (2) a careful assessment of the behavior to be changed, (3) careful evaluation of the effects of a program used to alter the behavior, and (4) the concern for changing socially significant behavior. Kazdin's list clearly illustrates that what analysis shares most with the experimental analysis of behavior is its research methodology. Although experimental and applied behavioral research differ with respect to the concern for "socially significant" behaviors, that variation may be accounted for by the difference of purpose in basic and applied work.

While most applied behavior analysts would describe the environ-

mental changes or treatments which they organize using the technical language of basic behavioral psychology, applied work does not require one to do so. More important are the basic assumptions shared by applied behavior analysts that behavior is the focus of concern and that changes in behavior will occur as a function of manipulation within the environment. Applied behavior analysts take this approach since they act on the basic system assumptions that behavior is primarily a function of interactions between the individual and the environment rather than a manifestation of underlying "disease entities" or "traits." The important implication of this position for work in the field of learning disabilities is, of course, that the behaviors characteristically identified as typical of learning disabled children (e.g., word identification errors) are seen as products of the child's training history rather than manifestations of an underlying problem called "dyslexia."

The characteristics of the behavioral approach to treatment specified by Kazdin make it clear that in applied work, data rule supreme. Not just any data, of course, but data obtained through recording instances of "selected target behaviors." While considerable effort is directed toward describing behavior in what is referred to as "observable" terms, the crucial determiner of whether or not the behavior has occurred is agreement between two or more parties that a recordable event has occurred.[2] Once a recording system is

[2]This point is not a trivial one since arguments are often advanced that the behavioral approach is either "reductionistic" or that the requirement to define problems in terms of "observable" behaviors results in failure to address valued constructs such as "caring," "sharing," and "cooperating." More extended discussion and empirical analysis of the relationship between "observableness" and the reliability of behavior identification can be found elsewhere (cf. Deno & Jenkins, 1969).

developed which yields high interobserver agreement, frequencies, percentages, or durations of behavioral events, these are then ordered in time to produce the time series data which serve as the basis for evaluating treatment effects. Changes in the level or direction of time series data are then the purpose of treatment.

Perspective #4

The comprehensive behavioral teaching systems used to design remedial instructional programs differ significantly with respect to assessment.

As a result of the wide application of applied behavior analysis to the solution of a variety of human problems, with results which many have considered successful, a substantial number of books and planning materials have been developed to train teachers to effectively use concepts and procedures from the basic behavioral system. Different authors have given different names to the teaching systems they have developed and some of them have developed larger followings than others. A representative list of these teaching systems would include "Direct Instruction" by Engelmann and Becker, "Precision Teaching" by Lindsley, "Responsive Teaching" by Hall, "Directive Teaching" by Stephens, and "Individual Instruction" by Peter. All of these systems draw directly from the basic behavioral system; however, as White (1977) has noted, the approaches differ from one another with respect to the relative emphasis placed on the experimental methodology typically employed by applied behavioral analysts. Hall and, particularly, Lindsley, lay great stress on observation, recording, graphing, and interpretation of data. Hall and Lindsley differ from one another,

however, especially with respect to their emphasis on using applied behavior analysis research designs and rate of responding as the primary datum to be collected. Hall presents teaching as applied behavior analysis (ABA) in which the teacher uses single subject research methodology to determine functional relationships between teacher behavior and student behavior. Hall's Responsive Teachers are taught to use a variety of observation and recording procedures, including duration, event, interval, and time sampling to sample the behavior of interest. The variety of data which is collected is also plotted graphically as number of occurrences, amount of time, or percentage of intervals in which the behavior has occurred. Lindsley's Precision Teachers, on the other hand, are not specifically instructed in ABA research designs and collect data primarily through counting each occurrence of a behavior (what Hall calls "event" recording). The number of occurrences is then divided by the duration of the recording interval (in minutes) to obtain the rate datum, which is plotted on a semi logarithmic graph called the Daily Behavior Chart. Precision teachers then use the daily rate of occurrence data as a guide in making decisions regarding whether specified levels of performance, ("aims") are being achieved rapidly enough. To someone outside the behavioral approach such a distinction may seem trivial. Within the behavioral camp, however, the difference has caused a considerable amount of disagreement.

The approach taken by Engelmann and his colleagues differs from that advocated by Hall and Lindsley in that the emphasis is on teaching what White calls "...the application of specific instructional

tactics rather than on the measurement and analysis skills with which the teacher might continue to refine and develop those tactics, should the need ever arise." He goes on to say that, "Both Lindsley and Engelmann are highly respected and successful behaviorists but their personal approaches to teacher preparation are almost diametric. One obviously operates under the assumption that it is better to provide teachers with the means of continuously monitoring and analyzing child progress, while the other finds it better to instruct teachers in the application of procedures which others have developed and tested" (White, 1977, p. 65). At the present time no empirical basis exists for advocating one approach to training teachers rather than the other.

Perspective #5

The applied behavioral systems which contribute most uniquely to the development of procedures for assessing children with learning disabilities include repeated behavior sampling and graphic displays of time series data.

For purposes of this review, perhaps the most important application of the behavioral approach to consider is its measurement methodology. A great deal has been written in many places about norm-referenced and criterion-referenced tests and little if any of that discussion will be summarized here. A distinction which we do wish to make here is between assessment approaches using single samples of behavior and those approaches using multiple behavior samples or repeated measurements.

Single behavior samples. As Hively and Reynolds (1975) have

pointed out, norm-referenced and criterion-referenced tests differ primarily with respect to their purposes. Norm-referenced tests are designed to "separate competent from incompetent learners" (p. 5) and criterion-referenced tests are designed to determine whether students have mastered well defined areas of skill or competence. They also point out that "in a practical sense the two images have a simple relation to one another. If the norm-referenced test constructor were to go on and develop a large set of parallel test forms he [or she] would gradually obtain the advantage of a domain-referenced (criterion-referenced) testing system" (p. 4). For our purposes the important difference in testing is not whether a test is norm-referenced or criterion-referenced but rather the frequency with which a test is administered and the way in which the data are displayed for use in making instructional programming decisions. Whether or not one uses a norm-referenced or a criterion-referenced approach to testing, we believe, it is most common for educators to use a limited number of behavior samples for decision purposes. For example, when a child is referred as having difficulty in school, one or more tests will be administered on one occasion. The data will be used to make a decision about whether that child is eligible for additional services, or to determine his or her skill deficiencies. Subsequently, a teacher may use a test instrument to draw one sample of that student's behavior to determine appropriate instructional goals (pretest), and after a period of teaching the test may be readministered to determine whether or not the student has achieved those instructional goals (posttest). This is what we are describing as the single behavioral sampling

approach to assessment.

Repeated behavioral sampling. An alternative to single behavior samples is repeated measurement of a student's performance on the same or equivalent test instruments or task over time (Lovitt, 1971). We believe that repeated behavior sampling is a measurement approach which can be derived directly from the measurement methodology of the basic behavioral system described earlier. As we have already pointed out, it is a characteristic of the behavioral approach to carefully examine an individual subject's behavior over time. Careful examination is usually accomplished by "direct and daily measurement" (Lovitt, 1977) of the behavior of interest. The repeated behavior samplings are then used as a basis of interpreting the effects of changes in the environment. Within the educational context, of course, the changes which are relevant are those made in the student's educational program.

When repeated behavior samples are obtained, the data are most clearly represented graphically. Graphic displays of variations in student performance on specified tasks over time have become a common attribute of the behavioral approach to assessment. Unfortunately, however, repeated measures displayed graphically do not constitute an invariant attribute among behavioral approaches to education. One may as frequently find behavioral educators using single behavior samples as multiple behavior samples. In the tightly structured teaching programs developed by Engelmann and Becker, for example, one finds little if any use of time series data analysis. Student performance is carefully monitored on a periodic basis but daily

measurements on the same task are not repeated, graphed, and used by the teacher for making instructional decisions. Tests may be given every two weeks to a student and a judgment made as to whether or not the student's level or accuracy on the test indicate mastery of a skill. A monitoring sheet may be used to check off the skills which have been mastered.

As Lovitt (1977) has pointed out, the advantage of frequent (daily) measurement is that it prevents "overteaching" and "underteaching" and provides a basis for determining what works for the individual student. Further, extensive descriptions of how to take frequent behavior samples and use these data to assess children with learning and behavior problems can be found elsewhere (cf. Deno & Mirkin, 1977; White & Haring, 1976a). Whether or not reported behavior sampling is necessary for program success, however, requires empirical validation. As we shall consider in more detail later (cf. Bohannon, 1975; Mirkin, 1978) such validation has begun to occur.

In Section I we have attempted to identify those perspectives from the behavioral approach which bear directly on the assessment of children with learning disabilities. Collectively, the five "perspectives" presented in Section I form the basis for an approach to assessment which is characterized by:

1) The assumption that "learning disability" is a natural product of the interactions between an individual and his or her environment.
2) The use of direct observation and recording of those behaviors identified as relevant to the problem called

learning disability as the primary assessment methodology.

3) An intensive analysis of the functional relationships between a student's current environment and the learning disability behaviors using time series research designs.

4) Relatively little effort to determine the etiology of learning disability in the individual case.

We turn now from the behavioral approach, in general, to its applications in making identification, planning, and evaluation decisions in developing learning disabilities programs.

## Section II

## Behavioral Assessment Procedures in the Identification of Learning Disabled Children

The first major question which must be answered when developing programs for children who are learning disabled is, "Who is eligible for learning disability service?" The answer to that question requires what is sometimes referred to as the identification decision. In Section II of this paper we shall attempt to identify those perspectives which provide the basis for a behavioral approach to the identification of learning disabilities.

### Perspective #6

Current approaches to defining learning disabilities are based on an "inner cause" conception of the problem; however, the functional basis for initial referral is typically a deficiency in basic skills.

How the identification question is answered depends on whether the question is addressed as a strictly legal question, as a practical-descriptive question, or as a theoretical-conceptual question. In a strictly legal sense, learning disabilities is defined operationally by the procedures described in the rules and regulations published in the Federal Register (Vol. 42, No. 250, December 29, 1977). The essence of the procedures described under the rules and regulations is that a child must be evaluated by a multidisciplinary team which is using multiple measures to determine that a child is not achieving commensurate with "his/her age or ability, has a severe discrepancy between achievement and intellectual ability on one of seven areas relating to communication skills and mathematical abilities," and that the

discrepancy is not due to one of the "other categories of handicapped or economic disadvantage." Operationally then, who is served is determined by a multidisciplinary team which must write a report which states that a child "has a specific learning disability." When the procedures are completed, the legal requirements for answering the question and providing services have been met.

Since the federal regulations concerning learning disabilities have only recently been established, it is difficult to predict whether or not a change in who is served will occur as a function of the changes in the regulations. One way in which to determine who actually has been served as learning disabled is to examine the populations served through the Child Service Demonstration Centers (CSDC's) for children with learning disabilities (U.S.O.E. Title VIg). Kirk and Elkins (1975) surveyed 21 CSDCs to determine who they were serving and concluded that underachievement in reading, spelling, and/or arithmetic was the primary basis upon which decisions to provide service were made. They pointed out that the learning problems encountered by the children tended to be in all basic skills rather than in one or two and that the disability, therefore, seemed more general than specific. They noted further, that a large proportion of the children had tested IQs below 90. They pointed out that for such children a severe discrepancy beween potential and achievement did not exist, and concluded that the children actually served under the heading of learning disability would not meet the current definition of learning disabilities cited in the federal rules and regulations.

In a subsequent study, Thurlow and Ysseldyke (1979) determined that the CSDCs varied considerably in how they defined learning disabled children, and in what types of assessment data they collected. They did find, however, that virtually all CSDCs surveyed required data on basic academic skills. It is difficult to know whether or not the data obtained by Kirk and Elkins and by Thurlow and Ysseldyke are representative of the field in general, but the likelihood is great that children receiving service as learning disabled are those students having difficulties in basic skills, primarily reading.

From the standpoint of research in the field of learning disabilities, the more interesting questions may have to do with the theoretical-conceptual question regarding who is learning disabled. In 1968 the National Advisory Committee on the Handicapped of the Department of Health, Education and Welfare recommended a definition to Congress which read as follows:

> Children with specific learning disabilities means those children who have a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which disorder may manifest itself in imperfect ability to listen, think, speak, read, write, spell or do mathematic calculations. Such disorders include such conditions as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia and developmental aphasia. Such terms do not include children who have learning problems which are primarily the result of visual, hearing or more handicaps, or of mental retardation, or emotional disturbance, or environmental disadvantage." (Federal Register, October 11, 1973, 38[196], 23230-23231)

That same definition is included in the rules and regulations recently published in the Federal Register. A reading of that definition makes it abundantly clear that those who formulated the definition viewed

the problem from a cognitive and physiological developmental perspective rather than a behavioral perspective. The phrase "disorder in one or more of the basic psychological processes involved in understanding or in using language" and the statement that "the disorder may manifest in imperfect ability to listen, think, speak, read, write, spell or do mathematic calculations" reveals the intent of the regulations to view the problem of learning disabilities from what many applied behavior analysts refer to as the "illness" model (cf. Kazdin, 1975). The locus of the problem is seen to be somewhere within the child and the discrepancies observed are viewed as signs or indicators of the underlying problem.

If the "disorder" referred to in the definition is based on the assumption that factors in the physiological or biological construction of the individual determine the poor performance in various areas of communication, then the basic behavioral assumptions previously presented within this paper could be applied consistently with the definition. If, on the other hand, however, the disorders referred to in the definition are cognitive constructs, then applications of the basic behavioral system to defining, and therefore identifying, the learning disabled child become difficult if not impossible. The applications become difficult if what will be required is that "perceptual handicaps" or "dyslexia" construed only as inner or private events must be shown to cause the academic problems. Applications of ABA become possible if such terms name constellations of behaviors. In that case, if one may assume that the constellation of behaviors to which the term dyslexia refers, for example, are those which may

have been learned through interaction between the individual and the environment, then applied behavioral research on both the training histories which lead to variations in those behaviors and, behavioral assessment procedures which might be used to reliably describe those behaviors could be developed and used in a manner consistent with the definition.

Finally, if the phrase "the term does not include children who have learning problems which are primarily the result of...environmental, cultural or economic disadvantage" is to be taken seriously then it is impossible to apply the behavioral model to the definition of youngsters who are learning disabled. As stated previously in Section I, when biological factors cannot be identified which determine the behavior, one assumes that the behavior is determined by environmental factors.[3] Even in such circumstances, however, the methodology employed by behavioral psychologists in measuring behavior may be of value, and much of the remainder of this section will consist of a summary of the state of the art with respect to the application of behavioral measurement procedures to identifying learning disabled children.

Perspective #7

The kind of behavioral data collected to identify a child as learning disabled varies as a function of the orientation of the persons conducting the assessment.

Behavioral measurement procedures have been applied in a variety of ways to identify those children to be served through learning dis-

[3]However, the same difficulty will exist for all definitions which are based on a psychological theory which holds that the development of behavior is primarily determined by environmental variables once the individual begins to interact with the environment.

abilities programs. The approaches can be categorized into two general groups based on assumptions regarding the locus of the problem to be called learning disability: a) person-centered, and b) situation-centered.

Person-centered approach. When behavioral assessment procedures are used in a person-centered approach to the identification of learning disabilities, the assumption is made that the child is either deficient in some skill necessary for performing on school tasks (such as "copying numerals" or "saying sounds"), or exhibits some behavior in excess which interferes with successful performance on related school tasks (such as "reversing letters" or "looking around"). The implication of the person-centered approach is that the locus of the problem is in the behavioral repertoire of the child, and that assessment procedures must precisely describe the nature of the problem as it exists within the child's repertoire. All traditional standardized psychological tests created were for use in a person-centered assessment.

When behavioral procedures are used in a person-centered approach, the student may be removed from the classroom environment to conduct the assessment, since the primary purpose of the assessment is to determine the student's skills. Behaviorally speaking, the problem is to determine the degree of stimulus control currently exerted by the relevant academic task. In such an assessment, a variety of task stimuli (i.e., the verbal and numerical symbols involved in written and spoken language) are presented in isolation and in context to assess the extent to which they properly control behavior. The presen-

tation of these task stimuli may occur in virtually any environment, and may be selected by someone who knows the common task stimuli to which most children in our culture must respond correctly if they are to develop mastery of basic skills in written and spoken language.

One of the best examples of using behavioral procedures in a person-centered approach to the assessment of children for purposes of identifying them as learning disabled is the work done by Project PerForm, the Seattle-Spokane-Tacoma (SST) CSDC. Within that project, rate of responding on seven basic "movement cycles" (behaviors) has been explored as a basis for screening children in the early elementary years to determine whether or not they are eligible for service. In that project, considerable attention has been given to identifying what White and Haring (1976b) refer to as "tool movements." In their words:

> In almost every assessment we make of a child there is some basic movement cycle that is critical to the child's success. To properly interpret the meaning of our assessments we must first be sure of the child's fluency in the use of basic tool movement cycles. (p. 147)

They go on to point out that generally these tool movements can be classified as "say," "write," or "do" movements.[4] The major issues which people in the SST Project have addressed are those associated with the reliability and validity of the procedures developed for measuring the tool movement cycles used in identifying children for learning disabilities services. Interesting analyses have been con-

[4]It should be pointed out that people who followed the Lindsley tradition of measurement, commonly referred to as Precision Teachers, frequently refer to behavioral events as movements or movement cycles. No special attention will be given to defining these terms within this paper and the reader for all intents and purposes should read the term "movement" or "movement cycle" as synonymous with "behavior."

ducted to determine a) the number of behavior samples necessary for obtaining concurrent and predictive validity, b) the effect that the duration of a behavior sample has on the discriminative power of the screening instrument, c) whether the median rate of response is more or less predictive than the slope of a time series, and d) whether consistent differences exist between the response rates of "normal" children and those of children receiving learning disability service. A similar approach has been used by Kunzelmann (1978) to ascertain the effects of using repeated rather than single behavior sampling on who is selected for service in learning disability programs in the state of Washington. The data which he has collected seem to indicate that if single samples on tool movements are obtained, the children identified as in need of service are the same as those identified using more traditional testing procedures. With repeated measurements there is a decrease in the overlap of students who are identified. This finding relates to the point made earlier in this paper that a major difference in the behavioral approach to assessment is the use of repeated behavior sampling to create time series data for decision making.

A final comment should be made concerning screening. Adopting a person-centered approach to assessment for purposes of identification makes screening a sensible activity since screening is based on the assumption that learning problems reside in the student. Screening can then be done to identify the "high risk" student for whom early intervention may be desirable. As we shall see in the situation-centered approach which follows, however, a different approach to assessment would raise doubts about the sensibility of screening.

Situation-centered approach. The situation-centered approach to assessing children for identification purposes differs from the person-centered approach in that it does not proceed from the assumption that "the problem" resides in the behavioral repertoire of the individual. Instead, a problem is defined as the discrepancy between an individual's behavior and the behavior desired from him or her by someone else (cf. Deno & Mirkin, 1977; Kauffman, 1971; Mager & Pipe, 1970). Bergen (1977), in his book Behavioral Consultation, illustrates the discrepancy definition of a problem as follows: "For example, if a child is throwing temper tantrums every night at bed time and his parents wished that he would never ever throw a temper tantrum again they have a problem. Their problem is to devise a way to stop the tantrums and thereby restore peace to their presumably otherwise happy household" (p. 23). In Bergen's example it is clear that the parents "own the problem"; that is, they are the ones who hold standards (desires) for their child's behavior which are discrepant from what the child is doing. Without their desires, which are common to our culture, a problem would not exist. This point of view regarding problem definition has been referred to as "ecological" by Rhodes (1967) as applied to the disturbing child.

> In this alternative view of disturbance it is suggested that the nucleus of the problem lies in the content of behavioral prohibitions and sanctions in the culture. Any behavior which departs significantly from this lore upsets those who have carefully patterned their behavior according to cultural specifications. The subsequent agitated exchange between culture violater and culture bearer creates a disturbance in the environment. It is this reciprocal product which engages attention and leads to subsequent action. (p. 449)

Additional quotations from Rhodes make this point easier to understand. To clarify the implications of this viewpoint for defining, and therefore, identifying, learning disability, however, we have inserted the term learning disability where Rhodes used the term emotional disturbance.

> Generally, we assume that [learning disability] is the exclusive property of the child. This approach has been borrowed from the physiological model and applied it to psychological disturbance. For a long time we have probed, analyzed, and dissected the psychic structure, the chemical structure, the neurological substrate, the glandular constituents, and the genetic history of the organism in a search for the essence of [disability]. We have carefully reviewed the developmental history of the organism and studied the influence of the environment upon it. In all of these attempts the starting point has been the assumption that a flaw within the child was responsible for the [disability].
>
> If we could temporarily put aside the physiological or host organism point of view and substitute an ecological point of view, it might provide us with a fresh start. A view of [learning disability] as a reciprocal condition might suggest new approaches and new measures for management.
>
> With the problem thus restated, conditions such as pathology, divergence, or discordance become environmental products of the emotive exchange between excitor and responder instead of a simple property of the excitor himself. We can then address ourselves to the agitated environmental product, in which both sides bear relationship to the problem, rather than the child alone. The "disease" would be considered as much a condition in the responder as in the elicitor.
>
> In this bilateral statement of the problem, the child becomes an excitor whose behavior or life style elicits reciprocating emotive reactions from a community of responders....
>
> This restatement could be compared to the old question about the relationship of noise to a falling tree and the human ear. If a tree crashes in the forest, but there is no human receptor apparatus to be activated by the subsequent sound waves, is there a noise? Does the sound reside in the crashing tree which sets up

> the sound wave, does it reside in the receptor mechanism, or is it a product of both? We might ask the same thing about [learning disability]. When an individual lives or behaves in a [disabled] fashion, does the [disability] exist without a reactor group to register the condition? Does the [disability] reside in the child, the reactor, or is it a product of both?
>
> The question is not, 'What is it really?' The question is, 'What is the predominant purpose of the society in the actions it pursues with the subject after society's response has been triggered?' My answer is that in all of these cases society's unspoken and unrecognized purpose is much more to lower its own stress level than to solve the problem facing it. By a peculiar twist of logic, however, it reserves its subsequent operations for the subject, and only the subject. Society fails to recognize pathology, divergence, or [disability] as a product of the reciprocity between activator and resonator: Therefore, it fails to apply itself to study and solution of all terms of the problem. It concentrates upon the activator, temporarily relieves the tension of the reciprocator, and never quite comes to grips with the whole problem. (pp. 449-451)

Taken together, Rhodes' statements applied to the problem of learning disabilities provide the basis for a significantly different approach to assessment for purposes of identification.

In contrast to the person-centered approach to assessment, which involves measuring the student's behavioral repertoire on predetermined tasks, the situation-centered approach relies more heavily upon interviews with a person's "significant others" to determine who believes that a problem exists and why. Within the school, the scenario for a situation-centered approach to assessment for purposes of identification involves the following sequence: Teacher refers a child as "having a problem"--resource person receives referral--schedules interview with teacher and other relevant caregivers--through an interview, the resource person determines what it is the teacher

and others wish the student to do that the student is not now doing. As a result of the interview, a set of desires and a set of target behaviors are selected which may include such things as "completing work," "following directions," "doing math work sheets," and "answering comprehension questions." Subsequently, any one of a variety of behavioral observation recording procedures (cf. Hall, 1971) may be initiated to measure the actual level of performance of the student relative to the desired level.

The aspect of the situation-centered approach to assessment which makes it most different from the person-centered approach is consideration, in each case, of the possibility that factors other than the behavior of the student alone are part of problem definition. If, during an interview with the teacher who has referred a student, the resource person detects some bias operating with respect to the teacher's identification of this particular child as a problem, an opportunity exists to address the teacher's biased expectations as well as, or instead of, the student's behavior. The position that "problems exist in the eye of the beholder" is consistent with the point of view taken by Lilly (1971) in which he suggested that "exceptionality" be defined as a breakdown in the relationship between the teacher and the student rather than a deficiency within the student.

The distinction between the person-centered and the situation-centered approaches to assessment leads to four useful conclusions regarding assessment for purposes of identification. The conclusions bear on 1) the development of assessment procedures and measurement instruments, 2) the requisite skills of the person doing the assess-

ment, 3) the nature of service programs developed, and 4) the characteristics of the children receiving service. The implications are summarized in perspectives 8, 9, 10, and 11.

Perspective #8

While the critical behaviors to be assessed and the assessment procedures to be used can be specified on an a priori basis using a person-centered approach, the behaviors to be observed in a situation-centered approach cannot be determined until after teacher interviews have been conducted.

While it is likely that a general similarity exists between the types of behaviors which are identified through teacher interviews and the critical behaviors (or, "tool movements") which are identified on an a priori basis, the specific tasks on which performance is desired vary greatly across teachers, classrooms, and curricula. Since children referred for learning disability service commonly have reading problems, both approaches may produce assessment data on reading. Consider the example of Terri, however, who in first grade is perceived by her teacher to be having difficulty in reading because she is "falling behind the others, not completing her worksheets, and writes poorly when she does them." Depending on his or her orientation, a person-centered assessor is likely to move quickly, for example, to determine Terri's proficiency on "tool movements," on "prereading skills" (cf. Venezky, 1975), or on "the essential concepts" of the curriculum (DISTAR). The outcome of the assessment will be a description of Terri's behavioral repertoire relative to those tasks determined by the assessor on an a priori basis as critical for devel-

opment in reading. The "student's problem," then, is always defined in terms of the orientation of the assessor. Students assessed by tool movement orientated assessors will have deficiencies on tool movements, while the same students assessed by an essential concepts oriented person will inevitably suffer from deficiencies in essential concepts. Whatever the orientation if Terri is "deficient" in terms of the skills measured by the assessor, a decision may be made that a basis exists for providing Terri with additional special education service.

The situation-centered assessor, upon receiving the same referral, will interview the teacher and perhaps determine that the teacher's highest priority is to have Terri "complete worksheets neatly with 90 percent accuracy."[5] Through classroom observation and measurement of performance the assessor may then establish that Terri averages about 60 percent accuracy on her worksheets with 70 percent of her letters printed legibly. With this information the assessor is able to say that a discrepancy exists between desired and actual level of performance, and now the importance of that discrepancy must be established (Mager & Pipe, 1970). If the importance of that discrepancy, and others so identified, can be established by the responsible decision makers, Terri and her teacher may then be identified as eligible for learning disability service.

The two different approaches can, and often do, lead to different descriptions of "the problem," and ultimately influence the type of services provided. Further, and perhaps more critically for our dis-

[5]It is at this point in the assessment process, of course, that the orientation of the teacher biases the problem definition in much the same manner as the orientation of the assessor in person-centered assessment. Students whose teachers value neatness and accuracy on worksheets inevitably suffer from problems defined in those terms.

cussion, the person-centered approach is usually viewed as more consistent with law and regulations which were written on the assumption that problems exist within the individual. Solving a problem like "doing worksheets accurately" may seem to some to require the inappropriate use of special education monies unless "real cause" for the problem can be found within Terri.

Validity. Predictive validity is a primary concern when using the person-centered approach, since the relationship between the behaviors determined on an a priori basis and those required for success in the classroom, must be established. Magliocca, Rinaldi, Crew, and Kunzelmann (1977) investigated the predictive validity of a behavioral assessment procedure for identifying those four and five year old children who might later be identified as having school problems. They collected one minute behavior samples for five consecutive days on nine different tasks (e.g., "marking x's in circles," "counting objects on cards," "matching colors," "naming objects," "copying letters") to screen 65 children. Assessment occurred in the Fall and in the Spring. The children's teachers were interviewed in the Spring to determine which children would be "at risk" during the following school year. Using different selection criteria, the results of the behavior sampling procedures were compared to the results of the teacher's judgments. The results clearly confirmed the relationship between the assessment procedures and the teacher judgments. Magliocca et al. cautioned that the results of their study should be conservatively interpreted because of several methodological problems. The reason for describing their study here, how-

ever, is not to recommend the screening procedure. Instead, the study illustrates both the behavioral approach to assessment for purposes of identification and the need to establish the predictive validity of the assessment procedures when taking a person-centered approach.

The predictive validity issue is less relevant when taking the situation-centered approach. In that approach the discrepancy assessed is "the problem," and resolution of that discrepancy is the goal. In addition, where general cultural imperatives may determine the selection of tool movements in the person-centered approach, individual teacher, parent, or other professional biases will be more relevant in the situation-centered approach. Finally, where measurement of student proficiency on basic skills will be the primary focus of the person-centered approach, interview procedures for the selection of target behaviors will be critically important in the situation-centered approach (cf. Bergan, 1977; Gelfand & Hartmann, 1975).

Perspective #9

The person-centered and situation-centered approaches require different skills for conducting a behavioral assessment for purposes of identification.

The requirements of a person-centered approach to behavioral assessment are similar to more conventional standardized assessment. Consequently, the person conducting the assessment must be trained in how to reliably use those empirically validated observation procedures which have been developed on an a priori basis for collecting repeated samples of those behaviors. The person doing a situation-

centered assessment, in contrast, must be skilled in helping the teacher to define the problem in terms of level of target behaviors he or she desires, and in developing ad hoc behavioral observation procedures to collect repeated measurement data on those target behaviors.

In taking a person-centered approach the assessor may interact only minimally with the referring teacher and therefore not need to be skilled in communicative and consultative techniques. The assessor using the situation specific approach will interact extensively with the referring teacher around issues which are potentially sensitive and, therefore, must be highly skilled as a consultant. Where the assessor in the person-centered approach will be looking at the student and appraising the student's performance, the situation-centered assessor will be looking at the teacher, the classroom, the peers, the student, and the relationships among them. In a general sense, the person-centered assessor needs to be a skilled psychometrician, while the situation-centered assessor must be a skilled consultant-problem analyzer. Since the training required to conduct either type of assessment well takes considerable practice and resources, the decision as to what approach should be taken in training will have to be carefully considered.

Perspective #10

The service delivery which tends to follow from the person-centered approach is likely to be characterized by an emphasis on developing the child's skills by varying the curricula, the method, and the administrative arrangement. The services provided through the situation-centered approach are more likely to take the form of

consultation and support to the classroom teacher.

In the hypothetical case of Terri discussed earlier, the results of assessment will likely lead to quite different programs depending upon the approach taken. If a person-centered assessor with a phonics orientation assesses Terri, a program to remediate Terri's skills in word analysis and synthesis is likely to result. The situation-centered assessor might, instead, attempt to influence the teacher's desire to have Terri complete worksheets accurately, or might consult with the teacher regarding a behavioral contracting system for improving Terri's performance on reading worksheets. As illustrated earlier in Rhodes quotations, person-centered assessment generally results in interventions directed to the individual alone. Behavioral intervention based on situation-centered assessments focuses, instead, on the behavior of the teacher who is the "mediator" (Tharp & Wetzel, 1969) of the contingencies of reinforcement controlling the student's current behavior (in Terri's case, the worksheets). The question then becomes, what are the sources of influence on the teacher's behavior which the assessor can identify and, eventually, manipulate. Changes in the student's behavior may simply be used to determine whether or not an effective change has occurred in the teacher's behavior.

Although the differences between approaches may not seem significant, they affect both the type of services delivered and the role of the special educator who is providing that service. The real effects of the difference in role functioning can be observed when contrasting the services provided by Consulting Teachers in Vermont (Fox, Egner, Paolucci, Perelman, & McKenzie, 1973) and those provided by the CSDCs.

Vermont's Consulting Teachers provide service to the child through the classroom teacher through "in service training in applied behavior analysis and individual instruction that provides regular-classroom teachers with the necessary special education skills" (p. 23). The role cast for the situation-centered Consulting Teacher does not include direct service to the student identified as handicapped. In contrast, teachers in the behaviorally oriented CSDCs such as the SST Project previously referenced and the SIMS Project in Minneapolis provide direct instruction on specific skill deficits which have been identified through behavioral assessment on standard tasks. In many cases the learning disabilities teacher in a CSDC will never meet a child's home school classroom teacher. Clearly, the Vermont program rests on the assumption that the teacher's behavior is part of the problem, while many CSDCs are organized around the assumption that the problem is defined in terms of the child's behavior. Classroom observation and interviews with significant others are mandatory as part of assessment in less than half of the CSDCs (Thurlow & Ysseldyke, 1978).

Perspective #11

The person-centered approach to assessment for purposes of identification will produce a population of children relatively homogeneous with respect to skill deficiencies, while the situation-centered approach is more likely to produce a population of students who are quite heterogeneous with respect to their performance on tool movements.

At present no empirical description can be given contrasting the students identified using the two approaches to behavioral assessment.

Since students selected for service through a person-centered approach are typically assessed on standard tasks, however, students identified as learning disabled should be more homogeneous with respect to the skill deficits in their behavioral repertoires. This will hold true, however, only in those instances where initial assessment screening is made on standard tasks such as those identified in the SST Project. Person-centered assessment, which involves direct measurement of student performance on the school curriculum (cf. Lovitt, Schaff, & Sayre, 1970), but does not include assessment on standard "tool movements" may generate a very heterogeneous LD population. The situation-centered approach to identification leads to assessment practices which are ad hoc and idiosyncratic; therefore, little basis exists for predicting that a situation-centered approach to identification will produce a set of children who are homogeneous with respect to their behavioral repertories. In fact, in a situation-centered approach, what will determine whether children with identical behavioral repertories will be identified as eligible for service is not their behavior, but the reaction of the teacher to their behavior. Consequently, homogeneity ought to be a function of teacher desires rather than student behavior.

The behavoral approach to assessment which is person-centered may well be easier to justify in terms of the law and the regulations which have been written, whereas the situation-centered approach may continually encounter difficulty on legal grounds. This point is true if for no other reason than current laws and regulations are based on the assumption that the locus of any handicap is in the child.

Approaches to problem definition which do not identify the behavior of the individual as "the problem" are in conflict with the federal regulations by virtue of differences in basic assumptions. The situation-centered approach has much to recommend it, however, since it removes the total burden of responsibility for the existence of a problem from the child and places a fair share on the teacher and society.

Perspective #12

A complete assessment for purposes of identification includes an analysis of personal and social problems.

As is clear in the recommended definition, to identify a student as learning disabled requires a determination that the manifest academic problems are not a function of socio-emotional variables. The usual assumption is that if a child with learning disabilities manifests disorders in social-emotional behavior then these are correlates of academic problems rather than determinants. Some research has been conducted which reveals that children with learning disabilities have personal and social behavior problems (Bryan & Bryan, 1975); however, that research does not reveal the direction of that relationship. The intent of the federal regulations is to clearly identify a set of children with academic performance problems which are a function of factors other than social-emotional disorders. That such a distinction will ever be possible on other than conceptual grounds, however, is not as clear. Bryan (1978), for example, states that it "seems reasonable that children characterized by so many aversive characteristics are experiencing interpersonal difficulties" (p. 1). Indeed, the learning

disabled child is often depicted as stereotypically "hyperactive," "emotionally labile," and having poor social relationships with peers. Yet, to a large extent, the social behaviors of learning disabled children have been largely ignored. Part of this difficulty may be due to the fact that the social behavior difficulties of learning disabled children have too often been treated as products of being learning disabled instead of being correlates or, potentially, as partial determiners of the academic problems. The major emphasis in the treatment of social behavior difficulties of these children has been the attempt to ameliorate the academic difficulties through instruction, rather than interpersonal interventions.

The use of behavioral observation procedures to record the social behavior of learning disabled children has, with a few notable exceptions, been largely ignored. One of the major advantages of behavioral assessment is that the same sources of data can be used in all of the major educational decisions as discussed by Salvia and Ysseldyke (1978). Data used for the identification of the LD can be used for program planning and again for evaluation.

At present, all the research on behaviorally assessing interpersonal problems of LD children has been restricted to differentiating between an LD sample and a non-LD sample. In other words, all the research has been on the use of behavioral assessment techniques to make identification decisions. Little or no use has been made of these data in research regarding their use in making program planning and evaluation decisions.

Two major types of social behavior assessment of children with

learning disabilities can be found in the research literature: first, direct observation of the child in school, and second, teacher rating scales. Bryan (1974, 1978; Bryan & McGrady, 1972; Bryan & Wheeler, 1972) has done the major work in the direct observation of learning disabled children. Bryan's method of direct observation involves the use of what she calls Interactional Process Analysis (IPA), which includes four main categories of behavior--Task Oriented, Non-Task Oriented, Interactions, and Waiting. The recording system used requires the observer to observe one child and code his or her behavior every 10 seconds for a period of five minutes and then observe the next child.

Bryan has used the IPA to describe the extent and nature of social behavior difference in learning disabled children. Bryan and Wheeler (1972) used the IPA to study the behavior of four boys in each class, two LD and two normal, in grades K through 6. Their results, not surprisingly, showed the LD children spent less time in Task Oriented behavior than their peers; however, no differences were found in the percent of time LD students spent interacting with teachers and peers. Bryan (1974) again used the IPA to determine 1) whether LD children behaved differently from normal children in the classroom, 2) whether the task oriented behavior of the LD child varies from task to task, 3) and, finally, whether the behavior of the LD child varies from the regular class setting to the setting of the LD specialist. Her results were consistent with the earlier study. The LD children exhibited less task oriented behavior and more time in non-task oriented behavior, regardless of the subject or activity. As before, the two groups did not differ in the amount (percent) of time spent with the teacher or

peers; however, a teacher was three times more likely to respond to the verbal initiation of a normal child and the learning disabled child was more likely to receive "negative reinforcement" (sic) from his or her teacher than a normal child. The LD child was also more likely to be ignored by peers.

Research has also been conducted on the observation of children's classroom conversations by Bryan, Wheeler, Felcan, and Henek (1976) in an attempt to determine patterns of social attention and rejection. Observations were done by two observers who recorded the activities of the subject and everything said to the subject by others. A behavior recording system involving eight broad categories was used (rejection, information source, self-image, cooperation, competition, helping, consideration, and intrusiveness). Examination of the frequencies of emission and receipt of statements by learning disabled and comparison peers revealed that learning disabled children emitted and received more rejection statements than peers, emitted the same frequency but received fewer questions from peers than comparison children, emitted and received more competition statements than peers, gave much less help but received somewhat more help than peers, emitted and received far fewer consideration statements than peers, and engaged in less intrusive behavior than peers (Bryan et al., 1976). An analysis of differences in the frequency of communication between learning disabled and comparison children resulted in two statistically significant differences. Learning disabled children emitted significantly more "competitive statements" and control subjects emitted more "consideration statements." The remaining variables failed to reliably differentiate the two sets of students.

Forness and Esveldt (1975), in research on the predictive validity of behavior observation for identifying high-risk children in kindergarten, observed children in four areas and coded the behaviors observed into four categories (i.e., "Verbal Positive," "Attend," "Not Attend," and "Disrupt"). A recording system was used where a child's behavior was observed for six seconds and coded. The next child was then observed for six seconds and so on until everyone in the class was observed. The whole process was then repeated. Direct classroom observations were done during October and March and, at the same time, teacher's completed ratings of the children. The correlation between teachers' ratings in October and March was high and positive. The authors reported that scores on disruptive behaviors were more predictive of both teacher's ratings and actual rates of behavior. This was true even though the actual rates of disruptive behavior in the sample were quite low. The same relationship regarding teachers' ratings of disruptive behavior has also been reported by Blunden, Spring, and Greenberg (1974), who state "it would appear that there is greater agreement between teachers' ratings of negatively valued than positively valued behavior, perhaps because they are more salient" (p. 85).

The research by Cobb (1972), while not conducted specifically with LD children, bears on the use of social behavior assessment as part of the identification of academically successful students. Using an interval recording method, Cobb observed children for ten seconds, coded the behavior, observed the next child, coded his or her behavior, and so on for the whole class in 14 categories (attention, talk to teacher positive, talk to peer positive, volunteers, initiation to teacher, com-

pliance, self-stimulation, out of seat, play, inappropriate talk to teacher, inappropriate talk to peer, non-compliance, looking around, and not attending). Cobb concluded that the "behavior of 'talk to peer positive' consistently became a powerful predictor within the samples for reading and spelling and across samples for arithmetic" (p. 79) for achievement. Children who followed instructions were also more likely to be achievers.

The research on the predictive validity of directly observed social behavior for both teacher judgments and achievement measures provides support, we believe, for including social behavior observation as a part of the identification process. Less clear, however, is the validity of teacher ratings of interpersonal behavior.

The teacher rating scale is by far the most common instrument used to assess the social behavior of learning disabled children, and while teachers' ratings have been severely criticized, Ohlson (1978) argued that "many authors have shown high correlations between teachers' rating scales and standardized instruments" (p. 43). Keogh and Smith (1970) argue much the same when they state that "teachers' ratings had consistently significant correlations with achievement measures" (p. 288). Haring and Ridgway (1967) stated that "it appears that the individual behavior analysis done by teachers may prove to be a more effective procedure than group testing in identification" (p. 393).

Blunden et al. (1974) stated that "content validity of most behavior rating scales is assumed. Such an assumption may be insufficient" (p. 84). In their attempt to validate the Classroom Behavior Inventory

(CBI) by comparing ratings of the five categories of the instruments to actual rates of behavior, only one category even moderately correlated to the actual rates. Most rating scales are validated by comparing ratings to standardized test scores (Bryan & McGrady, 1972; Keogh & Smith, 1970; Novack, Bonaventura, & Merenda, 1973) or to teachers' grades (Spivak, Swift, & Prewitt, 1971). Other criticisms of rating scales include halo effects, teacher bias (Forness & Esveldt, 1975) and the belief that "a checklist does not permit an objective analysis of behavior across time and different situations" (p. 385).

One way to resolve the issue over the validity of teachers' ratings is to consider them in light of the distinction made previously between the person-centered and situation-centered approaches to assessment. If a person-centered approach is to be taken in assessment for purposes of identification, then the predictive validity of the rating scale used must be determined. If, on the other hand, a situation-centered approach is taken, then the ratings can be used as statements that, in the teacher's view, a discrepancy exists between what the child is doing and what the teacher believes is desirable. Viewed in this way, the rating scale becomes an instrument for the teacher to indicate that, for him or her, a problem exists. When a teacher rates a student negatively, the teacher is saying "I have a problem with this student on these behaviors."

A second approach to using rating scales may also be derived from the behavioral perspective. In this approach the teacher's rating is viewed as an effect of the student's behavior on the environment which defines the occurrence of that behavior. This approach is akin

to what behavioral psychologists call a functional rather than a topographical definition. In a free operant research apparatus, what defines the occurrence of a behavior like key pecking or bar pressing is the electrical contact which occurs rather than what the subject does to effect the electrical connection. Thus, a rat may press the bar with any paw, or its snout, and the act will be counted as a bar press so long as the contact occurs. In using a rating scale, the teacher's rating might be viewed as analogous to the electrical contact. If the rating occurs, the critical effect has occurred regardless of what the student has done. The primary problem with such an approach is that the teacher's rating is usually temporally and spatially too remote to be treated as part of an analysis of the current environment. Nevertheless, we might do well to develop some of our research efforts around functional rather than topographical definitions of behavior.

However the data is collected, we believe that a complete assessment for purposes of identifying children with learning disabilities should include measures of personal and social adjustment. Asher (in press) has recently provided a persuasive summary of the evidence that peer relationships are predictive of later life success. As we organize our research and development efforts we need to address the role of personal and social development as well as academic performance.

Summary

In Section II of this paper we have addressed the use of behavioral assessment procedures in identifying learning disabled children. We believe a substantial basis exists in the available literature for

creating service programs which use behavioral assessment techniques for selecting/identifying children for learning disabled service. What is less clear from our literature search, however, is what the effects will be of basing identification decisions primarily on data collected through behavioral assessment techniques. We have speculated that the effects will vary as a function of two general orientations to using behavioral assessment which we have called "person-centered" and "situation-centered." To our knowledge, no research exists contrasting the effects of using a behavioral approach to identification with other approaches, nor does research exist which contrasts person-centered and situation-centered approaches. What exists at this point are descriptions of what can be done rather than empirical analyses.

Whether behavioral psychologists and educators will ever extensively research issues related to identification is doubtful. The reason for this is simple. In Gardner's words, "The primary feature of behavioral assessment is to provide data which give direction to devising individual programs for behavioral change" (Gardner, 1977, p. 475). The point is clear: behaviorally oriented assessors seek information useful for planning environmental changes rather than for identifying etiology. In Section III we turn our attention to the role of behavioral assessment in program planning decisions.

## Section III

## Behavioral Assessment Procedures in Planning Programs for Learning Disabled Children

Once children have been identified as eligible for learning disabilities service, the major decision which must be made is to select the type of educational program to be provided for the student. The Education for Handicapped Children Act (PL 94-142) requires that program planning produce for each student what is referred to as the Individual Education Program (IEP). Writing the IEP, together with what special educators are now referring to as the Individual Instruction Plan (IEP), involves answering the following questions:

1) What are the reasonable long and short range goals toward which the program will be directed?
2) What are the program modifications which must be implemented in an effort to achieve those long and short range goals?
3) How will progress toward the attainment of program goals be evaluated?
4) Who will be responsible for implementing each aspect of the program?
5) How will program success ultimately be determined?

As was stated early in this paper, extensive treatments of how a behavioral approach is used in planning programs already exists (cf. Deno & Mirkin, 1977; Gardner, 1977; Peter, 1972; Stephens, 1976; White & Haring, 1976a). In this section of the paper we intend to identify perspectives on the uses of a behavioral approach to assessment when

making program planning decisions.

Perspective #13

Behaviorally based programs include goal statements derived from the assessment data collected for making the identification decision.

A common problem facing program planners is how to relate the data collected during initial assessment for purposes of identification to the development of instructional programs for children who have been identified as eligible for service. The problem typically arises when the behaviors sampled during identification and initial assessment are qualitatively different from the behaviors toward which program modification is directed. For example, if data from standardized ability testing are the primary data used for identification, then the program planner is faced with the question of whether the program goals ought to be written in terms of improving the abilities described as deficient through initial assessment, in terms of improving of the child's functioning on school related tasks, or both. Considerable controversy exists over the validity of ability training and its value for improving academic achievement (cf. Hammill & Larsen, 1974, 1978; Lund, Foster, & McCall-Perez, 1978; Minskoff, 1975; Newcomer, Larsen, & Hammill, 1976). The present state of the art with respect to an ability based diagnostic prescriptive procedure is such that Ysseldyke and Salvia (1974) have gone so far as to argue that children experiencing programs planned on this basis are, in effect, involuntarily participating as subjects in uncontrolled experiments.

Behaviorally oriented educational planners, with few exceptions (see e.g., Becker, Englemann, & Thomas, 1971), generally have avoided

the issue of whether to train abilities or task performance. Programs developed from the behavioral perspective include educational goals specified in terms of the academic and social performance required for successful functioning within the regular classroom. These goals are derived from the same data collected during the process of describing the "problem" which precipitated referral of the child for service. The major advantage of this approach is that it provides for continuity of assessment data from initial identification of a child for service through planning and evaluating changes in the child's program. For example, if a child is discrepant in oral reading or task completion, and the desires which make the child's performance discrepant can be justified then, for the behaviorally oriented educator, it follows directly that the program goals should be stated in terms of reducing that discrepancy (cf. Deno & Mirkin, 1977). While a difference may exist in the nature of program goals specified by behaviorally oriented educators who take a person-centered approach to assessment rather than a situation-centered approach, the nature of that difference is determined by the kinds of assessment conducted during initial identification of the problem (i.e., if initial problem description is based on assessment of tool movements rather than situation-specific tasks then program goals will be written in terms of reducing discrepancies in tool movements rather than in terms of situation-specific discrepancies).

While continuity in the data collected and used for making program decisions would seem desirable, it does place a heavy burden on collecting the "right" data during identification. Misjudgments in

the type of data collected during identification will be perpetuated during program planning and intervention, since program objectives will be written in terms of those data. This concern, of course, bears on the validity issue previously discussed in Section II.

A major empirical question which must be considered in connection with setting behavioral goals is whether or not that approach results in an improvement in the special educational services provided for learning disabled children. The reasons given for specifying objectives in behavioral terms have been presented by Mager (1962), Popham & Husek (1969), Steiner (1975), and Tyler (1950), among others. The presumed benefits range from improved accountability to improved performance, and while the arguments seem logically compelling they lack empirical verification. The research on the effects of specifying objectives by Baker (1969), Bishop (1969), Boardman (1970), Dalis (1970), Doty (1968), Engel (1968), Jenkins and Deno (1970, 1971), McNeill (1967), Parker, Sperr, and Rieff (1972), Smith (1967), and Tiemann (1968), among others, has produced largely contradictory results. Equal numbers of studies can be found in which significant and non-significant results are reported (Duchastel & Merrill, 1973). The mixed research results on the effectiveness of behavioral objectives in instruction is evidence that specifying behavioral goals is not sufficient to improve programs.

Perspective #14

Behaviorally based programs include a system for direct and frequent measurement of performance on behaviorally stated goals.

Crutcher and Hofmeister (1975) have offered an explanation for

the failure to obtain consistent effects in the research on behavioral objectives. They state that a "major reason for the discrepancies in findings may be related to whether an emphasis is placed on the statement of objectives or on the use of the objectives to improve treatment processes. For adequate use of the objectives, emphasis must be placed on evaluation devices for determining task or objective mastery" (p. 78). They propose further that a monitoring system is necessary which will "allow the special educator to stay close enough to the child to allow for effective decision making regarding the child's program" (p. 78). To test their hypothesis, Crutcher and Hofmeister designed a study and obtained large and significant effects in which objectives were combined with a monitoring system. Similar results were obtained by Bohannon (1975) where again, careful collection of time series data on the objectives was used to make instructional improvement decisions on a daily basis.

In both the Crutcher and Hofmeister study and the study by Bohannon, the separate effects of specifying objectives in behavioral terms and the use of daily time series data collection were not determined. Subsequently, Mirkin (1978) designed a study to ascertain the separate effects of objective setting and daily measurement. Her results support the conclusion that time series data obtained through direct and daily measurement of the behavior specified in the objective can be used to improve student performance, but that the specification of behavioral objectives alone is ineffective. We will consider that conclusion in somewhat more detail in Section IV of this paper, which includes a discussion of behavioral assessment procedures

in formative evaluation. The results of these studies, however, underscore the need for answering program evaluation questions during program planning.

In addition to specifying the goals of programs in behavioral terms, behaviorally oriented educators have recently addressed the question of what are reasonable levels of performance to specify in stating long and short term goals (Haughton, 1971; Starlin, 1971; White, 1972; White & Haring, 1976a). White, in particular, has described both the empirical basis and the procedures for using data collected during initial assessment to establish precise program goals. The approach is particularly commendable because it moves the specification of goals from a kind of "seat of the pants" hunching to an empirically based system. Whether or not this system improves performance beyond a more intuitive approach has not been adequately tested. However, the work previously cited by Bohannon (1975) and Mirkin (1978) provides some preliminary evidence and support of the system which has developed. The importance of the procedures for this paper, however, is that they underscore the need for repeated, rather than single, behavior sampling when conducting assessment for purposes of identification. The procedures involve using those data as a basis for making empirical predictions about subsequent student performance, which is the basis for setting program objectives. The inevitable conclusion is that a major part of the assessment which must be done for program planning is the collection of baseline data on relevant behaviors during child identification.

Another important implication of the work just cited, and that

of others who are behaviorally oriented (e.g., Liberty, 1972, 1975) is that once long term performance levels are established in the goal statements which have been derived from baseline data, it is possible to derive short term, or intermediate performance levels for the daily and weekly progress required to achieve the long term goal or aim. These short term objectives are a simple interpolation from initial performance and long term goals. Liberty refers to such goals as dynamic aims for decision making which are intended to ensure that the progress the student makes is always in the direction of achieving the long range objective. If the student fails to meet the dynamic aim for a prespecified period of time, a new aim is established and a change is made in the student's program. Illustrations of this approach can be found in the work of White and Haring (1976a), Deno and Mirkin (1977), and Bohannon (1975) previously referenced.

Perspective #15

The evaluation procedures written as a part of program planning are based on the same assessment procedures used for making the identification decision.

Since the goals written into the IEP are based on the behaviors specified during identification, and the assessment procedures for taking data on those behaviors have already been created and implemented during the identification process, it follows logically that behaviorally oriented program planners will specify evaluation plans which include data on the same behaviors using the same assessment procedures. The evaluation plans are, of course, based on the time series research designs used by behavioral psychologists to study the variables con-

trolling an individual's performance. Time series research designs can be used to investigate the effects of independent variable manipulations with single subjects. Since IEP's are, in effect, single subject experiments conducted by teachers with students, they can be used to evaluate the effects of modifications in the student's program. For the behavioral educator, then, program planning includes specification of exactly which type of data will be collected, how often the data will be collected, by whom, how they will be graphed, and finally how and by whom the data will be reviewed to make formative evaluation decisions. (See again, Deno & Mirkin, 1977, and White & Haring, 1976a, for illustrations of program plans specifying the evaluation procedures just described.)

For a behavioral educator, the data to be collected as a basis for evaluating program effects are the first concern of program planning. The reason is that most behavioral educators approach educational interventions from the perspective that they are, in fact, applied research activities designed to determine whether modifying different aspects of a student's environment constitute program improvements. From this point of view, program planning involves specifying the research design which will be used to continually test alternative hypotheses about which variables in the environment have the greatest influence in reducing performance discrepancies. The operating assumption is that no matter how carefully assessment might have been done initially, at the present time we are unable to prescribe specific and effective changes in instruction for individual pupils which will have certain effects and, therefore, that we must treat changes in the

educational program as hypotheses to be empirically tested. The approach is like the one Campbell (1969) recommended for administrators in general. Campbell's point was that the effects of few if any "reforms" in programs can be predicted and that all reforms in programs should be treated as testable hypotheses. To act as if an IEP constitutes an intervention in a learning disabled child's educational program which is certain to be successful is to "trap" the educators in the same sense that Campbell described "trapped administrators."

Since, in applied work, it is impossible to predict with certainty what will be the effects of specific changes in the individual's program, behaviorally oriented educators operate from the assumption that during program planning, agreement on the changes which are to be made is less important than agreement on the evaluation procedures used in the analysis of the effects of those changes. This approach departs fairly dramatically from that of the conventional diagnostic-prescriptive approach, which operates on the assumption that aptitude by treatment interactions are sufficiently well understood to predict what program will be effective for the individual. As discussed in Section I, the behavioral assumption is that each individual is the unique product of his or her personal training history and genetic constitution, and that the uniqueness of the individual will make differential predictions virtually impossible. In his recent book, Lovitt (1977) forcefully presents the point of view just stated. He provides evidence and argues that the teacher must continuously evaluate different techniques which are used to solve individual problems, and that no single instructional technique will ever be appropriate for solving all the problems pre-

sented by children who have difficulty academically. Since he devotes an entire book to these issues we will not present them here. Any one wishing a further exploration of the approach is encouraged to read Lovitt on these points.

While it is relatively easy to say that the instruction of children with learning disabilities should consist of continuous evaluation of alternative changes or reforms in the individual's environment, it is far more difficult to create a model instructional program based on this recommendation. In a different paper, Lovitt (1971) points out that one program of research which yet needs to be undertaken is what he calls "logistics research." By that he means research to determine how very busy teachers can collect the type of data necessary to make the instructional decisions which are a vital part of behavioral teaching. Since a major component of a behavioral program consists of daily data collection on a variety of different behaviors, the resources and arrangements necessary to collect such data and use them for decision making must be specified. At present the solution seems to be to place data collection in the hands of a variety of individuals other than the teacher (including aides, volunteers, and the children themselves). It is fair to say that the logistical problems involved in direct and daily measurement of student performance are sufficient to constitute a major barrier for the effective utilization of behavioral assessment techniques in teaching. When using a situation-centered approach to problem identification and subsequently to program planning the logistical difficulties become even greater since most assessment and decision making is ad hoc. One solution has been

to teach the classroom teacher how to take data and what data to take; however, the success of this approach remains to be adequately tested. A major study by Cantrell and Cantrell (1976), in which resource personnel were trained in behavioral analysis and data collection, provides some data that the approach can be effective.

As with the identification decision, whether the approach taken is situation-centered or person-centered significantly influences program planning decisions bearing on the types of resources and administrative arrangements which are organized for problem solution. Situation-centered program planning usually focuses on attempts to train the individual teacher to function differently, or how to supply that teacher with materials and techniques which can effectively be used to improve the program for an individual child. The service delivery model includes a resource person, usually a special education teacher, who has the time and skills necessary for providing consultation and support to the classroom teacher. Program plans typically do not involve the removal of the child eligible for service from the regular classroom; instead, services are brought to the child in the form of changes in teacher behavior and classroom curriculum. In contrast, person-centered problem definition and subsequent program planning tend to result in service delivery models which include resources external to the classroom designed to improve student performance on tool movement deficiencies. As often as not these resources might consist of special education resource teachers who organize supplementary or parallel curricula on a part time or full time basis. At the present time very little empirical evidence exists as to the

relative effectiveness of either the person-centered or situation-centered programs. Jenkins, Mayhall, Peschka, & Townsend (1974) present evidence that supports the conclusion that where supplementary services are provided is less important than what types of service are provided. While investigating the value of peer tutoring as an approach to remediating skill deficits, they determined that where the tutoring occurred (in the resource room or in the classroom) was less important than whether or not it was carefully supervised. Results like theirs support the hypothesis that some of the types of programs provided for the learning disabled child in the resource or special classroom could just as well be provided for the child within the regular classroom. If so, then no need exists for the common practice of removing the child from the classroom for learning disabilities service. A major program of logistics research could be undertaken to determine precisely what instructional variations are, in fact, provided for learning disabled children in special education programs and what resources would be necessary to bring those instructional alternatives into the regular classroom. Current efforts at "mainstream training" are directed toward helping classroom teachers "individualize" their programs for all children. The eventual result of this kind of work is likely to increase the complexity of program management for the classroom teacher. A situation-centered approach to programming, taken together with a completely individualized classroom, would result in the elimination of alternatives in learning disabilities programs which remove the child from the classroom, and would increase the numbers of children for whom the regular classroom could be the least

restrictive environment. That end is not immediately in sight, however.

## Section IV

## Behavioral Assessment Procedures in Evaluation Programs for Learning Disabled Children

In Section II we addressed how behavioral assessment procedures were used to identify children as eligible for learning disabilities service. In Section III the use of behavioral assessment procedures in planning instructional programs for learning disabled children was considered. In Section IV we are concerned with two major questions which fall under the heading of evaluation: First, how can we use behavioral assessment procedures to improve the IEP now implemented (formative evaluation) and, second, how can behavioral assessment procedures be used to determine whether or not learning disabilities service has been effective (summative evaluation)?

Perspective #16

Behavioral assessment procedures provide special educators with useful and effective procedures for formative evaluation of learning disabled children's programs. (Improved formative evaluation procedures may, in fact, be the primary contribution made by the behavioral approach to the improvement of instructional programs for learning disabled children.)

At least three research studies can be identified in which a behavioral approach to formative evaluation increased student performance on basic skills (Bohannon, 1975; Jenkins et al., 1974; Mirkin, 1978). In each of those studies the formative evaluation technique consisted of daily observing, recording, and graphing of the desired behavior.

While the results of each study provide evidence of the value of a behavioral approach to formative evaluation, only in the Mirkin study was a systematic attempt made to isolate the effective variables. She examined the effects of three different treatments on oral reading performance in the basal reader. One treatment consisted of setting an oral reading objective and pre- and post-testing of students on that objective. A second treatment consisted of setting an oral reading objective, pre- and post-testing on those objectives, and measuring student's performance each day. The third treatment consisted of setting an oral reading objective, pre- and post-testing, daily measurement, and using specific data decision rules (Liberty, 1975) to make consequence changes. A fourth group created as a control came to a resource room each day for reading instruction in the same manner as all other experimental groups. Mirkin's results indicate that daily measurement is very likely a necessary component of formative evaluation but is most valuable when a mechanism exists for ensuring utilization of data for making instructional decisions. In general, the treatment condition which included not only daily measurement but also systematic changes based on decision rules was most effective. In several comparisons, daily data collection without data utilization rules was not better than simply setting objectives with pre- and post-evaluation. The treatment which consisted of objective setting and pre-post evaluation proved no more effective than the untreated control group. In the Bohannon study, systematic data decision rules were also employed by the resource teachers as a part of the experimental treatment. The conclusion which emerges from these

studies is that formative evaluation procedures should include not only daily behavior sampling, but a data utilization system as well. The number of possible variations in daily measurement and data utilization systems are many, however, and considerable investigation of the alternatives is required before recommendations can be based on adequate data.

The Bohannon study is interesting to consider, as well, because his experimental treatment (which served as the model for Mirkin's most effective treatment) was contrasted with a "teacher does her own thing" treatment in which teachers were allowed to do anything except measure performance each day and use data decision rules. Teachers in the "do your own thing" condition spent approximately 30 minutes a day instructing pupils while those same teachers instructing pupils in the data decision rule treatment spent approximately 10 minutes per day. Despite this substantial difference in instructional time, students in the data decision rule treatment exceeded the goal attainment of students in the "do your own thing" treatment. When that result is considered in the light of the logistical problems of daily measurement previously described, the possibility for cost benefit resolutions of the issue arise.

White (1971) has suggested that, ideally, assessment should provide the teacher with information to predict eventual success or failure before it actually materializes and permit changes in programs consistent with the daily needs of children. He argued that to do so will result in a much higher degree of success. In his words: "Without continuous analysis of the child's performance, if the child does

run into trouble (in mastering the objective) the problem has grown to grand proportions before it is recognized" (p. 445). It is interesting that from an entirely different perspective, Snow (1977) also proposes that the evaluation question always must focus on whether the instruction worked well for the student. The "key" he suggests is "continuous formative evaluation." The subgroup of applied behavioral psychologists represented by Haring (1969), Haughton (1971, 1972), Kunzelman (1970), Liberty (1972, 1975), Lindsley (1964, 1971), Lovitt (1971), Starlin (1971), White (1971), White and Haring (1976a), in particular, present the potential of behavioral assessment in the formative evaluation of programs for children with learning disabilities. No quotation better represents their point of view than the following one taken from White: "The process of education while it is in operation must be carefully observed, measured and analyzed." (White, 1974, p. 14)

Despite the fact that preliminary research on the efficacy of formative evaluation procedures based on behavioral assessment techniques is encouraging, most of the arguments for using direct and daily measurement are based on the logic that a teacher using such information will, as part of an instructional system, make corrections in the child's program which will lead to problem resolution. The result should be a more efficient system which avoids both "overteaching" and "underteaching" (Lovitt, 1977). Additional arguments for using time series data are based on the need for accountability required by Public Law 94-142, which requires that the effects of children's programs be regularly monitored to determine whether or not they are succeeding.

The requirement for regular monitoring as stated in the law is imprecise, however, and periodic review may occur as infrequently as two or three times per year.

Perspective #17

A program's effectiveness is ultimately evaluated by 1) whether or not performance discrepancies have been eliminated, and 2) whether data revealing the relationship between interventions and outcomes can be provided.

Where formative evaluation is directed toward assessment for the purpose of improving an instructional program provided for the child, summative evaluation is designed to answer the more general question of whether intervention in the form of learning disabilities service proved to be effective. At the present time educators tend to rely heavily upon the use of standardized tests initially for purposes of identification and finally for evaluation of program effects. A kind of security exists in the use of instruments which are more generally referred to as standardized, despite the fact that few of these instruments are technically adequate with respect to the purposes for which they are used (Ysseldyke, 1977). The general practice for evaluating the outcomes of programs seems to be to give a standardized achievement test at approximately the onset of learning disabilities services, and to follow that with the administration of the same or similar tests on an annual basis. Rates of gain while in the program are then contrasted with rates of gain prior to program entry when reaching conclusions about the effectiveness of the program. The problem with using such an approach is clearly identified in an article by Eaton and

Lovitt (1972), in which they provide data for six different students who were given the Metropolitan Achievement Test, the Wide Range Achievement Test and were placed in the Basal Reading Series based on direct assessment of oral reading performance in that series. The results from Fall and Spring testing show that large differences existed in pre- and post-achievement test scores for the same student as a function of the test used. Further, the standardized test data in some instances are at wide variance with the student's placement in the reading series based on direct measurement of oral reading. The disparities in achievement test data are the greatest for one student who shows approximately a three grade level change in performance on the Metropolitan Achievement Test from fall to spring and approximately an eight grade level change on the Wide Range Achievement Test during the same period. A similar inconsistency of results based on the type of test used can be found in a study by Samuels (1971), in which he used three different tests to determine the magnitude of the student's reading deficit. The issue is, of course, one of the reliability of tests for making predictions regarding individual student performance. While test developers generally acknowledge that tests predict group performance rather than individual performance, educators in evaluating programs tend to use group tests to measure individual achievement. An additional problem concerns the content validity of the widely used achievement tests. In a recent paper, Jenkins and Pany (1978) presented an analysis of the bias of specific standardized reading tests toward particular curricula. They concluded that "the data from the present investigation strongly suggests that a basic assumption under-

lying standardized achievement measures--that they representatively sample different curricula--is largely without support; clear, significant biases appear to exist" (p. 452). They go on to argue that "what educators need is an instrument to measure learning that is sensitive to curricular differences" (p. 453).

While substantial arguments can be raised regarding the invalidity and the unreliability of standardized achievement tests for assessing individual student performance, pretesting and posttesting as evaluation practice is an approach fraught with even greater logical problems. Campbell and Stanley (1963) have pointed out that pre- and post-testing as a basis for drawing reasonable conclusions about the effects of interventions is a "bad example" of research design since the observed changes in performance from pre- to posttesting cannot be attributed to treatments applied during the intervening period. When pre- and posttesting is applied as an evaluation design it may be reasonably safe to conclude that the discrepancy identified during initial assessment for purposes of identification will be smaller during posttesting (though regression effects are common). The purpose of summative evaluation however is to determine whether or not the program provided to the child was in fact the reason why the discrepancy has decreased. An evaluation design must be created which rules out potential threats to internal validity which are common whenever such a conclusion is sought. At the present time, time series research designs offer the greatest potential for controlling potential threats to internal validity. Since program effectiveness must be evaluated with respect to the individual child's performance, evaluation procedures which rely on groups

are not useful. Time series research designs can be applied to the treatment programs provided for learning disabled youngsters to appraise the effects of services which have been delivered. This is true only if sufficient data collection has occurred during initial assessment and subsequently during programming.

An example of the use of time series data to evaluate treatment effects can be found in a study by Walker and Hopps (1976), in which they not only collected time series data on individual student performance, but also sampled individual student's peers to develop nonequivalent comparison groups to strengthen the evaluation design. In most behavioral research designs the effectiveness of the treatment is determined by replication of the change from a baseline to a treatment condition. Since the implementation of earning disabilities services constitutes a treatment, if sufficient baseline data are developed, the effect of implementing service on the level and trend of student performance should be observable in the data. Time series research designs are not without their limitations in ruling out plausible rival hypotheses however (Campbell & Stanley, 1963), and Walker and Hopps' use of nonequivalent comparison groups is an important contribution to the design of evaluation procedures for determining the effects of treatment. A more complete description of how nonequivalent control groups can be used to evaluate interventions for learning disabled children is presented by Deno and Mirkin (1977).

We need to underscore here what we have stated previously regarding the use of behavioral data and the assessment of programs for learning disabled children. The data which behavioral educators collect

during assessment for purposes of identification and the procedures used for collecting that data are the same data and the same procedures which are subsequently used in program planning and in formative and summative evaluation of learning disabilities services. The effect of this continuity in data collection from initial referral to final evaluation is to provide greater integration of the major phases of programming and enable program developers to continually focus on the specific problems which were the basis for the original referral and provision of learning disability services.

## Conclusion

In presenting the behavioral approach to assessing children's school related problems, we have attempted to identify those "perspectives" which, together, provide a context for considering the identification, planning, and evaluation decisions which must be made when providing learning disabilities services. As stated initially, we have limited our focus to perspectives which have clear implications for assessment. The result of limiting the focus to assessment was that the perspectives were derived primarily from the assumptions and the methodology of behavioral research rather than the behavioral principles which have been abstracted as a result of taking a behavioral approach to research. As we stated early in the paper, however, we believe that behavioral principles can be used to improve the educational programs of children with learning disabilities. For that reason we would encourage responsible decision makers to seek new solutions to developing effective interventions through applying behavioral principles as well as to develop new assessment procedures based on the behavioral approach.

While the primary outcome of our effort has been to identify a set of relevant perspectives we have, in the process, been able to generate a variety of questions which should be answered in attempts to improve learning disabilities services. We shall close this paper by restating some of those questions.

1. What is the purpose of identifying a student as learning disabled beyond legitimating the expenditures of special education monies? Said differently, is the likelihood great enough that we will ever be able to

differentially prescribe treatments based on our initial classification into such a gross category to warrant spending extensive resources on developing identification procedures?

2. What are the different effects of taking a situation-centered rather than a person-centered approach to assessment in developing learning disabilities services? Are schools and parents more or less satisfied? Do the populations of children served differ? Is one approach more cost effective?
3. To what extent is repeated behavior sampling necessary for making the identification, planning, and evaluation decisions made in providing learning disability services? Are the decisions improved? If so, what performance data shall be obtained? How shall it be obtained? By whom shall it be obtained?

References

Asher, S. R. Children's peer relations. In M. E. Lamb (Ed.), Socio personality development. New York: Holt, Rinehart, & Winston, in press.

Baker, E. L. Effects on student achievement of behavioral and non-behavioral objectives. Journal of Experimental Education, 1969, 37, 5-8.

Becker, W., Engelmann, S., & Thomas, D. Teaching: A course in applied psychology. Chicago: SRA, 1971.

Bergan, J. R. Behavioral consultation, Columbus, Ohio: Charles E. Merrill, 1977.

Bijou, S. Practical implications of an interactional model of child development. Exceptional Children, 1977, 44(1), 6-15.

Bijou, S., & Baer, D. Child development: A systematic and empirical theory (Vol. 1). New York: Appleton-Century-Crofts, 1961.

Bishop, D. D. Effectiveness of prior exposure to performance objectives as a technique for improvement of student recall and attention. Unpublished doctoral dissertation, Ohio State University, 1969.

Bloom, G., & Jones, A. Bases of classification of reading disorders. Journal of Learning Disabilities, 1970, 3, 606-607.

Blunden, D., Spring, C., & Greenberg, L. Validation of the classroom behavior inventory. Journal of Consulting and Clinical Psychology, 1974, 42 (1), 84-88.

Boardman, D. Effect of students' advanced knowledge of behavioral objectives on their achievement in remedial chemistry. Unpublished doctoral dissertation, University of California, Los Angeles, 1970.

Bohannon, R. Direct and daily measurement procedures in the identification and treatment of reading behaviors of children in special education. Unpublished doctoral dissertation, University of Washington, Seattle, Washington, 1975.

Bryan, T. An observational analysis of classroom behaviors of children with learning disabilities. Journal of Learning Disabilities, 1974, 7(1), 26-34.

Bryan, T. Social relationships and verbal interactions of learning disabled children. Journal of Learning Disabilities, 1978, 11, 107-115.

Bryan, T. H., & Bryan, J. H. Understanding learning disabilities. Port Washington, N.Y.: Alfred Publishing, 1975.

Bryan, T., & McGrady, H. J. Use of a teacher rating scale. Journal of Learning Disabilities, 1972, 5, 199-206.

Bryan, T. S., & Wheeler, R. Perception of LD children: The eye of the observer. Journal of Learning Disabilities, 1972, 5(8), 484-488.

Bryan, T., Wheeler, R., Felcan, J., & Henek, T. Come on dummy: Children's comprehension of non-verbal comprehension. Journal of Learning Disabilities, 1976, 9, 661-669.

Campbell, D. T. Reforms as experiments. American Psychologist, 1969. 24, 409-429.

Campbell, D. T., & Stanley, J. C. Experimental and quasi-experimental designs for research. Chicago: Rand McNally, 1963.

Cantrell, R. P., & Cantrell, M. L. Preventive mainstreaming: Impact of a supportive services program on pupils. Exceptional Children, 1976, 42, 381-386.

Cimenero, A., Calhoun, K., & Adams, H. Handbook of behavioral assessment. New York: John Wiley & Sons, 1977.

Cobb, J. A. Relation of discrete classroom behaviors to fourth grade academic achievement. Journal of Educational Psychology, 1972, 63(1), 74-80.

Crutcher, C. E., & Hofmeister, A. M. Effective use of objectives and monitoring. Teaching Exceptional Children, 1975, 7(2), 78-80.

Dalis, G. T. Effect of precise objectives upon student achievement in health education. Journal of Experimental Education, 1970, 39(2), 20-23.

Deno, S., & Jenkins, J. On the behaviorality of behavioral objectives. Psychology in the Schools, 1969, 6(1), 18-24.

Deno, S., & Mirkin, P. Data-based program modification: A manual. Minneapolis, Minn.: Leadership Training Institute/Special Education, University of Minnesota, 1977.

Doty, C. R. Effect of practice and prior knowledge of educational objective on performance. Unpublished doctoral dissertation, Ohio State University, 1968.

Duchastel, P. C., & Merrill, P. F. The effects of behavioral objectives on learning: A review of empirical studies. Review of Educational Research, 1973, 43(1), 53-69.

Eaton, M. D., & Lovitt, T. C. Achievement tests vs. direct and daily measurement. In G. Semb (Ed.), Behavior analysis and education. Lawrence, Kans.: University of Kansas, 1972.

Engel, R. S. An experimental study of the effect of stated behavioral objectives on achievement in a unit on numeration. Unpublished master's thesis, University of Maryland, 1968.

Federal Register, October 11, 1973, 38(196), 23230-23231.

Federal Register, December 29, 1977, 42(250).

Ferster, C. B., Culbertson, B., & Perrott, M. C. Behavior principles, New York: Appleton-Century-Crofts, 1975.

Forness, S., & Esveldt, K. Prediction of high-risk kindergarten children through classroom observation. Journal of Special Education, 1975, 9(4), 375-387.

Fox, W., Egner, A., Paolucci, P., Perelman, P., & McKenzie, H. An introduction to a regular classroom approach to special education. In E. Deno (Ed.), Instructional alternatives for exceptional children. Minneapolis, Minn.: Leadership Training Institute for Special Education, University of Minnesota, 1973.

Gardner, W. I. Learning and behavior characteristics of exceptional children and youth. Boston: Allyn & Bacon, 1977.

Gelfand, D., & Hartmann, D. Child behavior analysis and therapy. New York: Pergamon, 1975.

Glass, G. V., Willson, V. L., & Gottman, J. M. Design and analysis of time-series experiments. Boulder, Colo.: Laboratory of Educational Research, University of Colorado, 1975.

Hall, R. V. Managing behavior (Vol. 1). Lawrence, Kansas: H & H Enterprises, 1971.

Hammill, D. D., & Larsen, S. C. The effectiveness of psycholinguistic training. Exceptional Children, 1974, 41, 5-14.

Hammill, D. D., & Larsen, S. C. The effectiveness of psycholinguistic training: A reaffirmation of position. Exceptional Children, 1978, 44(6), 402-417.

Haring, N. The application of functional analysis of behavior by teachers in a natural school setting. Seattle: Washington University, 1969.

Haring, N. G., & Bateman, B. Teaching the learning disabled child. Englewood Cliffs, N.J.: Prentice-Hall, 1977.

Haring, N. G., & Ridgeway, R. W. Early identification of children with learning disabilities. Exceptional Children, 1967, 33(6), 387-395.

Haughton, E. Great gains from small starts. Teaching Exceptional Children, 1971, 3(3), 141-146.

Haughton, E. Aims-growing and sharing. In J. Jordan and L. S. Robbins (Eds.), Let's try doing something else kind of thing. Arlington, Va.: Council for Exceptional Children, 1972.

Hersen, M., & Bellack, A. A. Behavioral assessment: A practical handbook. New York: Pergamon Press, 1976.

Hively, W., & Reynolds, M. C. (Eds.) Domain-referenced testing in special education. Minneapolis, Minn.: Leadership Training Institute/Special Education, University of Minnesota, 1975.

Honig, W. Operant behavior: Areas of research and application. New York: Appleton-Century-Crofts, 1966.

Hong, W., & Staddon, J. E. R. (Eds.). Handbook of operant behavior. Englewood Cliffs, N. J.: Prentice Hall, 1977.

Jenkins, J., & Deno, S. A model for instructional objectives: Responsibilities and advantages. Educational Technology, 1970, 10(12), 11-16.

Jenkins, J., & Deno, S. Influence of knowledge and type of objectives on subject-matter learning. Journal of Educational Psychology, 1971, 62(1), 67-70.

Jenkins, J., Mayhall, W., Peschka, C., & Townsend, V. Using direct and daily measures to increase learning. Journal of Learning Disabilities, 1974, 10, 604-608.

Jenkins, J., & Pany, D. Standardized achievement tests: How useful for special education? Exceptional Children, 1978, 44(6), 448-453.

Kauffman, R. A. A possible integrative model for the systematic and measurable improvement of education. American Psychologist, 1971, 26, 250-256.

Kazdin, A. E. Behavior modification in applied settings. Homewood, Ill.: The Dorsey Press, 1975.

Keogh, B. K., & Smith, C. E. Early identification of educationally high potential and high risk children. Journal of School Psychology, 1970, 8, 285-290.

Kirk, S., & Elkins, J. Characteristics of children enrolled in the Child Service Demonstration Centers. Journal of Learning Disabilities, 1975, 8(10), 630-637.

Klein, S., Fenstermacher, G., & Aiken, M. C. The center's changing evaluation model. Evaluation Comment, 1971, 2(4), 9-12.

Kunzelmann, H. (Ed.). Precision teaching: An initial training sequence. Seattle: Special Child Publications, 1970.

Kunzelmann, H. Learning screening and the identification of specific learning problems without being racially or culturally discriminatory. Presented at the CEC Topical Conference on Individualized Educational Plans, Albuquerque, N.M., February 1-3, 1978.

Liberty, K. Data decision rules (Unpublished working paper #20). Eugene, Oregon: Regional Resource Center, University of Oregon, 1972.

Liberty, K. A. Decide for progress: Dynamic aims and data decisions. Seattle: Experimental Education Unit, Child Development and Mental Retardation Center, University of Washington, Seattle, 1975.

Lilly, M. S. A training based model for special education. Exceptional Children, 1971, 37, 745-49.

Linsdley, O. R. Direct measurement and prosthesis of retarded behavior. Journal of Education, 1964, 147, 62-81.

Lindsley, O. R. Precision teaching in perspective: An interview with Ogden R. Lingsley. Teaching Exceptional Children, 1971, 3(3), 114-119.

Lund, K. A., Foster, G. E., & McCall-Perez, F. C. The effectiveness of psycholinguistic training: A reevaluation. Exceptional Children, 1978, 44, 310-319.

Lovitt, T. C. Assessment of children with learning disabilities. Exceptional Children, 1967, 34(4), 233-239.

Lovitt, T. C. Assessment of children with learning disabilities. In R. H. Bradford (Ed.), Behavior modification in learning disabilities. San Rafael, Calif.: Academic Therapy Publications, 1971.

Lovitt, T. C. In spite of my resistance, I've learned from children. Columbus, Ohio: Charles E. Merrill, 1977.

Lovitt, T., Schaff, M., & Sayre, E. The use of direct and continuous measurement to evaluate reading materials and procedures. Focus on Exceptional Children, 1970, 2, 1-11.

Mager, R. F. Preparing objectives for programmed instruction. San Francisco: Fearon Press, 1962.

Mager, R. F., & Pipe, P. Analyzing performance problems or 'You really oughta wanna'. Belmont, Calif.: Lear Siegler, Fearon Publishers, 1970.

Magliocca, L., Rinaldi, R., Crew, J., & Kunzelmann, H. Early identification of handicapped children through a frequency sampling technique. Exceptional Children, 1977, 43(7), 414-420.

McCarthy, J. J., & McCarthy, J. F. Learning disabilities. Boston: Allyn & Bacon, 1969.

McNeill, J. D. Concomitants of using behavioral objectives in the assessment of teacher effectiveness. Journal of Experimental Education, 36(1), 1967, 69-74.

Minskoff, E. Research on psycholinguistic training: Critique and guidelines. Exceptional Children, 1975, 42, 136-144.

Mirkin, P. A comparison of the effects of three evaluation strategies and contingent consequences on reading performance. Unpublished doctoral dissertation, University of Minnesota, 1978.

Newcomer, P., Larsen, S. C., & Hammill, D. D. Reaction to Dr. McLeod's viewpoint. In P. Newcomer & D. D. Hammill (Eds.), Psycholinguistics in the schools. Columbus, Ohio: Charles E. Merrill, 1976.

Novack, H. S., Bonaventura, E., & Merenda, P. F. A scale for early detection of children with learning problems. Exceptional Children, 1973, 40, 98-105.

Ohlson, E. L. Identification of specific learning disabilities. Champaign, Ill.: Research Press, 1978.

Parker, R. K., Sperr, S. J., & Rieff, M. L. Multiple classification: A training approach. Developmental Psychology, 1972, 7(2), 188-194.

Peter, L. J. Individual instruction. New York: McGraw-Hill, 1972.

Popham, W. J., & Husek, T. R. Implications of criterion-referenced measurement. Journal of Educational Measurement, 1969, 6, 1-9.

Rhodes, W. C. The disturbing child: A problem of ecological management. Exceptional Children, 1967, 33, 449-455.

Rimm, D. C., & Masters, J. C. Behavior therapy: Techniques and empirical findings. New York: Academic Press, 1974.

Ross, A. O. Learning difficulties of children: Dysfunctions, disorders, disabilities. In H. Dupont (Ed.), Educating emotionally disturbed children. New York: Holt, Rinehart and Winston, 1969, Pp. 39-49.

Salvia, J., & Ysseldyke, J. Assessment in special and remedial education. Boston: Houghton Mifflin, 1978.

Samuels, S. J. Success and failure in learning to read. In F. B. Davis (Ed.), The literature of research in reading with emphasis on models. Rutgers, N.J.: Graduate School of Education, 1971.

Schoenfeld, W. N. The "response" in behavior theory. Pavlovian Journal, 1976, 2(3), 129-149.

Sidman, M. Tactics of scientific research. New York: Basic Books, 1960.

Skinner, B. F. Science and human behavior. New York: Macmillan, 1953.

Skinner, B. F. Contingencies of reinforcement: A theoretical analysis. New York: Appleton-Century-Crofts, 1969.

Smith, S. A. The effects of two variables on the achievement of slow learners on a unit in mathematics. Unpublished Master's thesis. University of Maryland, 1967.

Spivak, G., Swift, M., & Prewitt, J. Syndromes of disturbed classroom behavior. A behavioral diagnostic system for elementary schools. Journal of Special Education, 1971, 5, 269-292.

Starlin, C. Evaluating progress toward reading proficiency. In B. Bateman (Ed.), Learning disorders (Vol. 4). Seattle: Special Child Publications, 1971.

Steiner, R. L. The case for competency-based education. The Science Teacher, 1975, 42(10), 17-18.

Stephens, T. M. Directive teaching of children with learning and behavioral handicaps (2nd ed.). Columbus, Ohio: Charles E. Merrill, 1976.

Terrace, H. S. Toward a doctrine of radical behaviorism. Contemporary Psychology, 1970, 15, 531-535.

Tharp, R. G., & Wetzel, R. J. Behavior modification in the natural environment. New York: Academic Press, 1969.

Thurlow, M., & Ysseldyke, J. Assessment in the Child Service Demonstration Centers for learning disabled children. Unpublished manuscript, University of Minnesota, 1978.

Thurlow, M. L., & Ysseldyke, J. E. Current assessment and decision-making practices in model programs for the learning disabled (Research Report No. 11). Minneapolis: University of Minnesota, Institute for Research on Learning Disabilities, 1979.

Tiemann, P. W. Student use of behaviorally stated objectives to augment conventional and programmed revisions of televised college economics lectures. Paper presented at annual meeting of the American Educational Research Association, Chicago, 1968.

Tyler, R. W. Basic principles of curriculum and instruction. Chicago: University of Chicago Press, 1950.

Venezky, R. Prereading skills: Theoretical foundation and practical applications. (Theoretical Paper No. 54). Madison, Wisc.: Wisconsin Research and Development Center for Cognitive Learning, 1975.

Wallace, G., & McLoughlin, J. A. Learning disabilities: Concepts and characteristics. Columbus, Ohio: Charles E. Merrill, 1975.

Walker, H. M., & Hopps, H. Use of normative peer data as a standard for elevating classroom treatment effects. Journal of Applied Behavior Analysis, 1976, 9(2), 159-168.

White, O. R. Glossary of behavioral terminology. Champaign, Ill.: Research Press, 1971.

White, O. R. Methods of data analysis in intensive designs. Paper presented at the American Educational Research Association's national convention in a symposium entitled "The intensive approach in counseling," Carl E. Thoreson, organizer, John D. Drumboltz, chairman, April, 1972.

White, O. R. Evaluating the educational process (Working paper). Seattle: University of Washington, Experimental Education Unit, 1974.

White, O. R. Behaviorism in special education: An arena for debate. In R. D. Kneedler & S. G. Tarver (Eds.), Changing perspectives in special education. Columbus, Ohio: Charles E. Merrill, 1977.

White, O. R., & Haring, N. G. Exceptional teaching: A multimedia training package. Columbus, Ohio: Charles E. Merrill, 1976. (a)

White, O. R., & Haring, N. Working paper No. 16. Eugene: University of Oregon, Regional Resource Center for Handicapped Children, 1976. (b)

Ysseldyke, J. E. State of the art in the assessment of the learning disabled child (Research Report No. 1). Minneapolis: Institute for Research on Learning Disabilities/University of Minnesota, 1977.

Ysseldyke, J. E., & Salvia, J. A critical analysis of the assumptions underlying diagnostic-prescriptive teaching. Exceptional Children, 1974, 41, 181-195.

## PUBLICATIONS

Institute for Research on Learning Disabilities
University of Minnesota

The Institute is not funded for the distribution of its publications. Publications may be obtained for $2 per document, a fee designed to cover printing and postage costs. Only checks and money orders payable to the University of Minnesota can be accepted. All orders must be prepaid.

Requests should be directed to: Editor
Institute for Research on Learning Disabilities
350 Elliott Hall
75 East River Road
University of Minnesota
Minneapolis, Minnesota 55455

Ysseldyke, J. E. Assessing the learning disabled youngster: The state of the art (Research Report No. 1). November, 1977.

*Ysseldyke, J. E. Research and development plan: University of Minnesota Institute for Research on Learning Disabilities (Monograph No. 1). June, 1978.

*Ysseldyke, J. E., & Thurlow, M. L. (Eds.). Synthesis of the knowledge base: Identification and assessment of learning disabled children (Monograph No. 2). June, 1978.

*Ysseldyke, J. E. Organizational plan for Minnesota's Institute for Research on Learning Disabilities (Monograph No. 3). June, 1978.

*Ysseldyke, J. E., & Thurlow, M. L. Specific investigations to be completed during years two and three (Monograph No. 4). June, 1978.

*Ysseldyke, J. E., & Thurlow, M. L. Training opportunities at Minnesota's Institute for Research on Learning Disabilities (Monograph No. 5). June, 1978.

*Ysseldyke, J. E. Client base (Monograph No. 6). June, 1978.

Ysseldyke, J. E., & Regan, R. R. Nondiscriminatory assessment and decision making (Monograph No. 7). February, 1979.

**Thurlow, M., & Ysseldyke, J. Assessment in the child service demonstration centers for learning disabled children (Research Report No. 2). March, 1979.

---

*As part of its continuation proposal, the Institute was required to prepare these monographs. Because they are part of the proposal, they are not available for general distribution.

**This research report is not being distributed by the Institute. Requests for it should be directed to: The NETWORK, 290 S. Main Street, Andover, Massachusetts 01810.

Foster, G., Algozzine, B., & Ysseldyke, J. Susceptibility to stereotypic bias (Research Report No. 3). March, 1979.

Algozzine, B. An analysis of the disturbingness and acceptability of behaviors as a function of diagnostic label (Research Report No. 4). March, 1979.

Algozzine, B., & McGraw, K. Diagnostic testing in mathematics: An extension of the PIAT? (Research Report No. 5). March, 1979.

Deno, S. L. A direct observation approach to measuring classroom behavior: Procedures and application (Research Report No. 6). April, 1979.

Ysseldyke, J. E., & Mirkin, P. K. Proceedings of the Minnesota round-table conference on assessment of learning disabled children (Monograph No. 8). April, 1979.

Somwaru, J. P. A new approach to the assessment of learning disabilities (Monograph No. 9). April, 1979.

Algozzine, B., Forgnone, C., Mercer, C. D., & Trifiletti, J. J. Toward defining discrepancies for specific learning disabilities: An analysis and alternatives (Research Report No. 7). June, 1979.

Algozzine, B. The disturbing child: A validation report (Research Report No. 8). June, 1979.

Ysseldyke, J. E., Algozzine, B., Regan, R., & Potter, M. Technical adequacy of tests used by professionals in simulated decision making (Research Report No. 9). July, 1979.

Jenkins, J. R., Deno, S. L., & Mirkin, P. K. Measuring pupil progress toward the least restrictive environment (Monograph No. 10). August, 1979.

Mirkin, P. K., & Deno, S. L. Formative evaluation in the classroom: An approach to improving instruction (Research Report No. 10). August, 1979.

Thurlow, M. L., & Ysseldyke, J. E. Current assessment and decision-making practices in model programs for the learning disabled (Research Report No. 11). August, 1979.

Deno, S. L., Chiang, B., Tindal, G., & Blackburn, M. Experimental analysis of program components: An approach to research in CSDC's (Research Report No. 12). August, 1979.

Ysseldyke, J. E., Algozzine, B., Shinn, M., & McGue, M. Similarities and differences between underachievers and students labeled learning disabled: Identical twins with different mothers (Research Report No. 13). September, 1979.

Ysseldyke, J., & Algozzine, R. Perspectives on assessment of learning disabled students (Monograph No. 11). October, 1979.

Poland, S. F., Ysseldyke, J. E., Thurlow, M. L., & Mirkin, P. K. Current assessment and decision-making practices in school settings as reported by directors of special education (Research Report No. 14). November, 1979.

McGue, M., Shinn, M., & Ysseldyke, J. Validity of the Woodcock-Johnson psycho-educational battery with learning disabled students (Research Report No. 15). November, 1979.

Deno, S., Mirkin, P., & Shinn, M. Behavioral perspectives on the assessment of learning disabled children (Monograph No. 12). November, 1979.