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ABSTRACT

There has been an increasing call for school psychologists to spend time collecting data that are functionally related to the planning of academic interventions. In order to identify the problem and plan for remediation, data must be taken that bear directly on the child's academic problems in the classroom and the curricular sequences actually utilized in instruction. Not all referred problems are a result of skill deficits. The difference between skill and performance deficits lies in the fact that skill deficits may require the acquisition of new behaviors before progress can occur, while performance deficits require changing the level of performance of already acquired skills. If assessment data are to be functionally related to interventions, objective measures should be established that may be taken repeatedly; environmental events that are related to the problem or may be manipulated to solve the problem should be analyzed. Several variables consistently appear related to academic achievement: time allotted for instruction, academic engaged time, content covered, and direct instruction. It is suggested that information regarding environmental variables should be collected through a specifically structured problem identification interview as well as through standardized classroom observations. There are many published descriptions of successful behavior interventions, some involving detailed alterations of instructional and teaching behaviors. A decision about what type of intervention to employ clearly depends on the analysis of relationships among assessment data, analysis of available resources, and degree of permissible intrusiveness in classroom structure. (LLL)

BEHAVIORAL APPROACHES TO THE ASSESSMENT AND REMEDIATION OF ACADEMIC PROBLEMS

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It appears well documented that school psychologists spend a majority of their time involved in the assessment and placement of children in special education (e.g. Hughes, 1979). Most of the data collected during this process appear normative in nature, at least for academically related variables, as is appropriate in specifying degree of deviance. Even so, evidence increasingly indicates that data collected during an assessment may play little part in classification decisions (Thurlow & Ysseldyke, 1979), or that many measures are collected on hypothetical processes with no demonstrable functional relationship to the acquisition of academic skills (Arter & Jenkins, 1978; Ysseldyke & Mirkin, 1982). Additionally, the type of data that are collected, (e.g. IQ, achievment, perceptual process measures, seem to indicate an explicit or implicit assumption on the part of school psychologist that assessment of variables located "within the child" is all that is needed to define or treat academic problems. Such a conceptualization clearly ignores both the relationship of the classroom ecology to manifestation of academic problems, and the data about efficacious interventions with academic problems (Kazdin, 1982). In this light there has been an increasing call for school psychologists to spend time collecting data that are functionally related to the planning of academic interventions (e.g. Ysseldyke & Mirkin, 1982).

This paper will outline a set of basic premises and alternative assessment procedures for school psychologists that still allows for description of the degree of difference between expected and actual achievement but also lead to a functional analysis of events contri-

buting to the problem, and to the use of collected data in planning and implementing interventions. The suggested procedures will be recognized as basic applied behavior analysis; however, a unique conceptualization of specific classroom variables, materials, and measures related to academic problems is offered. It is assumed that the procedures would be used by a school psychologist operating within a consultation model (Bergan, 1977) or a behavioral school psychology model (Bentz & Shapiro, in press). The scope of the paper is limited to academic problems.

Basic premises. It is held that children are referred to school psychologists because someone was concerned about the discrepancy between the actual child performance, and expected performance in one or more academic areas. Several assumptions follow this. First, that one desired eventual outcome of the referral is to increase the level of student performance to acceptable or expected levels. Secondly, that it is the discrepancy between actual and desired performance that must be assessed and targeted for intervention. In order to make assessment data effectively relate to intervention an analysis of contributing variables must be conducted as well as an identification of the actual academic problem.

Most norm based measures of academic achievment or variables hypothesized to be causal of poor achievement are inadequate for this purpose for several reasons. Standardized achievement tests do not overlap different curricular sequences in a uniform fashion (Jenkins & Pany, 1978; Leinhardt & Seewald, 1982), thus either not measuring skills in which a student has been provided instruction; or assessing skills in which no instruction has been provided. The degree

of bias between various tests is often quite large (note 1). The conceptualization and assessment of variables causing poor academic performance within current practice likewise seems awry. Faulty learning styles, gleaned from IQ tests or other measures, perceptual deficits, or information processing deficits often assessed by school psychologists have not been functionally demonstrated to be causal variables (Arter & Jenkins, 1978; Ysseldyke & Mirkin, 1982) in academic problems. In order to effectively identify the problem and plan for remediation, data must be taken that directly bear on the child's academic problems in the classroom and the curricula sequences actually utilized in instruction. The following premises are offered to form the basis for an appropriate conceptualization of issues leading to effective assessment and intervention.

(1) An efficient assessment of academic problems should yield a clear description of a child's actual skill levels within the curriculum he/she is being instructed. This always involves use of curriculum based materials, clear delineation of expected placement in a curriculum, and direct assessment with curriculum based performance measures that may be repeated so that the impact of an intervention can be described and evaluated.

(2) An efficient assessment always involves a formal, in classroom assessment of the student's interaction with classroom variables that have a demonstrated functional relationship to classroom achievement. These variables include immediately impinging environmental events, various setting events, and teacher planning behaviors.

(3) Given an efficient assessment, the resources and requirements for a successful intervention may be delineated, thus clarifying the need for possible special education involvement.

(4) Not all academic problems result from deficit student skills; they very often result from inefficient or detrimental classroom practices.

(5) Choice of intervention must always take 4 (above) into account and consider the least intrusive alteration of classroom practices necessary for successful intervention. The effects of interventions must be continually assessed with the direct measures developed during intervention.

Performance vs. skills deficits. It seems clear from examining the literature on interventions with academic problems, that not all referred problems are a result of skills deficits. A differentiation between skills and performance deficits lies in the fact that skills deficits may require the acquisition of new behaviors before progress can occur, while performance deficits require changing the level of performance of already acquired skills. It has been demonstrated that some serious referring complaints can be remediated through manipulation of consequent events without a concurrent manipulation of antecedent or instructional events (e.g. Kazdin, 1982). Such problems, then, are not necessarily a result of the child lacking specific skills or abilities but are more positively conceptualized as a failure to perform or to make adequate progress because the environment does not adequately reinforce expected behaviors. In fact, once a child is placed in a curriculum at the appropriate point (see below) the problem is often to enhance rate of progress through the curriculum-normal instruction may not need to be altered, although consequation of performance must be. There are implications for assessment derived from such a conceptualization. For example, a school psychologist need not conduct a fine-grained assessment of all subskills in an academic area unless it is clear that a successful intervention requires such assessment. In that case the necessary assessment of intervention planning could still derive from direct measures such as timed skill probes, and/or the assessment of appropriate curriculum placement (see below).

Given these assumptions, the initial task of assessment is to identify expected levels of performance (i.e., expected materials that should have been covered and mastered) identify where in the curriculum

the child's actual skills would place him/her, and to determine if a more minute analysis of skills needs to be accomplished so that progress through a curriculum is possible. If the child appears to have the desired skills, then the problem is conceptualized as one of performance deficit, and completion and accuracy of required work should be a target of intervention and assessment. This is somewhat in contrast to common practices, where if the tested deviancy of a student does not meet certain cutoffs, the student typically does not receive furthur psychological services.

Identifying specific academic problems. The fact that curriculum-test overlap may not be sufficient for describing the discrepancy between actual and expected sutdent skills doesn't seem to negate the necessity for such a description. If assessment data are to be functionally related to interventions, a clear description of such a discrepancy is necessary so that both the quantity of curricular materials or objectives to be instructionally covered and specific treatment goals may be established. A second requirement to be met in connecting assessment and intervention is the establishment of measures that may be taken repeatedly in order to continuously evaluate the adequacy of intervention procedures. A final requirement for completing the connection is an analysis of environmental events that are already related to the problem or that may be maniuplated to solve the problem (see below).

A well documented set of procedures exists to meet the first two requirements--the data based procedures described by Deno and Mirkin, (1977), and Lovitt (1981). Basically, these procedures involve two levels of assessment: progress assessment in terms of curriculum content or skill objectives that would need to be covered during intervention;

and collection of performance data on more specific immediate skill objectives or on "vital signs" (Deno et al, 1983) of performance in an area like reading. These latter assessments are made to clearly specify at what point in a basic skills sequence a student can successfully perform, to establish curriculum specific treatment goals, and to provide continuous progress assessment. These measures typically involve closely specifying the dimensions of a skill to be assessed (e.g., computation of addition facts, sums 0-10) and developing probes containing a number of problems constructed along the defined dimensions. Data in the form of rates or percent correct are produced. Such measures have been developed for numerous math skills, oral reading skills, reading comprehension, handwriting, spelling, story problems in math, and so forth (Deno et al, 1983; Deno & Mirkin, 1978; Lovitt, 1981). The probes are used both for baseline and post intervention data.

For example, placement in a reading curriculum at the appropriate level of student competence may be accomplished by timed probes of oral reading within the sequential books of the reading series. Criterion levels of correct and incorrect words read per minute and percent correct on comprehension questions have been established for minimal success in any level reading materials (Deno & Mirkin, 1978). The brief timed probes may then be frequently administered so that the difficulty level of reading materials may be increased systematically and to provide a continuous "vital sign" of reading ability ability in order to assess the impact of any discrete intervention. It is emphasized that repeated oral reading probes have proven quite sensitive to interventions such as specific phonics instruction in reading (Lovitt & Hurlburt, 1978). Likewise repeated math skill probes have been shown sensitive

to the effects of various interventions (Lovitt, 1981). Both types of measures are highly correlated with standard achievement tests providing a measure of validity(Lovitt, 1981; Deno et al, 1983). Thus, they provide valid, low response cost baseline measures and continuous direct assessment of the impact of specific interventions on academic performance.

In order to illustrate the use of such measures, assume that a school district uses a basal reading series with 15 levels (books), first to sixth grade. A fourth grade child, who should be performing at book 12 is referred to the school psychologist because of poor performance. Beginning at level 12, the child is asked to read for one minute from three selected passages in each book. In addition he is asked to answer five questions about each passage. The district established criterion instructional level is the book in which at least 60 words/min. are read correctly, fewer than 2-3 words/min. are incorrect, and 80% of the comprehension questions are answered correctly. The student achieve these criteria in book 8--this, then, is the student's actual placement while the expected placement is in book 12. It should be noted that as time passes, the expectancy increases. Thus setting an actual goal for intervention requires deciding how long the intervention will occur, establishing the expected level at the end of that period, and judging the required rate of progress by the discrepancy between actual and extrapolated expectancy. The reading probes may then be taken repeatedly across time in the actual books the child is reading in order to judge the effects of treatment and to decide to move the child into more difficult books.

More specific assessment of skills may be needed to plan interventions, for example assessment of specific phonics skills or vocabulary. Thses are also direct, rppeated, and taken from the

curriculum or matched criterion referenced probes. More detailed performance assessment is made if intervention is specifically to be aimed at these skills. Otherwise, the sequence of instruction within the curriculum is followed and the built in progress assessment procedures are used during intervention. In the latter case intervention is aimed at achieving a rate of progress adequate to meeting the established treatment goals (in terms of desired curriculum placement). A final assessment available for use by the school psychologist is the built in criterion referenced mastery tests (end of book, end of chapter, end of instructional module) that accompany almost all standard reading and math basic skills curricula. These tests, if given in the classroom or given by the psychologist provide very specific information about student mastery on skills previously covered in the curriculum. The author is developing similar procedures to be used with high interest low ability adolescent curricula. In summary, the described assessment procedure results in a clear description of the discrepancy between actual student abilities and specific expected abilities, provides a measure to be repeatedly used to assess progress, and provides for more specific assessment of discrete instructional objectives. These procedures have been demonstrated effective in planning interventions, the probe measures are highly correlated with standard achievement tests, and the procedures can be used by school psychologists (note 2).

Assessing the student-environment interaction. One of the premises within these suggested procedures is that a formal assessment of certain classroom variables and their interaction with student behavior should nearly always be made by the school psychologist during assessment of academic problems. This is somewhat different than the behavioral consultation model suggested by Bergan (1977), where teacher interviews

may be used as the only contact point between psychologist and student. It is strongly believed that full understanding of an academic problem leading to efficacious interventions, can only be attained through some direct, in classroom observation, as well as through teacher interviews.

During the following discussion the variables related to academic problems will be described as separate entities. It should be initially understood that they are highly interrelated, and that the job of the psychologist is to make sense of the relationships for the purpose of problem analysis and planning of intervention. The variables deemed potent in poor academic problems are gleaned from detailed analyses of more traditional educational research (e.g. Rosenshine, 1981), and from a host of small applied behavior analysis studies demonstrating functional relationships in the classroom.

In the general sense several variables consistantly appear related to academic achievement (Rosenshine, 1981): time allotted for instruction; academic engaged time; content covered; and direct instruction. Experimental literature clearly indicates that manipulation of the contingencies of reinforcement and precise determination of antecedent stimulus events are strongly related to improving poor performance (e.g. Bushell, 1978). Finally, teacher use of discrete goals and continued progress monitoring has been shown related to achievement (Lovitt, 1981). This list is not likely exhaustive, but it seems generally sufficient for a true psychologically sound analysis of academic problems.

The following list provides a discrete examination of assessment requirements, drawn from the list of potent variables. (1) The psychologist must assess the absolute amount of time during a school day that is allotted for student instruction or work in a problem area.

(2)A measure of student engagement during instruction or work in the problem area must be taken. While this is approximated by an observational analysis of "on task" behavior, it is more meaningful if an analysis is make of whether or not materials used are appropriate for student skills (see above); if the frequency of accurate student responses in a problem area is assessed; and if the proportion of allotted instructional time that the attention of the child (on task), with high accurate responding, is directed towards teacher instruction and work materials is assessed. In order to make such an assessment a direct observation(s) of instruction must occur. (3) Measures of certain teacher behaviors, mainly the frequency and type of elicitation of student responses, frequency and latency of feedback about accuracy, frequency of evaluative praise or negative comments relating to academic work, and student behavior at the time of contact must be taken. Again, direct observation is required. (4) Contingencies for work accuracy, and work completion should be assessed. For example, what happens for prompt completion and high accuracy? What happens when work is inaccurate or incomplete? These are events beyond immediate teacher verbal behavior. Interview data and direct observation are required. (5) Behaviors competitive with academic engagement should be measured, again with both interviews and observation. It is noted that improper placement in curriculum may result in "acting out" behaviors as well as such behaviors preventing adequate progress. (6) Finally, it is important to assess certain teacher decision making behaviors. These include whether or not specific short and long term instructional goals have been established, whether student performance data are collected and analyzed, whether or not specific academic skills

have been identified for intervention, and what consistant alterations of normal classroom instruction have been made in an attempt to remediate the problem.

It is suggested that the above information be collected through a specifically structured problem identification interview as well as through standardized classroom observations. The author has used an observation code developed by Saudargas (1985) and has found it to yield very useful data for analyzing problems and planning interventions.

Normal classroom environments do not often provide the maximum levels of the above variables and most students still achieve adequately. However, even "normal" students could benefit from more precise environmental management. Furthur, referred students have de facto failed to profit from normal structure, and have been demonstrated (through research) to profit from structured alterations of classroom structures and contingencies. In order to examine the relationship of environmental variables to the problem, the school psychologist should conceptualize that the ideal regular classroom environment for improving academic progress should be structured to: engender high student engagement in appropriate materials (including high accuracy in work), for adequate periods of time; to involve frequent accurate responses that receive frequent teacher feedback; to provide positive consequences for accuracy and completion; to be managed through curriculum based goals and progress monitoring. Student involvement in goal setting and progress monitoring is highly desirable, and may also act as an effective intervention (Van Houton, 1980). As a final note, more precise analysis of actual instructional behavior may be necessary to insure rapid skill acquisition (see Blankenship, 1978;

Carnine, 1980).

Interventions with academic problems. In using relevant assessment information to plan interventions, the resources in terms of time and persons to be involved must be assessed. Given a clear understanding of the discrepancy in terms of materials that must be covered and the classroom environmental variables that need to be altered, decisions about required resources should be facilitated. However, there have been a number of interventions implemented in the regular classroom with few additional resources, that have been demonstrated efficacious, that are "molar" in nature, and clearly involve alteration of one or more of the variables discussed above. Examples of these will be briefly described.

Reading performance has been significantly improved by improving reinforcement for completion and accuracy of reading work (e.g. Holt, 1971; Rapport & Bostow, 1976; Staats & Butterfield, 1965); likewise for spelling accuracy (Lovitt, Guppy, & Blattner, 1978). Interventions have typically involved making access to desired activities or free time contingent on performance. Such interventions as alteration of teacher contact rates (Weiss, Bushell, & McLaughlin,1975), changing the types of work assignments within contingency requirements (fixed page vs. fixed time); and allowing children to skip parts of basal readers and to avoid drill contingent on improved performance (Lovitt & Hanson, 1976) have also been effective in increasing progress through curriculum materials, improving engagement, and improving achievement test scores. None of these interventions require detailed changes in classroom procedures.

The use of peer tutors (Harris & Sherman, 1973; Schwartz, 1977; Greenwood, Sloane, & Baskin, 1976), or community tutors (Staats, Minke,

& Butler, 1970) has been very effective in improving reading and math achievement. Likewise, using parents to reinforce school performance when the children arrive home has been effective (Trovato & Bucher, 1980). Similar programs would not be difficult for school psychologists to start, and are easily implemented for regular education students.

Positive teacher attention contingent on specific academic performance has remediated digit reversals (Hasazi & Hasazi, 1972; Stromer, 1975), and improved handwriting (Trapp, Milner-Davis, Joseph, & Cooper, 1978). Structured provision of feedback to students about performance, graphing performance, and public display of performance results have been effective in improving academic work (Van Houton, & Fall, 1981; Van Houten, 1978). Again, these interventions are inexpensive, don't involve a lot of extra teacher time and are remarkably effective.

There are many other published descriptions of successful behavioral interventions, some also involving detailed alterations of instructional and teaching behaviors (Carnine, 1980; Hendrickson, Roberts, & Shores, 1978; Cullinan, Lloyd, & Epstein, 1981). A decision about what type of intervention to employ clearly depends on the analysis of relationships among assessment data, analysis of available resources, and degree of permissable intrusiveness in classroom structure. School psychologists can accomplish such analyses by following the suggested procedures. Furthur, alteration of the assessment role in the suggested direction does not preclude empirically based assessment of the need for special education (see Lentz & Shapiro, in press).

Summary. Use of direct academic assessment, understanding and assessing classroom variables known to be related to achievement, having a working knowledge of standard curricula used within a school

and using such knowledge and data to plan and evaluate effective interventions are procedures that make the connection between assessment and intervention very explicit. It is believed that use of such procedures takes into account the relationship of child behavior to the surrounding environment and involves a sounder application of basic psychological principles within the school structure. School psychologists can no longer afford to function merely as gatekeepers to special education. Educational institutions, including the legal basis for special services, could change so that others (educational diagnosticians, for instance) could legally perform all required assessments for placements in special education, and do so more cheaply. If school psychologists are to be more valued members of educational institutions, then job roles must be valued. The collection and use of relevant information in the planning of successful remediation of academic problems is one way to insure such evaluation.

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