
FOCUS ON EXCEPTIONAL CHILDREN

CREATING AND EVALUATING REMEDIATION FOR THE LEARNING DISABLED

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REMEDIAL METHODS AND MATERIALS FOR THE LEARNING DISABLED

Inasmuch as the learning disabled constitute one of the most heterogeneous populations of children, the learning disabilities teacher must be able to construct and utilize a great variety of teaching methods and materials. Although it is wondrously simple to do so, it is certainly educationally debilitating to use but one or just a few teaching methods and materials for all learning disabled children. Regrettably, for some types of learning disabilities there are few, if any, published methods and materials. Even if the many published methods and materials are to be used for a particular learning disabled child, they must be modified to his individual learning characteristics. Therefore, the primary purpose of this article is to guide the teacher in creating methods and materials where none exist and in modifying existing methods and materials so that the proper remediation can be provided for any learning disabled child.

Since there is presently a strong and justifiable emphasis on the effectiveness of remediation, a second purpose of this article is to aid the teacher in evaluating the adequacy of the remedial methods and materials she has created or modified for a specific child.

Fortunately, the research on the effectiveness of various remedial methods and materials is growing. The learning disabilities teacher, however, must learn to be a knowledgeable consumer of such research if the current trend of blanket acceptance or rejection of remedial techniques is to be avoided. Hence, a third objective of this article is to provide the learning disabilities teacher with certain criteria for realistically assessing research on the efficacy of remedial methods and materials.

GUIDELINES

The following 12 guidelines are to be used by the teacher as a basis for creating or modifying remedial methods and materials. These guidelines are based on the author's experiences in constructing the *MWM Program for Developing Language Abilities* (Minskoff, Wiseman & Minskoff, 1972). Although many of the examples cited are for learning disabilities in language, these guidelines are applicable to remedial methods and materials for all types of learning disabilities.

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1. Direct Remediation to the Child's Learning Disabilities, Not His Learning Abilities

Remediation must be directed to a child's learning disabilities. If it is not, then the child will have certain areas of development in which he has not reached a basic level of competence. This, in turn, prevents him from mastering certain requirements for school and social adjustment.

Too often remediation is not directed to a child's disability areas because of tenuous assumptions about prerequisite learnings, lack of understanding of the nature of the disability areas, and inadequate diagnosis.

Example of tenuous assumptions: The frequent practice of having a reading disabled child walk a balance beam even though he has no apparent motor problem is tied to the unsupported premise that development of balance is a required skill for reading. After the child has mastered walking the balance beam, he is no more ready to learn to read than previously, and precious learning time has been lost.

Example of lack of understanding: Limited comprehension of the 12 ITPA areas and their relation to the ITPA communication model often leads to inappropriate remediation. The Judy "Sequee" materials, in which a child logically arranges a series of pictures, are often used for a child with a Visual Memory disability. There is no memory component involved in the use of these materials; rather, the association process is involved. Understanding of the ITPA processes would not result in such erroneous usage of materials.

Example of inadequate diagnosis: Remediation of a reading disability that is based solely on reading achievement tests such

as the Wide Range Achievement Test (Jastak & Jastak, 1965) cannot be adequate as there is no information obtained concerning the reading processes of the child. Such information must be ascertained from more comprehensive diagnostic reading tests such as the Spache Diagnostic Reading Scales (Spache, 1963) and from diagnostic teaching.

2. Provide Remediation That Fits the Specific Symptoms of a Child's Learning Disability

There are many different symptoms associated with each type of learning disability. The specific symptoms of each child's disability can be ascertained from diagnostic teaching and from an analysis of the results of screening instruments and standardized achievement and diagnostic tests.

Example: Two children may have disabilities in Auditory Reception. However, one child may have difficulty only in understanding lengthy material such as series of oral directions, while the other child may have difficulty only with specific speech sounds such as rhymes. Obviously, each of these children requires totally different programs of remedial methods and materials.

Example: Some teachers use one method exclusively—such as Fernald's Kinesthetic Method of Teaching Reading (1943) or the Gillingham-Stillman Multi-Sensory Approach (1965)—for all children who have reading disabilities even though some of the children have difficulties with the visual aspects of reading, others with the auditory aspects, and still others with auditory-visual integration. The category of "reading disabilities" is global and cannot be used as the basis for providing remediation without knowledge of the specific symptoms of a child's reading difficulty.

3. Use the Child's Learning Abilities as Aids in Remediating His Learning Disabilities

It is necessary to use a child's learning abilities as instructional aids; therefore, his abilities as well as his disabilities must be determined in the diagnosis. The child's learning abilities are used temporarily until he begins to develop some competence in his disability areas and, when possible, they are phased out. If reliance on his abilities is not gradually eliminated, the child will not learn to function independently in his disability areas.

Example: A 7-year-old has a disability in Auditory Reception (4 year level), but he has an ability in Visual Reception (8 year level). To present only auditory material to such a child is to repeat an approach which has already proven ineffective. Initially, pictures and other visual cues must be used as aids. Once the child progresses to a higher level of functioning in understanding what he hears, these visual cues are gradually dropped and only auditory materials are used.

Example: A 11-year-old boy who has a learning disability in Auditory Memory (6 year level) and a learning ability in the association process (about the 12-year level) can be taught to

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memorize nonmeaningful materials such as the months of the year with the aid of meaningful associations. The 12 months of the year may be separated into seasonal groupings with the meaning cue of weather added. To further aid recall of each month, other specific cues are used (e.g., November is the month with Thanksgiving). As the child recalls the months in each grouping, they are combined. First, he is to recall 6 months, then 9 months, and finally 12 months. The meaning cues are dropped and only reintroduced when the child has difficulty recalling any month.

4. Provide Remediation at the Child's Level of Functioning in His Disability Area

The child's level of functioning in his disability area is the appropriate instructional level for remediation. This level is lower than his CA or MA. The instructional level can be obtained from diagnostic teaching and from the age scores on standardized tests, such as the PA of the Frostig Developmental Test of Visual Perception (Frostig & Horne, 1964) and the PLA of the ITPA (Kirk, McCarthy & Kirk, 1968).

Example: If a 7-year-old obtained a 3-6 PLA on the Grammatical Closure subtest of the ITPA, then grammatic structures for a normal child of 3½ would be taught. These would include grammatic structures such as action and descriptive sentences, but not structures with the passive voice or the "if-then" construction which are mastered at higher age levels.

A knowledge of child development norms is necessary for determining which activities best fit at particular age levels.

Example: A knowledge of developmental norms for copying shapes would indicate that a child with a fine motor problem would be taught to draw a circle when he is functioning at the 3-year level, a square at 4, a triangle at 5, and a diamond at 8 (Beery, 1967).

5. Include Both Testing and Teaching in Remediation

Both testing and teaching are inherent components of remediation. Testing in remediation does not involve the use of formal tests; rather, it involves the clinical use of teaching activities to continuously determine what the child has learned and what he has not learned. Naturally, testing is necessary *before* teaching to discover what learnings the child has not mastered so these can be taught. Testing is also necessary *after* teaching to ascertain the degree to which the child has mastered the material that was presented.

In both testing and teaching, there is a presentation of a stimulus to which the child makes a response. In testing, nothing occurs between the stimulus and the child's response. In teaching, strategies are employed between the

stimulus and the response. The purpose of these strategies is to build in the desired responses if they have not been acquired. If they have been acquired, these strategies then serve to strengthen the responses.

Strategies differ for each remedial method and set of materials.

Example: Two strategies used to train a child's Visual Memory are *tracing* and *labeling*. If a child's Visual Memory is being tested, the visual stimulus of the word "cat" is presented; then the child writes the word from memory. If he cannot recall it, this word is then taught. Teaching in this case differs from testing in that the visual stimulus of the word "cat" is presented, and the child traces each letter as he says the letter names. Then he writes the word from memory.

Example: When testing a child's Verbal Expression, the child is asked to describe objects he sees. If the child is being taught, he is trained to describe certain aspects of people, animals, and things (e.g., color, shape, label, function, action, etc.). Teaching in this instance differs from testing in that the teacher draws from specific categories of questions which she consistently asks the child. She gradually phases out each category as the child independently begins to use it. Her teaching is successful when the child spontaneously describes all stimuli using these categories as an internal model of self-questioning.

The essential ingredient of remediation involves these specific strategies. Learning disabled children cannot master what is to be learned without them. If methods and materials are presented without such strategies, then the children are being tested and not taught.

6. Gradually Increase the Difficulty Level of the Stimulus

Stimuli presented to the child should be structured in such a way as to start with an easy stimulus and gradually work to more difficult stimuli.

Example: When training a Visual Reception disability, concrete stimuli such as actual objects and people should be used initially. After these are mastered, more abstract materials such as pictures are used, then photographs and realistic color drawings, then black and white line drawings and, finally, stick figures. At the most abstract level, symbols such as letters and numbers are employed.

Remedial materials must be selected on the basis of where a particular child is functioning in terms of the difficulty level of the stimulus.

7. Gradually Increase the Difficulty Level of the Response

The response required from a child should be structured in such a way as to elicit easy responses at first, such as

recognition responses, and gradually work to more difficult ones, such as recall responses.

Example: When training an Auditory Association disability, a recognition task such as the following is first used. "Which one doesn't fit—an apple, orange, hamburger, or banana?" The required response is relatively easy as the child must select the correct response from the 4 alternatives. After this is mastered, a recall task in which the child gives the category label is used. "What are an apple, an orange, and a banana?" This is more difficult as the child must produce from his response repertoire the one correct answer. At the most difficult level, a recall task where the child generates the members of a category is used. "What are all the fruit you can name?" This is the most difficult as the child must produce a number of correct answers from his response repertoire.

Most remedial materials require only one type of response. Therefore, the teacher must construct different levels of responses using the same teaching materials. Then she must determine the most appropriate level of response difficulty for a particular child.

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8. Provide Small Steps in a Graduated Sequence of Learning

The child must be moved to higher levels of performance in his disability areas in very small steps. Therefore, it is necessary for the teacher to formulate the total learning sequence from the child's starting point to the child's final performance goal. She then must break this sequence of learning into small graduated steps. In this way the child will experience success and a firm foundation of learning will be established.

Example: When training Visual Memory, the strategy of vanishing (Skinner, 1968) can be used to break the task into small steps. The complete visual stimulus such as the word "dog" is presented. Then the last letter is removed and the child must recall it (d_o_). This is the easiest letter for him to recall as it is the last letter he saw. After this is mastered, the first letter is removed (_og), and at a still higher level the middle letter is removed (d_g). Next, the 2 final letters are removed (d__). After this is learned, the initial 2 letters (__g) are removed. At the highest level, the child must recall all 3 letters he saw (___). Preceding the total recall task with 5 smaller steps ensures the solid development of the child's Visual Memory for letters.

9. Direct Remediation to the Child's Individual Rate of Progress

Regardless of whether a child is being given remediation in a group or on an individual basis, it must be geared to his own individual rate of progress. Therefore, the teacher must keep records of each child's progress so she can

determine when each child is ready to move to a more difficult level. To do this, the teacher must establish a criterion level of mastery—that is, the number of correct responses required to define a child's mastery of a particular learning. It is suggested that a 90% criterion level of mastery be used. When a child correctly responds to a specific task 90% of the time (e.g., 9 out of 10 times, 18 out of 20, or 90 out of 100), the teacher moves the child to the next more difficult level in the sequence of learning. All learning disabled children vary in their rates of progress thereby making it necessary for the teacher to keep records of each individual's progress. Movement to a more difficult level should never be determined by the entire group's readiness or by a predetermined period of time.

Example: A child with an Auditory Memory disability was taught to follow directions. Initially, he was taught to follow one direction at a time. He was able to do this 90% of the time after 16 trials. Then, series of 2 directions were given, and he reached the 90% mastery level after 37 trials. Finally, he was required to recall series of 3 directions, and it took him 112 trials to reach the 90% level.

10. Make the Content of the Remedial Methods and Materials of Social or Academic Value to the Child

The content of remediation should be of some social or academic significance. There is no logical reason for training a child's Auditory Memory for letters with nonsense words when actual spelling words that the child must learn can be used. This common practice has no academic value.

Most learning disabled children have a great deal of information to acquire because their disabilities have often prevented them from gaining this in school. Therefore, as much information as possible must be provided through the content of the remedial materials. The content of the remediation is primarily determined by the curricular demands of the child's grade placement and his own unique interests.

Example: A 9-year-old child with an Auditory Association disability should not be required to answer inferential, reasoning, and other types of association questions about fiction stories only. Rather, stories with content, such as those usually presented in the third grade, should be given (e.g., social studies units on transportation, communication, food, shelter, clothing, or the city).

Example: A 13-year-old boy in seventh grade who has a Visual Perception problem should not be given materials such as the Frostig Program for the Development of Visual Perception (Frostig, Maslow, Lefever & Whittlesey, 1964). He should be receiving remedial instruction using maps, graphs, traffic signs,

fractions, and other such academic material that ordinarily he would be expected to master in the seventh grade.

Although it is of utmost importance to stress academics, it is equally as important to stress the social aspects of learning. If a child has a problem in fine motor coordination, it is much more meaningful to teach him to tie his shoes, buckle his belt, button his shirt, cut with a knife, and other such social tasks than to make marble board designs or work with parquetry blocks.

11. Build Transfer into Remediation

It cannot be assumed that a child will automatically transfer learning from one type of material to other types of materials or situations. Remediation must be planned to provide for transfer to all types of materials and situations the child will encounter.

Unfortunately, this author has encountered learning disabilities teachers who state they are not responsible for effecting transfer from some singular type of remediation they may provide (e.g., perceptual motor training) to the child's work in the regular classroom. It is equally regrettable that some regular classroom teachers do not, or cannot, facilitate appropriate transfer from individual remedial sessions (with a learning disabilities teacher) to the child's regular classroom work. Remediation can never succeed in helping the child nor can the field of learning disabilities ever completely become a viable entity without a radical turnabout in the views as well as the skills of these teachers.

12. Restructure a Task When a Child Cannot Master It

The teacher must know how to restructure a task if a child does not master it in the way she tries to teach it. Restructuring strategies are probably one of the most important elements of remediation since few, if any, learning disabled children will automatically master all the tasks presented to them.

Naturally, restructuring strategies differ for each remedial method and set of materials. However, some of the more useful ways of restructuring are described.

Rearrange the stimulus. With this strategy, a visual stimulus may be rearranged or an auditory stimulus may be rephrased.

Example: If a child with a Visual Reception disability could not determine which of 2 groups of blocks was bigger, one group might be placed under the other so that the child could match them.

Example: If a child with a Verbal Expression disability could not respond to the question, "Of all the children in your family, which one would you say is the oldest?" it might be rephrased to "Who's the oldest kid in your house?"

Give additional cues in the same channel. Here, more visual cues are added to a visual task and more auditory cues are added to an auditory task.

Example: If a child with a Visual Closure disability could not tell that a tail was missing from an incomplete picture of a dog, a complete picture of another dog would be presented so that the child could make a visual comparison of the pictures.

Example: If a child with an Auditory Association disability could not complete an unfinished story, the teacher might give a one-word auditory cue so that the child could build an ending around it.

Give additional cues in a different channel. With this strategy, auditory or kinesthetic cues might be added to a visual task. Or, for an auditory task, visual or kinesthetic cues might be added.

Example: If a child with a Manual Expression disability could not pantomime the use of an object in a picture, the teacher might give verbal directions as to how to execute the pantomime.

Example: If a child with an Auditory Reception disability could not execute a series of oral directions, the teacher might look or point toward each of the objects involved in the directions. If actions are involved in the directions, she might perform an abbreviated version of each of the actions expected of the child.

Lead the child to discover the correct response. With this strategy, the teacher asks certain questions that lead the child to discover the correct response. This strategy is derived from the inductive teaching method in which discovery of the correct response is a major component (Goldstein, Mischio & Minskoff, 1969; Mischio, 1973).

Example: If a child with a Visual Association disability could not make up a picture to complete an unfinished series of 3 pictures, the teacher would ask questions about each of the pictures presented as well as inferential questions leading to the most likely picture to complete the series.

Use a cue at a lower difficulty level. Here, there is a return to a step at a lower difficulty level in the graduated sequence of learning.

Example: If a child with an Auditory Reception disability could not recall the beginning sound of the word "boy," the teacher would use a recognition task that is at a lower difficulty level than a recall task (e.g., "Does boy begin with b, g, or do?").

Example: If a child with a Grammatical Closure disability could not construct an action sentence about a picture of a boy running, the teacher would provide a sentence completion task

that is at a lower difficulty level than the total production task. She would start a sentence and have the child complete it. "The boy..."

Give the correct response. This strategy should be used only as a last resort when there are no other restructuring strategies that can be used for the situation.

Example: If a child with an Auditory Reception disability could not discriminate 2 environmental sounds as the same or different when he looks at the sound sources, then the correct response would be given by the teacher.

Giving the correct response is the least desirable strategy because it tends to add to the child's feelings of failure and his dependence upon the teacher or other students for getting the correct response.

TEACHER EVALUATION OF EFFECTIVENESS

Evaluation is a necessary step which follows the diagnosis and remediation of a child's learning disability. Such evaluation is too often unwittingly omitted from the diagnostic-remedial process. When the teacher should evaluate depends upon the severity of the child's learning disability and the frequency of the remedial sessions. The more severe the learning disability or the less frequent the remedial sessions, the longer the period of time necessary before the teacher can adequately evaluate the effectiveness of the remedial methods and materials she has been using with a particular child.

The data used for evaluation are the same as those used to make the original diagnosis of the child's learning disability. The sources of such data are shown in Figure 1.

Step I: Diagnostic Teaching

The teacher assesses the child's present performance in relation to his performance at the start of remediation. She analyzes his performance using some of the guidelines discussed in the previous section. Can the child function in his disability area without the aid of his learning abilities? Has the child progressed to a higher instructional level in remediation? Can the child function in his disability area without the aid of teaching strategies? Can the child respond to more difficult stimuli in his disability area? Can the child make more difficult responses in his disability area? Has the child progressed to more advanced steps in the graduated sequence of learning? Does the child reach his mastery level at a faster rate? Does the child require fewer restructuring strategies to master the task?

If the answers to most or all of these questions are affirmative, then the teacher may conclude that the child has profited from remediation and proceeds to Step II of evaluation.

If the answers to most or all of the above questions are negative, then the teacher would conclude that remediation has not been successful. The teacher then assesses the original diagnosis to determine if it is indeed appropriate to the child and whether a rediagnosis is in order. Should the original diagnosis prove to be appropriate, then the teacher evaluates the adequacy of the remediation on the basis of the following variables: Is the remediation centered on the most critical subareas or symptoms of the child's disability? Does the child have the learning abilities that are required as aids? Is the remediation at the suitable instructional level? Are the teaching strategies effective? On the basis of this analysis, the teacher should modify the remediation.

Step II: Testing

If the child shows improvement in remediation, then the same achievement and diagnostic tests used in the original diagnosis are used to measure the child's progress. Should the child obtain significantly higher retest scores, the teacher would then move to Step III of evaluation.

If the child does not obtain significantly higher retest scores, the teacher must analyze the nature of the remediation in relation to the nature of the tests. Discrepant findings between Step I and Step II are often due to the different subareas or symptoms stressed in a particular test as opposed to those stressed in remediation. For example, in the diagnostic process the Visual Memory subtest of the ITPA uses nonmeaningful, unfamiliar symbols, while the remediation of a Visual Memory disability usually stresses symbols such as letters and numbers. Even though the child's Visual Memory for letters and numbers may have improved as a result of remediation, there may be no transfer to the nonmeaningful symbols of the ITPA. In such instances, the results of the test must be placed in proper perspective and minimized. In other cases, remediation may have been inappropriate. For example, too few subareas or symptoms of the disability may have been stressed, or there was no attention to transfer or to the inclusion of relevant social and academic learnings. Remediation must then be altered accordingly.

Figure 1

DATA FOR EVALUATING REMEDIATION

Step I: Diagnostic Teaching

Child has improved in remediation if he:

- a. can function without aid of learning abilities
- b. has progressed to higher instructional level
- c. can perform without aid of teaching strategies
- d. has progressed to more difficult stimuli
- e. has progressed to more difficult responses
- f. has progressed to more advanced steps in sequence of learning
- g. has increased his rate of reaching mastery level
- h. requires fewer restructuring strategies

Child has NOT improved in remediation if he:

- a. cannot function without aid of learning abilities
- b. has not progressed to higher instructional level
- c. cannot perform without aid of teaching strategies
- d. has not progressed to more difficult stimuli
- e. has not progressed to more difficult responses
- f. has not progressed to more advanced steps in sequence of learning
- g. has not increased his rate of reaching mastery level
- h. requires same number of restructuring strategies

Assess original diagnosis and alter accordingly.

Assess adequacy of remediation on basis of following variables and alter accordingly:

- a. subareas of remediation
- b. adequacy of child's learning abilities
- c. instructional level
- d. teaching strategies

Step II: Testing

Child has improved on testing if he scores significantly higher on achievement and diagnostic tests used for original diagnosis.

Child has NOT improved on testing if he scores at same level on achievement and diagnostic tests used for original diagnosis.

Analyze tests and nature of remediation and minimize test results if child seems to have been helped by remediation.

Assess adequacy of remediation on basis of following variables and alter accordingly:

- a. subareas of remediation
- b. transfer
- c. social and academic behaviors

Step III: Observation of Social and Academic Behaviors

Child has improved if he can adequately perform social and academic behaviors he could not do prior to remediation.

Child has NOT improved if he still cannot adequately perform social and academic behaviors he could not do prior to remediation.

Assess remediation in terms of transfer and social and academic relevance, and alter accordingly.

Treat other untreated learning disabilities. Stop intensive remediation and give supportive remediation.

Step III: Observation of Social and Academic Behaviors

When a child has improved in remediation and in test scores, it must be determined if this improvement is being manifested in the child's social and academic performance. Thus, it is necessary for the teacher to channel and record her observations of social and academic behaviors through the use of screening instruments such as the Inventory of Language Abilities of the MWM Program (Minskoff, Wiseman & Minskoff, 1972).

If improvement in social and academic behaviors is found to corroborate the improvement found in diagnostic teaching and with tests, the teacher then proceeds to treat the child's other learning disabilities that have been given little or no instructional attention. If the child has no other disabilities, then intensive remediation is curtailed and supportive remediation is provided. After intensive remediation is stopped, most children cannot be expected to progress at a "normal" rate in their former disability areas (Balow, 1965; Lovell, Byrne & Richardson, 1963). If they are not given some form of special supportive attention at certain intervals, they may again evidence significant problems. For example, a 13-year-old may have had an Auditory Reception disability that made it difficult for him to learn to read by a phonic method when he was 7 years old. Remediation was given at that time, and he was able to master rudimentary phonics. Now he is enrolled in French where strong demands are made on his Auditory Reception. Specific remedial methods and materials must be designed and provided until he can meet the requirements of mastering French.

If there is no improvement noted in the child's social and academic behaviors, the teacher must analyze the remediation for transfer and for inclusion of relevant social and academic learnings. Then she must alter the remediation accordingly.

RESEARCH

To be a knowledgeable consumer of remedial methods and materials, the teacher must be able to assess the research concerned with remediation. She must be aware of certain relevant variables involved in assessing such studies. Although there are other variables that are important in terms of statistics and research design, only the variables relevant to the teacher are discussed here. These are shown in Figure 2.

Sample of Subjects

The subjects used in the study must be described in detail so that the teacher can determine the degree of generalizability possible from the children in the study to the groups of learning disabled children with whom she is working.

Whether the subjects in a study were actually learning disabled or not is an important factor. Despite titles of studies or labels assigned to the subjects, some studies are conducted with non-learning disabled children. In these cases, one must be cautious in inferring that similar findings would be obtained with learning disabled children.

The definition of learning disabilities used as the basis of forming the group of subjects in a study must be made explicit. In some studies no operational definitions are presented. Even when definitions are given, confusion often results because of the multiplicity of definitions of learning disabilities which abound in the field. Therefore, children defined as learning disabled in one study may bear little resemblance to other groups so labeled.

The degree of severity of the subjects' learning disabilities is very relevant. Obviously, the more severe the disability, the more difficult it is to remediate. Hence, results obtained from children with mild or moderate disabilities cannot necessarily be expected for children with severe disabilities.

It is imperative to analyze the background characteristics of the subjects in any study. The ages of the children are important since it is evident that the older the children, the more difficult it is to successfully remediate their disabilities. Therefore, if particular remedial methods or materials are found to be successful with younger children, it cannot be automatically assumed that similar results might be found with older children.

The learning abilities of the subjects are important and must be described. These are areas that often are used as instructional aids. If children do not have certain areas of learning ability, then these instructional aids cannot be effectively employed.

The general level of intellectual functioning may be a factor of significance. Generally, children at higher intellectual levels learn at a faster rate and have areas of superior ability which they can use to compensate for their disabilities. Thus, remedial methods and materials found to be effective with high IQ learning disabled children may not be as effective for the average or below average IQ learning disabled.

Figure 2

**VARIABLES FOR TEACHERS TO USE IN ASSESSING
RESEARCH ON REMEDIATION****I. SAMPLE OF SUBJECTS**

- A. Were the subjects learning disabled?
- B. How were the subjects' learning disabilities operationally defined?
- C. How severe were the subjects' learning disabilities?
- D. What were the background characteristics of the subjects (e.g., age, learning abilities, IQ, social class, and race)?

II. NATURE OF TREATMENT

- A. What time factors were involved (e.g., length of remedial sessions, frequency of sessions, and total number of sessions)?
- B. Was remediation given on an individual, small group, or large group basis?
- C. What was the theoretical basis of the remediation?
- D. What were the specific remedial methods and materials used in terms of each of the guidelines presented in this article (e.g., symptoms treated, abilities used as aids, instructional level, strategies, level of difficulty of stimulus and response, sequence of learning, mastery level, transfer, social and academic relevance, and restructuring strategies)?

III. NATURE OF TEACHERS PROVIDING REMEDIATION

- A. What was the nature of the teachers' training?
- B. What was the nature of the teachers' experience?

IV. EXPERIMENTAL DESIGN

- A. Was a control group used?
- B. If a control group was used, on what variables was it matched to the treatment group?
- C. If one subject was used, was adequate baseline data provided?

V. ANALYSIS OF RESULTS

- A. Were statistics used to analyze findings?
- B. Was reevaluation done "blind"?
- C. Were relevant tests used for reevaluation?
- D. Was reevaluation data from diagnostic teaching or social and academic behaviors obtained?

VI. CONCLUSIONS FROM DATA

- A. Were conclusions warranted on basis of results?
- B. Was there complete acceptance or rejection of remedial methods or materials?

Social class and racial backgrounds of subjects are also relevant and must be made explicit. Research findings for middle class or white children do not necessarily hold for lower class or minority group children.

Nature of Treatment

It is essential that research studies specify in detail the nature of the educational treatment. In this way, the teacher can identify the critical elements that seem to be responsible for the success or failure of the remedial methods or materials under study. If remediation is not fully described, there may be modifications in its application by others; there may then be very different findings regarding its effectiveness.

The time factors involved in the remediation must be described. Obviously, the length of remedial sessions, the frequency of the sessions, and the total number of sessions provided greatly influence the likelihood of success for any method or materials. Studies such as Rejto's (1973) in which a small number of remedial music sessions over a relatively short period of time is reported to have resulted in substantial improvement in language, perception, and intelligence must be seriously questioned.

It must be determined if the remediation was done on an individual, small group, or large group basis as there is a greater probability of success for any remediation given on an individual basis than a group basis. It also follows that any remediation given to a small group will be more likely to succeed than the same remediation given to a large group.

The theoretical basis of the remediation (e.g., Frostig, Kirk, Orton, etc.) should be made explicit so that the teacher can judge the findings of a particular study in relation to the body of knowledge regarding that theory. In addition, knowing the theoretical basis of the remediation and the bias of the researcher often places the results in clearer perspective. It seems that researchers who favor a particular theory usually find research support for that theory. Conversely, those researchers opposed to a particular theory most often do not find support for it.

There should be a detailed description of the methods and materials in terms of the guidelines outlined earlier in this article. Such a description should include the specific symptoms treated, the learning abilities used, the aids, the instructional level, the teaching strategies, the organization of the levels of difficulty of the stimulus and of the response, the sequence of learning, the criterion for mastery level, transfer, the inclusion of social and academic

behaviors, and restructuring strategies. The delineation of these variables is of utmost importance because changes in any of these may result in markedly different results for the same remedial methods and materials. Most studies do not describe these variables and, therefore, it is usually impossible to determine the critical elements that make for the success or failure of the methods and materials under study.

Nature of Teachers

It is necessary to describe the teachers who provided the remediation in order to determine whether specialized training or experience is necessary for the use of such remediation. It is important to know first the nature of the teachers' academic training and second the specific training necessary for using the remedial methods and materials under investigation.

The nature of the teachers' experiences should be given to determine whether experience with the handicapped is needed to utilize the remediation discussed.

Experimental Design

It should be noted whether a control group was employed as a basis for comparison with the experimental or treatment group. If no control group was used, then any improvement noted in the treatment subjects may have been due to any number of events including the passage of time or the extra attention subjects received rather than the actual remediation itself. Therefore, a control group serves a vital purpose and should be matched to the treatment group on relevant variables such as the nature of their learning disabilities and abilities, IQ, age, social class, and race.

In some studies there is an in-depth analysis of the remediation given to one child. With such an experimental design, it is mandatory to have adequate baseline or performance data for the child prior to the remediation. In this way, any changes noted following remediation can be directly attributed to the remedial treatment itself.

Analysis of Results

Any remediation study should include a statistical analysis of the data. Conclusions should not be drawn simply from a visual appraisal of the results. For example, Linn (1968) found that children who were given Frostig training were 2 to 4 months ahead in achievement as compared with control subjects. With no statistical analysis, she concluded that this relatively small difference

supports the use of the Frostig materials with kindergarteners.

Reevaluation after remediation must be done "in the blind"—that is, the persons administering and scoring the tests should not be aware of whether the children were in the control or experimental groups. In this way, it is possible to avoid the natural inclination of many researchers to obtain favorable results.

Tests that are used for reevaluation after remediation must be relevant to the nature of the remediation. In a critical article concerned with training methods for disabilities in visual perception (especially the Frostig materials), Hammill (1972) based his evaluations on tests of reading comprehension. Such reading tests are not relevant to visual perception as many other variables are more important than visual perception for understanding what is read. More relevant types of tests for evaluating remediation for visual perception disabilities are in word discrimination, word knowledge, or reversals since these are reading processes which rely heavily on visual perception.

In order to determine if the remediation has really been successful, however, it is necessary to use more than standardized tests. It is mandatory that information be obtained from diagnostic teaching and, most importantly, from an analysis of how children who were given certain remediation now perform in social and academic areas.

Conclusions from Data-

The major issue here is whether or not the conclusions reached by the researcher are merited on the basis of the results of the study. Unfortunately, some researchers find that certain methods and materials work for only some children, yet they conclude that this form of remediation is appropriate for all learning disabled children. Conversely, if remediation is found not to be effective with children in a study, it should not follow that such remediation would be ineffective with all learning disabled children. Whenever there is complete acceptance or complete rejection of remedial methods or materials from the findings of one study, then one must seriously question the conclusions. The learning disabled are a heterogeneous population; therefore, some of these children will profit from certain methods and materials while others will not benefit from these same methods and materials.

The question to be answered by studies purporting to evaluate various kinds of remediation is, What type of learning disabled children will profit from what specific remedial methods and materials? This is, indeed, a complex

and challenging question, but one designed to tighten and refine the nature of both research on remediation as well as evaluation of such research. Once the answers to this question are forthcoming, it will be possible to educationally meet each learning disabled child's unique needs.

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CLASSROOM FORUM

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PROBLEM 29

The school psychologist tells me that two of my students are deficient in auditory discrimination and auditory memory. How will this affect their learning potential, and how can I help them?

Any deficiency in the auditory modality can be detrimental to learning. If you have not yet consulted an audiologist, do so at once to rule out any problems in auditory acuity. Furthermore, he can provide valuable information about the child's ability to discriminate sounds in a noisy or quiet atmosphere.

Auditory discrimination and auditory memory occur not in the receiving organ (ear) but in the mechanism where information is processed (brain).

Auditory perception is the ability to interpret what is heard.

Auditory discrimination is the ability to organize auditory sensations.

Auditory memory is the ability to store and recall what is heard.

Many school related tasks—particularly reading, spelling, and oral language—are dependent upon the student's ability to discriminate sound. These may be related to sameness or difference, loudness and rhythm, distance or direction. For example, the ability to recognize a difference between phoneme sounds and to identify words that are the same or different depends upon auditory discrimination. Not only does the child need to learn sound discrimination; he must also develop the ability to disregard irrelevant noise.

Instead of concentrating on what the child *cannot* do, try to observe what he *does* do. A superior visual modality may help the child compensate for an auditory deficit. You may choose to teach toward the intact modality while strengthening auditory skills in separate lessons.

Closely related to auditory memory are attention and concentration. Teachers and parents should be certain that the child *hears* the directions given him. If he does not follow directions, decide if they were too difficult or contained too many elements. If so, rephrase the directions. Maintain eye contact while making requests. Have him repeat what he is going to do. Be sure that you give him *your* attention also. Children need to be listened *to* if they are going to be asked to listen to others.

The following are merely representative of the many activities designed to provide practice in auditory discrimination and auditory memory:

1. With eyes closed, the child listens to sound patterns (clapping, bell ringing, drum beats, etc.). He is asked to identify the sounds or repeat the patterns. (Auditory attending and short-term memory)
2. Give the child a series of directions to follow, gradually increasing the number and difficulty level. (Auditory memory)
3. Have the child listen for important sounds against a background of noise. (Auditory discrimination)
4. Provide games that require the child to describe sameness or difference between isolated sounds. (Auditory discrimination)

Remember that parents are often your most important resource. Keep the lines of communication open, and you will find many parents who are willing to provide time for remedial activities.

Excellent teaching strategies designed to help children improve their auditory perception and memory can be found in *Children With Learning Disabilities* by Janet Lerner (Houghton Mifflin Company, 1971).

Another important resource designed to assist teachers is the *Approaches to Learning* filmstrip series (Teaching Resources Corporation, 100 Boylston Street, Boston, Mass., 02116).

Readers are invited to send in questions they feel are important, and answers will be developed for the *Classroom Forum* column by Mrs. Boekel, members of the Editorial Board, and other professionals.

Send questions to the Editorial Offices, *FOCUS ON EXCEPTIONAL CHILDREN*, 6635 East Villanova Place, Denver, Colorado 80222.