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Four new approaches to remedial reading directed toward the stimulation of defective perceptual areas by procedures other than teaching reading skills, are reviewed. The Delacato approach emphasizes the development of neurological organization and laterality. It may be useful for a small percentage of children with severe reading disabilities, but its value has not been substantiated. The Kephart approach proposes the development of learning readiness through exercises which develop balance and motor control, eye-hand coordination, and directionality. A third approach stresses specific perceptual training. It resulted from the development of the Illinois Test of Psycholinguistic Abilities and the Frostig Developmental Tests of Visual Perception. The possible contribution of pharmacology to remedial education is explored by an approach which suggests the use of drugs for children with reading disabilities. These four approaches, however, have failed to produce conclusive evidence of their effectiveness. More carefully controlled research is recommended. Forty-six references are cited in the bibliography. (NS)

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RESEARCH REPORT

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WHAT ABOUT SPECIAL THEORIES OF TEACHING REMEDIAL READING?

Albert J. Harris
City University of New York

April, 1968

Paper presented at International Reading Association Convention, Current Issues Program, April 27, 1968, Boston, Massachusetts.

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Majority opinion among remedial specialists has for many years favored the policy of beginning remedial reading by using perceptual and memory abilities which are normal or least impaired, and while the child is learning by a method with which he can achieve some success, working to strengthen those perceptual and associative abilities that are particularly weak. Major emphasis has been on capitalizing on strengths, with minor emphasis on building up areas of weakness.

The contrast between the general remedial viewpoint and a newer point of view has been clearly stated by Silver and Hagin (39): "Our initial concept had been that compensation was a basic principle i.e.: after assessing perceptual assets and deficits, we should train in the areas of greater perceptual strength, via the most intact modalities. Results of the follow-up studies, however, suggest that this technique does not appear to enhance perception or to effect lasting improvement in reading. Efforts now are directed to the stimulation of the defective perceptual areas. This is almost a complete reversal of our earlier approach. Our purpose now is really to enhance cerebral maturation, to bring neurological functioning to the point where it is physiologically capable of learning to read."

This paper will attempt to explore several new approaches to remedial reading which share the viewpoint expressed by Silver and Hagin, to review the research currently available concerning them, and to arrive at tentative conclusions concerning their readiness for widespread adoption.

I had originally hoped to be able to include, under "special methods," those that attempt to simplify the reading task by using special alphabets, applications of programmed instruction and reinforcement psychology, and various forms of psychotherapy. However, limitations of time and space have made it necessary to limit the scope of coverage.

Most of the approaches to be discussed agree with Krippner's statement that: "Often a program of perceptual training, dominance establishment, and/or motor coordination improvement is needed before reading improvement will be helpful." (25) The four major approaches to be discussed place emphasis on: (a) developing neurological organization; (b) establishing a firm motor and perceptual base; (c) developing specific perceptual skills; and (d) using drugs to improve the learner's accessibility to instruction.

In attempting to appriase any new approach one must realize that the first efforts to study the value of an innovation are usually case

reports or small-scale and poorly controlled pilot studies which may indicate whether the procedure is worth more careful evaluation, but cannot do much more. An ever-present danger is the placebo effect described by McDonald (29) -- the power of positive suggestion which tends to enhance the effects of any innovation when used by its creator or by a devoted disciple. A second danger is the Hawthorne effect, the built-in advantage that almost any new experimental procedure has over the routine and comparatively unglamorous procedure assigned to a control group. A third problem is that of broad generalization from results obtained with small groups of doubtfully representative subjects over a short period of time. A fourth problem in evaluating the evidence is the researcher's temptation to use a statistical method which tends to maximize the possibility of finding a statistically significant difference, whether or not it is the most appropriate way to treat the data. In reviewing the evidence I have tried to keep these possible sources of error constantly in mind.

One must keep in mind, also, that there is as yet no good statistical evidence on the frequency of neurologically-based reading disability or the per cent of retarded readers whose problems fall into this category. Recently Joyce Morris, in a large-scale study conducted in Kent, England under the auspices of the National Foundation for Research in Education in England and Wales, reported that "... the poorest readers were not in any reasonable interpretation of the term a neurological problem, and that the study as a whole lends little support to the idea that 'specific developmental dyslexia' is an identifiable syndrome distinct from 'reading backwardness.' In other words, if 'word blindness' exists as a condition which cannot be treated by good teaching within the state educational system it must be a rare condition indeed." (30, pp. 303-304)

Nevertheless there are many specialists in learning disabilities who believe in a special condition, caused by heredity, severe environmental deprivation, or brain damage, which makes it extremely difficult for some children with otherwise normal intelligence to learn to read. Among the characteristics stressed as frequently found in this group are poor visual and auditory perception, poor ability to make visual-auditory associations, and directional confusion; distractibility, motor restlessness, clumsiness, and short attention span are reported in many cases. (20) Most of the special remedial methods have been advocated especially for this subgroup of disabled readers.

THE DELACATO APPROACH: NEUROLOGICAL INTEGRATION

Delacato has explained his theoretical basis and remedial procedures in three books. (8, 9, 10) Obviously only a very sketchy summary can be given here. Very briefly, he believes that in some children a failure to achieve neurological integration below the cortical level of the brain is basic and must be corrected by such activities as sleeping in a particular position, and learning to crawl and creep properly. When sub-cortical integration is present or has been developed, the major problem is lack of clear and consistent dominance of one cerebral hemisphere over the other. A variety of treatment procedures have the common purpose of

strengthening the consistent use of the dominant hand and compelling the child to rely on the eye on the same side as the dominant hand. Among the procedures used are eliminating music, occluding one eye to force reliance on the other, etc. Once neurological integration has been achieved the child is said to learn to read by normal developmental teaching methods.

In his books Delacato has presented brief versions of fifteen studies, for several of which he did the statistical work on data supplied by others. A carefully analytical review of these studies has recently been made by Glass and Robbins, who analyzed each of the studies in detail, considering research design and statistical treatment. Their conclusions are summarized in the following quotation:

"Twelve experiments are analyzed in light of the controls which were lacking in their execution and the shortcomings of the reported statistical analysis. Serious doubts about the validity of any of the twelve experiments are raised. An analysis of correlation studies reported by Delacato reveals a conclusion quite contrary to the implications drawn by him from the data. Without exception, the empirical studies cited by Delacato as a 'scientific appraisal' of his theory of neurological organization are shown to be of dubious value." (18)

I had read the fifteen studies before seeing the Glass and Robbins critique, and reread them afterward. I find myself in close agreement with their criticisms.

Recent research has cast doubt on the idea that crossed dominance -- having the preferred eye on the opposite side from the preferred hand -- has any relation to success in reading, although Delacato considers this sufficient evidence of neurological immaturity. In my own research, crossed dominance was not significantly more frequent in severe reading disabilities than in an unselected school population, while mixed-handedness and directional confusion were found in a substantially higher proportion of reading disabilities. (21) A study by Stephen, Cunningham and Stigler recently found no relationship between crossed dominance and reading readiness in kindergarten children. (43)

Independent studies bearing on the Delacato approach have not produced supporting evidence. Yarborough (46) studied the value of the Leavell Language-Development Service, a procedure for strengthening the use of the eye on the same side as the preferred hand. Using a stereoscopic technique similar to one used by Delacato, she found no evidence of significant benefit in reading. Robbins (35, 36) tried out Delacato procedures with second graders. Not only did he find no benefit in reading, but after the training to establish consistent sidedness there were two more children with crossed dominance than before the training.

Anderson (1) tried cross-pattern creeping and walking exercises with kindergarten children and found no significant improvement in readiness in the experimental as compared with a control group. He did a similar study with intermediate grade students and again found no significant differences for the total population, for lower I.Q. children, or

for those with lower initial reading ability.

It may turn out eventually that the Delacato approach is useful for a small percentage of children with severe reading disabilities. However, the research efforts to date have failed to provide evidence of its value. In view of the widespread publicity given to these procedures and the considerable number of children who at present are spending a substantial part of their school time creeping and crawling, definitive impartial research on the Delacato system is urgently needed.

A rather extreme version of a point of view resembling that of Delacato is expounded by a private organization in Chicago called The Reading Research Foundation, Inc. In a brochure explaining their program the following statements are made: "Development of the capacity to sustain concentration is influenced by continuous changes in the stimulus cues for the appropriate response-pattern and for signaling success and error of response. Furthermore, the intensity of the signals (loud hollers, for example) are used as one way of developing the stability of concentration. Cross-lateral patterns of movements are used extensively in order to promote neurological organization in each of the cerebral hemispheres as well as an integration in their functioning." (33)

I have received from this organization two mimeographed papers reporting small-scale tryouts of their procedures with first-grade children. Although differences between the final reading scores of total experimental and control groups were not significant in both studies, the authors argue for significance in one case by restricting the comparison to low groups of twelve children each, and in the other by disregarding a non-significant analysis of variance and stressing a comparison of gain scores, which is, in my opinion, a dubious statistical procedure. (27, 28)

A very recent feature article in the Chicago Daily News describes this program and reports comments by two visitors. The following is a direct quotation from the article: "Dr. E. R. Simmons, director of the Texas Reading Institute, San Antonio, visited the school and saw teachers shake, pinch, and pull the hair of students. He described his attitude as disbelief giving way to anger and distress... James Weddell, director of Purdue University's Achievement Center for Children said some of his staff was 'appalled' by the approach, fearing it may 'tear some kids asunder emotionally.'" It is not necessary for me to add to these comments.

KEPHART: MOTOR AND PERCEPTUAL TRAINING

Kephart has advocated programs for slow or disabled learners in which much emphasis is placed on developing readiness. (23) In a recent paper co-authored with Dunning occurs the following: "Readiness for learning...consists of a hierarchical buildup of generalizations which allows the child to deal increasingly effectively with his environment. Learning difficulties may be viewed in terms of difficulties in this developmental sequence. When such difficulties occur, then there

are gaps in the sequence which will affect all future learning either by limiting or distorting it." (11) In the Kephart approach emphasis is placed on helping children change from stereotyped, rigid movement patterns to variable, adaptive, and purposeful movement patterns. Specific graded sequences of exercises are suggested to develop balance and locomotion and to improve laterality, directionality, ocular pursuit, and temporal rhythm and succession. Essentially the same basic program seems to be recommended for mentally retarded, brain injured, and reading disability children.

There is as yet little published research on the effectiveness of the Kephart approach in improving reading. Rutherford studied the effect of Kephart-type activities on the Metropolitan Readiness Test scores of kindergarten children. He found a significant gain for the boys in the experimental group, but not for the girls. (38) Whether this would induce better reading later on is not known. Roach used perceptual-motor training of the Kephart type with groups of reading disability children averaging twelve years old and found no significant differences in oral reading. (34) LaPray and Ross, selecting first graders who were low in both reading and visual perception, compared a group given training in large-muscle activities and visual training with one given extra time with simple reading materials; the former group improved more on perceptual tests, the latter on reading tests. (26) I have not yet found any controlled research that shows the Kephart approach to be useful in the treatment of reading disabilities.

Points of view quite similar to those of Kephart have been expressed by Barsch (3), Getman (17), and Bateman (4). I have not been able to find controlled research relevant to their theoretical positions.

Since establishment of directionality is one of the objectives of Kephart, it may be appropriate at this point to mention a new method of preventing and correcting reversal tendencies. J. C. Daniels has described a simple procedure which he says requires only one 20-minute session and is effective two years later. He uses paired cut-out forms which are mirror images, such as locomotives facing right and left. The child is shown and then practices fitting each into the correct form-board depression; this is then practiced with many similar pairs. Daniels states that one lesson at about the age of four prevented reversals at the age of six. (7) Certainly this procedure deserves to be tested by others; if it should be found to work one of the big problems in reading could be eliminated for most children.

SPECIFIC PERCEPTUAL TRAINING

Emphasis on developing specific perceptual skills received major impetus with the publication of the Illinois Test of Psycholinguistic Abilities (24) and the Marianne Frostig Developmental Tests of Visual Perception (16). With analytical tests available, training programs were developed to improve the particular functional weaknesses disclosed by the tests. Although this approach seems reasonable and in accord with common sense, both the diagnostic validity of the tests and the

value of spending time on perceptual training instead of remedial reading are at present questionable.

Olson studied the predictive value of the Frostig test and found that it had some predictive value when correlated with reading scores in grades two and three, but neither the total score nor the individual part scores were substantial predictors of specific difficulties in reading. (31, 32) Rosen compared twelve experimental classes which received a half-hour of Frostig training per day with thirteen classes receiving reading instruction only. The differences on reading tests consistently favored the control group, but were not significant when adjustments were made to equate the groups for readiness. (37)

According to Weener, Barritt and Semmel (45), the Illinois Test of Psycholinguistic Abilities falls short of the statistical requirements for a satisfactory diagnostic test. They found that the reliabilities of I.T.P.A. subtests are too low, both split-half and test-retest, for adequate prediction and diagnosis from individual profiles.

Thus both of these tests, which have been widely adopted in reading clinics and by school psychologists, are imperfect instruments. A remedial program based on their high and low subtest scores may or may not fit the child's needs. It is to be hoped that revised versions or new perceptual tests will provide more accurate diagnostic analyses of perceptual and linguistic skills, which will in turn permit research to determine whether remedial programs based on such tests will be valuable.

It should be noted that Frostig's descriptions of her own remedial approach are broader and more flexible than study of her perceptual training materials (15) might lead one to expect. She states that she includes physiotherapy, physical education, eye exercises, and help with fine motor coordination when indicated in an individual diagnosis (14), and employs varied teaching procedures for reading, including picture cues, phonics, and kinesthetic procedures, when indicated (13).

Concentrated training in auditory perception as a preparation for remedial reading is advocated by Daniels (7), who reported that a group of retarded readers given one term of auditory training followed by two terms of phonics-oriented remedial reading improved more than a matched group given three terms of remedial reading. Since the control group's final average age score was only 6.3, the quality of their remedial instruction would not seem to have been very high.

Silver, Hagin, and Hersh have issued a progress report on what seems to be a quite important study. One group of disabled readers was given training in auditory and visual perception for a half-year, followed by remedial reading during the second half-year; the other group had remedial reading for the first half and perceptual training during the second half. However, the remedial teaching consisted of using a basal reader and following the teacher's manual; hardly an optimal remedial procedure. The authors concluded: "The results so far suggest that where perceptual defects are first trained out, reading instruction at

intermodal and verbal levels will have a better chance of success. This is particularly true of the more severe language disabilities, those with defects in multiple modalities and those in whom 'soft' neurological signs may be found." (40) The final report of the study is not yet available.

A quite sophisticated study of the value of training in auditory perception was conducted by Feldmann and Deutsch (12) with third grade Negro and Puerto Rican children in New York City; all of the children were initially reading below middle second grade. The experimental children were instructed in small groups of two to four, three times a week for five months. In the first study there were three experimental groups: remedial reading only, auditory training only, and separate periods of reading and auditory training. None of the experimental groups did significantly better than the others, or better than the control group that received only regular classroom reading instruction. On the assumption that the instruction program needed improvement a second study was conducted with new but similar children. Changes were made in the auditory training program and a new variable integrating auditory training with remedial reading was added. Again the results showed the control group doing as well as the experimental groups and no significant differences among the experimental groups.

The results of the Feldmann and Deutsch study demonstrate that one cannot assume that training in auditory perception will necessarily benefit retarded readers; transfer of what is learned during perceptual training to the act of reading is not automatic and sometimes does not take place.

DRUG TREATMENT FOR READING DISABILITY

The most ambitious effort to provide a theoretical and experimental basis for a drug treatment approach as an adjunct to remedial teaching is that of Smith and Carrigan. (41) Starting with the hypothesis that reading disability is based on a physiological difficulty in the transmission of nerve impulses in the brain, they developed theoretical models for five syndromes, based on various patterns of excess or deficiency in two chemicals, cholinesterase and acetylcholine. They then analyzed the results of a test battery given to 40 cases of reading disability and reported that most of the cases fell into groups that corresponded to the models. Some of the children were given drugs chosen on the basis of the kind of change assumed to be needed in the child's brain chemistry. Statistically better response to remedial reading was reported for those taking medication as compared to other children not receiving medication. In 1961 I wrote an evaluation of this study which may be briefly summarized as follows: the theoretical base is highly original, most interesting, and still possibly correct; the experimental evidence is unconvincing because of technical errors in design and execution. (19) It is a pity that nobody has attempted to replicate the Smith-Carrigan study.

Staiger studied the effects of a drug called Deanol on perception and reading improvement. He found a gain in perceptual speed for those taking the medication, but not in reading. (42)

Baldwin and Kenny tried 20 medications, singly and in combination, with 100 children having behavior disorders involving hyperactivity, impulsiveness, etc. The most effective treatment in reducing symptoms was a combination of Benadryl and Dilantin, which produced some improvement in two-thirds of the cases to whom it was given, while only one child got worse. (2) For children who are very hard to teach because of behavior disorders, the use of drugs to make them amenable to instruction seems quite plausible.

However, one should not confuse expectations with results. Valusek did a carefully controlled study on the use of drugs with retarded readers in a state mental hospital, using Thorazine, Cytomel, and Dexedrine, tranquilizers that are quite popular in psychiatric practice. He found no significant differences between the medication and placebo groups in oral or silent reading or on psychological tests. (44)

An interesting report of successful drug treatment for a specific subgroup of disabled readers comes from Calvert and Cromes. (5) In the eye-movement photographs of children who were not responding to remedial tutoring they found evidence of fine tremors or spasms occurring at intervals of about 18 seconds. Treatment of a few of these children with Primidone both stopped the tremors permanently and was followed by improved learning. I have not found any other study reporting either similar tremors or the use of Primidone, so this study certainly seems worth replicating.

These are the only studies I have found on the use of drugs with children having reading disabilities, and they are certainly not definitive. It would seem logical that when children with reading disability are hyperactive, or sluggish, or depressed, appropriate drug therapy should be a useful adjunct to remedial teaching. New discoveries with animals open up possibilities of improving human mental functioning chemically, but as yet this is something for the future. Certainly any use of medication should be prescribed and supervised by a physician, and we need much more research on the use of drugs with poor readers.

SUMMARY AND CONCLUSIONS

This paper has considered four main approaches to the treatment of reading disability by procedures other than teaching reading skills. All are interesting, but none has yet been firmly substantiated.

Most radically innovative is the Delacato stress on neurological organization and laterality. Both Delacato's basic theories and the practical value of his procedures for treating reading disabilities are very much open to question. Publicity has far outstripped proof. Hopefully, careful objective studies will be done to discover if the method really helps any children with reading problems, and if so, how to identify the cases to which the method may be applicable. Adoption of cross-

pattern creeping and attempts to alter patterns of lateral dominance are not justified for either schools or reading clinics on the basis of present evidence.

The Kephart approach stressing the improvement of motor control and flexibility, the development of hand and eye coordination, and directionality, has not yet found verification as an improvement in remedial reading programs. However, it would seem to have some intrinsic value apart from reading. Better control of one's body can be a desirable goal in itself. Perhaps this kind of training will find a home in the physical education program rather than be judged in terms of whether or not it makes a direct contribution to academic learning.

Since there is ample evidence that visual and auditory perception are both significantly correlated with success in beginning reading, the main question would seem to be how to give perceptual training rather than whether or not to give it. Can it be most effective when it proceeds or parallels reading instruction, or when it is an integral part of reading instruction and emphasizes alphabetic shapes and the sounds of words and word parts? Here the evidence is somewhat conflicting. In the absence of proof to the contrary, my preference is to combine perceptual training as closely as possible with reading instruction.

The fourth and final special approach considered here, the use of drug medication, is one in which future possibilities far outstrip the present inconclusive findings. If the particular drugs tried so far have not produced remedial reading miracles, perhaps some drug not yet discovered will do so. We must keep a close watch on the possible contributions of pharmacology to remedial education, and we should encourage continuing research in this area.

This paper began by pointing out the contrast between the classical emphasis on making use of the child's best avenues for learning, and some newer approaches which concentrate on building up deficiency areas. As yet the newer approaches have not provided convincing proof of their effectiveness. Those who have been obtaining satisfactory results with established methods of remedial teaching would do well to wait for more conclusive evidence before adopting any of the newer procedures that have been discussed here.

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