Non-Profit Organization
U.S. Postage Paid
Permit No. 122 – Eugene, OR

ADI NEWS

Volume 7, Number 2 | Association for Direct Instruction, P.O. Box 10252, Eugene, Oregon 97440 | Winter, 1988

Research on Use of Language Experience in Beginning Reading

by Steven A. Stahl
Patricia D. Miller
Western Illinois University, Macomb

Ed. Note. This report is a summary prepared by Wes Becker of a 39-page manuscript by Stahl and Miller. Those wishing more details can contact the authors at the Department of Elementary Education, Western Illinois University, Macomb, IL 61455, (309) 298-1961.

Approaches to beginning reading instruction which focus on the use of the child's own oral language as a bridge to beginning reading instruction have been given a variety of names over the past 40 years. They have been termed "activity approaches," "informal approaches," "language experience approaches," and, most recently, "whole language approaches." While the approaches described by these labels are not identical, they have a common focus on reading for meaning and the use of the child's oral language productions. We will use the term "Language Experience" approaches, since it is the most common descriptor of these approaches. In deciding to include studies in this review, we insisted that roughly half of the reading materials involved (as best as could be determined from reports) be based on the children's oral productions.

Selection of Studies

Studies were included which were conducted after 1960 which compared a Language Experience approach to beginning reading with a basal or traditional approach. Computer searches were made using the descriptors "language experience" and "whole language." In addition, major bibliographies were checked, such as Crismore (1984), Hall (1977), and Stauffer (1976). Also conference programs were checked and letters were written to major figures in the field requesting further suggestions.

We found 26 studies in addition to the U.S. Office of Education (USOE) First Grade studies. The latter occurred in the late 1960's (except for a few longer-term follow-ups) and represent 16 references in our full report. Only 13 of the 26 non-USOE studies provided enough information for use in a meta-analysis. (In a meta-analysis, the magnitude of difference in standard deviation terms is used to determine an overall effect for a group of studies.) The 13 studies gave us 45 difference measures of effect sizes for the non-USOE studies. There were 71 effect-size measures in the USOE First Grade studies.

Evaluation of Effects

Two procedures were used to summarize the effects. First, when the data could be translated into effect sizes, this was done by taking the mean difference between the Language Experience Group and the Basal Group and then dividing by the standard deviation of the Basal Group. This procedure gives an effect size expressed in standard deviation units (Glass, McGaw, & Smith, 1981). In some cases, the pooled standard deviation for both groups had to be used. There were 116 comparisons possible using this procedure.

The second procedure simply counted the number of effects significantly favoring the Language Experience or Basal Groups, or neither. There were 149 comparisons possible using this procedure.

Results

Overall

The meta-analysis for all 116 effect sizes showed a mean effect of +.06 (s.d.=.61; range 1.43 to -1.46) favoring the Language Experience Groups. This mean effect was very small and not significantly different from zero. Overall, the Language Experience Groups did not do significantly better than the Basal Groups.

In looking at just the number of significant differences, out of 149 comparisons, 23% favored Language Experience Groups, 13% favored Basal Groups, and 64% were non-significant. By chance alone, 5% would favor each group. A Chi-Square test showed the number of significant differences to be more than one would expect by chance, suggesting that both Language Experience and Basal Programs may have had different effects for different subsets of studies. Further analysis of the studies were made to explore certain subsets of the data.

Continued on Page 15

Pretask Requests Help Manage Behavior Problems

by Keith Storey and Robert H. Horner
University of Oregon

Behavioral programming focused on inappropriate behaviors often emphasizes the manipulation of consequent events. When applying Direct Instruction logic to programming for these behaviors, Engelmann and Colvin (1983) recommend focusing on manipulation of antecedent events. This manipulation of antecedent events is a critical feature of Direct Instruction technology. Some of these antecedent events are the order of examples presented to the learner, the range of variation in the examples, the number of examples presented, the frequency and duration of practice, and the prompts that are presented (Engelmann & Colvin, 1983). Pretask requests are an application of Direct Instruction procedures and are used in managing students with severe behavior problems.

Pretask Requests

Pretask requests are a procedure designed for situations in which an adaptive pattern of responding competes with a long-standing inappropriate behavior (Horner & Billingsley, in press). Pretask requests are an antecedent strategy in that the procedure is used to keep the inappropriate behavior from occurring. Pretask requests also have been referred to as behavioral momentum (Mace, Hock, West, Lalli, Belifore, & Brown, 1987), have foundations in animal research (Nevin, Mandell, & Atak, 1983), and have been recommended for use by Engelmann and Colvin (1983).

Pretask requests involve identifying 3-5 simple responses that: (a) the learner can already perform, (b) require a very short time to complete, (c) are from the same response class as the targeted, adaptive response, and (d) have a high probability of being performed following presentation of a teacher request. These requests are then followed by a "difficult" request that the learner has not performed successfully, and is likely to resist via undesirable behavior. A request consists of an instruction to complete a task in which the learner frequently engages in inappropriate behavior.

In recent application of this procedure, we have identified three major situations in which to use pretask requests. The first is during *transitions* to avoid what is confusing or inappropriate. When a student is changing from one task to another, pretask requests can be used to facilitate appropriate responding during the transition. This avoids giving the student an opportunity to engage in inappropriate behaviors.

The second situation is when you want to *strengthen the durable responding* (or acquisition of skills) by the student. In this situation you intersperse pretask requests in with tasks which the student has trouble performing or is still learning. This allows the student to make a high density of correct responses and receive reinforcement while learning new tasks.

In the third situation, pretask requests are used to *interrupt a chain of behavior* that typically leads to inappropriate responding. Delivery of a pretask request early in such a chain increases the likelihood that the inappropriate behavior will be avoided, and when student starts to engage in inappropriate behaviors you use the pretask requests so that the student is engaging in appropriate behavior which is likely to continue rather than the inappropriate behavior. Pretask requests should be used only if there is a high enough level of reinforcement and antecedent practice for the appropriate behavior, otherwise the pretask request can inadvertently function to reinforce the inappropriate behavior.

Examples of Pretask Requests

Singer, Singer, and Horner (in press) used pretask requests with four elementary students with moderate to severe disabilities who had extensive histories of noncompliance to teacher requests. The pretask requests were used for the transition when the students came in from recess at three different times during the day.

During baseline, when the students came in from recess the teacher met each student at the door and delivered the request, "go to group now," while pointing to the appropriate set of chairs in the classroom. The students demonstrated low rates of compliance (17% to 33%) during this phase of the study.

Continued on Page 2

Information in this issue on these Upcoming ADI Training Opportunities:

March 18 & 19 • Yakima, Washington
Second Yakima DI Mini-Conference

June 27–29 • Arlington Heights, Illinois
Second Midwest Direct Instruction Institute

August 1–5 • Eugene, Oregon
14th Eugene DI Conference

August 8–12 • Kansas City, Missouri
Kansas City DI Institute

August 15–19 • Salt Lake City, Utah
Third Salt Lake City DI Institute

Dear Editor:

I read your letter in "The Editor's Desk" of the Summer 1987 issue of *ADI News* asking for more articles. Our basic skills program has been so *successful* at the Big Piney Middle School I though you might like to see the gains the students have made in the last two years. I credit these gains to the direct instruction programs being used in the classes.

I was hired in 1985 to set up a basic skills program for the Big Piney Middle School. The principal, Dan Johnson, let me order the Corrective Reading and Corrective Math direct instruction programs at the very beginning of the year. When he saw how successful they were, he then encouraged me to order the spelling and written language direct instruction programs. I had used these programs for two years previously in a kindergarten through sixth grade resource room. I had received my masters from the University of Wisconsin at Madison and at which time I received my training for using direct instruction programs. Dr. Sara Tarver and her two doctorate students, Loring Brinkerhoff and Ann Graves, did an excellent job of teaching the theory behind the direct instruction programs and how to implement them. With my direct instruction background and the principal supporting me, I was able to set up a successful basic skills program.

If you would like to use this article in the *ADI News* feel free to edit any part of it. I hope you enjoy reading the results as much as I have enjoyed achieving them.

Sincerely,

Jonita Sommers
Basic Skills Teacher
Big Piney Middle School
Big Piney, WY 83113

Ed. Note: See article on page 4. Let's hear from more of you!

Dear Wes:

I received my Fall copy of the *ADI News* yesterday. I was pleased to see my letter to Doug in the letters to the Editor. I did wonder when I moved to Alabama and how you found out about it.

Sincerely,

Roberta Bender,
Carmel River School
Carmel, California

P.S. Please forward any correspondence and/or back pay you might receive from the Tuscaloosa City Schools.

Dear Roberta,

The mystery remains unsolved. Let's blame Bryan.

Sorry,

Wes Becker

Need a Workshop in Your Area?

If you have any training needs and would like to have an ADI training workshop scheduled in your area, please contact Bryan Wickman at ADI and he will work with you to explore the possibilities.

It is helpful if you have a specific date in mind, such as a district or statewide inservice day. Also, if you can give an idea of how many other people are in need of the training and who the key contacts are in your area, the workshop will have a better chance of getting off the ground.

The Association for Direct Instruction would like to help you improve your technical confidence and competence. Help us help you!

The **Direct Instruction News** is published Fall, Winter, Spring and Summer, and is distributed by mail to members of the Association for Direct Instruction. Membership and subscription information may be found on the last page of this newsletter. Readers are invited to submit articles for publication relating to DI. Send contributions to: The Association for Direct Instruction, P.O. Box 10252, Eugene, Oregon, 97440. Copyrighted by ADI, 1988.

Pretask Requests - *Continued from Page 1*

During the pretask requests phase, the teacher met the students at the door and delivered an individualized set of pretask requests for each student (i.e., "give me five," "shake hands," "say your name") before saying "go to group now." If the students complied within three seconds they received verbal praise from the teacher. The results from the study indicated that each of the student's compliance increased to, or near, 100% when the pretask requests were used.

Mace, et al. (1987) used pretask requests related to response acquisition in three different experiments in a group home with adults who had severe handicaps. The first experiment involved a man who was noncompliant and aggressive. During baseline, commands ("Bart, please put your lunch box away" or "Bart, don't put your feet on the coffee table") were delivered to the man once a minute and if he complied, praise was delivered. He complied with 47% of the "do" commands and 53.5% of the "don't" commands during baseline. During the intervention, 3 or 4 pretasks ("give me five," "show me your pipe," "come here and give me a hug") were delivered immediately preceding the commands. With the pretask requests, his compliance increased to 87.5% of the "don't" commands and 90.5% of the "do" commands.

The second experiment examined whether other forms of attention besides the pretask requests would produce similar effects. The participant was Ned, a 44-year-old man who did not comply with requests to perform household or vocational tasks. In this experiment, pretask requests improved Ned's compliance from a mean of 26% to 73%. However, giving him attention (i.e., "that's a nice shirt you're wearing," "we're going bowling this weekend") before the command did not change his behavior (mean of 35% compliance.)

In the third experiment, pauses of five or twenty seconds occurred after the final pretask request before giving the command. Bart also participated in this experiment. It was found that Bart complied much more when the five-second rather than the twenty-second pause was used.

Dunlap (1984) used procedures similar to pretask requests to increase the learning rate of autistic students. Maintenance tasks (i.e., those that the student already knew) were varied and interspersed among acquisition tasks. This procedure was compared with two other procedures. In the first, only one experimental task was presented per session, using a massed format approach. In the second, acquisition tasks were varied and interspersed among other acquisition tasks. The tasks included spelling words, touching numbers or words, matching, and putting cards in sequence order.

The results indicted that the students needed fewer learning trials for acquisition duringthevaried-with-maintenance tasks than during constant or varied acquisition tasks. Subjective ratings of the students's affect indicated that they showed more positive affect during the varied-with-maintenance tasks than during the acquisition tasks.

Decision Rules for Using Pretask Requests

Pretask requests can be effective in transitions, acquisition of skills, and in breaking a chain of inappropriate behaviors. The teacher first needs to decide if one of these three situations is occurring. If so, then pretask requests may be effective. If not, then another strategy is called for.

Second, the teacher must assess if the student is bored or frustrated during teaching sessions, if the student is going from a more to a less reinforcing situation, is unclear about the transition, or if there is a chain to the inappropriate behaviors that the student is displaying.

Third, the teacher must determine what behaviors the student reliably performs that may be used in the pretask requests (i.e., "take this," "put it on the table," "come here," etc.). For task variation it is necessary to establish tasks that the student knows how to perform and enjoys doing.

And finally, the teacher must establish the pretask requests as part of the students school day. It is important to emphasize that pretask requests are a preventative strategy and should not be used as a punishment procedure that follows inappropriate behavior.

Discussion

The clinical experience with pretask requests has been good. An increasing number of teachers and practitioners are finding pretask requests to be an effective antecedent strategy for managing behavior problems. Because pretask requests are nonaversive and try to keep the inappropriate behavior from occurring, they can be used more readily in integrated/community environments than strategies that follow inappropriate behavior. It is important that the requests used be functional, age-appropriate, and with the principles of normalization. The requests should be tied into functional curricular activities whenever possible.

We have some applied work with pretask requests, but we're not sure why they work. The experimental validity of pretask requests remains undefined and more research is needed. The theoretical premise is that the pretask requests are functional because they are from the same class of responses as the desired response (compliance with rehearsal) (Engelmann & Colvin, 1983). Another possibility is that the reinforcement from the direction following, changes the valence of the target directive (Singer, et al., in press). It is also possible that the pretask requests serve as a stimulus or setting event that there is an expected change in the students behavior. A final possibility is that stimulus generalization has occurred in which there is a spread of the effects of reinforcement to stimulus conditions which have not been associated with reinforcement (Catania, 1984).

The support of students who have behavior problems is of critical importance. Among the most pressing obstacles to effective education, deinstitutionalization, and community integration are sever, asocial behaviors. Performance of these behaviors has reliably predicted the removal of individuals from the mainstream of society (Hill & Bruininks, 1984; Schalock, Harper, & Genung, 1981). there is a growing consensus that extreme, excess behaviors should not serve as justification for segregation, isolation, mediation, abuse, and neglect. However, the need exists for a well-documented technology that supports people with sever excess behavior in community settings.

Because of concerns with aversive procedures in managing behavior problems (Guess, Helmstetter, Turnbull, & Knowlton,

Continued on Page 3

Cognitive Behavior Modification, DI, and Holistic Approaches to Educating Students with Learning Disabilities

by Sara G. Tarver, Ph.D.*

Editor's Note: Sara Tarver first graced the pages of the DI News *in the last issue with her report on the happenings, learnings, and excitment of* The First Midwest ADI Institute. *The following article will be a bit "academic" to some, but it represents a profound analysis and intergration of how DI theory and programs fit in with other mainstream ideas about how children should be taught. I personally look forward to more contributions to the* ADI News *from Dr. Tarver.*

In this paper, cognitive behavior modification (CBM), Direct Instruction (DI), and holistic approaches to the education of students with learning disabilities are compared for the purpose of identifying similarities and differences in instructional practices. An overview of the approaches is followed by comparative discussions organized around four distinctions: (a) specific vs. general, (b) bottom-up vs. top-down, (c) structured vs. unstructured, and (d) effectiveness vs. ineffectiveness. In a final discussion section, some conclusions and recommendations are offered.

All three of the approaches included in this paper are considered to be cognitive behaviors that are not directly observable. However, each of these cognitive approaches has retained some elements of the purer behavioral approaches that were so popular in special education in the 1970s. Those behavioral elements will be addressed in this paper also.

Overview

Various CBM programs and procedures have been developed for the purpose of teaching general cognitive and/or meta-cognitive strategies rather than specific skills or content. Among them are Meichenbaum's (Meichenbaum & Goodman, 1971) "What's my problem? What's my plan?" problem solving program, Deshler's (Deshler, Warner, Schumaker, & Alley, 1983) learning strategies intervention model for adolescents, and Hallahan's (Hallahan, Kneedler, & Lloyd, 1983) procedures for teaching students to self-monitor their own attention.

In Meichenbaum's prototypic intervention, the child is taught to ask herself questions such as "What's my problem? What's my play?" when confronted with a problem solving task. The child is also taught to verbalize statement fo self-correction, self-evaluation, and self-reinforcement as the plan is being executed. In training, the teacher first models the entire procedure by performing the task while verbalizing instruction aloud, then the child performs the task while the teacher verbalizes the instructions aloud, then the child performs the task while verbalizing the instructions aloud, and finally the child performs the task while verbalizing the instructions covertly. This gradual fading of speech from overt to covert is theorized to have the effect of translating the student's observable spoken language into the type of unobservable inner language that regulates thought.

In his more recent writings, Meichenbaum (1983) has recommended that CBM training programs emphasize training at the metacognitive level; metacognitive training includes instruction in a variety of self-monitoring strategies (e.g., self-questioning, self-interrogation, self-checking), a variety of self-instruction strategies (e.g., "What is it I have to do? I have to find the main character," etc.) and a variety of executive strategies (e.g., scanning one's own repertoire of strategies and selecting the strategy most appropriate to the task or problem at hand.)

Although Deshler's (Alley & Deshler, 1979, Deshler et al., 1983) learning strategies are considered to be general strategies at both the cognitive and metacognitive levels, they are not as broad as Meichenbaum's. In actuality, the Deshler strategies are more like what most educators would call "study skills"— scanning, outlining, note taking, time management, questioning. The goal is to teach students "how to learn" rather than to teach them specific content.

Earlier research indicating that the academic problems of learning disabled students may be due to attention deficits and/or a passive approach to learning provided the rationale for Hallahan et al.'s (1983) attempts to design procedures for teaching students to self-monitor their attention to academic tasks. In their prototypic self-monitoring study, beeps are sounded intermittently from a tape recorder while the student is engaged in seatwork. The student is trained to ask herself, at the sound of the beeper, "Am I paying attention?" and to check "yes" or "no" on a card in response to that question. The beeps are gradually faded out. The goal is to teach the student a general self-monitoring strategy that can be used in a variety of academic activities.

Over forty DI programs have been developed to teach language, reading, writing, spelling, and mathematics across the elementary grades. The components of DI have been classified as curriculum design components (logical analysis of concepts and tasks; strategies and formats for teaching basic concepts, related concepts, rules, and cognitive operations) and implementation or presentation components (small-group instruction, signals, reinforcement, corrections) (Becker, Engelmann, Carnine, & Rhine, 1981; Carnine, 1983). The curriculum design components constitute the cognitive elements of DI and the presentation components constitute the behavioral elements. Although a number of people have contributed to the development of DI programs, the theory and principles underlying DI practices (Engelmann & Carnine, 1982) reflect, to a great extent, the thinking of one man, Siegfried Engelmann (Becker, 1984).

The proponents of holistic education (e.g., Brown, 1984; Poplin, 1984; Smith, 1983) have not designed new instructional techniques, materials, or curricula. Instead, they have relied upon the language experience approach (Stauffer, 1980) to the teaching of reading and they have advocated unstructured education of the type purported to be consistent with Piagetian theory. The holists emphasize naturalistic learning, discovery by the learner, and motivation via interest and/or meaningfulness.

Specific vs. General

Holistic educators have not addressed the specific-general issue in those terms; therefore, this discussion will be most relevant to CBM-DI distinctions. It should be mentioned, however, that the holists' strong stance against atomistic or reductionistic approaches and the behavioral practices associated with those approaches (e.g., task analysis, specific objectives, precise measurement) attests to their opposition to specificity as it has often been manifested in special education practices (Poplin, 1984).

Although training in the use of general strategies has been the primary goad of CBM approaches in the past, recent CBM literature reveals a trend toward increasing emphasis on specific strategies. Deshler et al. (1983), for example, describe the purposes of specific as well as general strategies as follows:

> A major purpose of general strategies is to enable the student to assess a problem situation, determine its requirements, and select a specific strategy for its solution. . . . The general strategy can be thought of as the mechanism that induces purposeful, planned behavior. The general strategy may be called the "executive" whereas the specific strategies are the tools that enable the student to solve a problem (p.268).

The general "What's my problem? What's my plan?" strategy is an executive strategy that can lead to a solution only if the learner has already acquired a repertoire of more specific strategies from which to choose. The learning strategies taught by Deshler et al. (1983) are thought to be the more specific tools that are essential to the success of the executive strategy in a variety of school situations.

Similarly, Hallahan et al. (1983) have concluded that training in the use of the general "Am I paying attention?" self-monitoring strategy is appropriate only in the case in which the student has already acquired the specific skills and strategies required to solve the problem at hand, but still needs practice in order to achieve mastery or automaticity. Training in the use of self-instruction that is specific to the problem to be solved is recommended when new learning is involved. The self-instruction training recommended by Hallahan et al. (1983) has been termed "academic attack strategy training" (Lloyd, 1980); it involves training in self-verbalization of academic strategies like those contained in DI programs. Each of the strategies is general in the sense that it is applicable to a set of problems rather than to isolated problems, yet it is specific in the sense that it is applicable only to a specified set or class of problems. In DI mathematics (Silbert, Carnine, & Stein, 1981), for example, students are taught to discriminate addition and multiplication word problems by asking themselves "Do I deal with the same number over and over again?" If the correct response is "yes," multiplication is indicated; if the correct response is "no," addition is indicated. This strategy can be generalized to the set of "addition and multiplication word problems" but not to other classes of math problems and certainly not to reading and/or spelling problems. Thus, the DI strategies and specific self-instruction strategies currently recommended by Hallahan et al. (1983) are much more specific than the "What's my plan?" and "Am I paying attention?" strategies which were designed to be applicable to all classes of academic problems.

Hallahan et al.'s (1983) increased emphasis on specific instructions is consistent with current thinking regarding the nature of attention and the role that specific knowledge plays in the development of attention (Hale & Lewis, 1979; Bereiter, 1985). Attention is no longer conceptualized as an abstract capacity or process, but as one's knowledge of what to pay attention to and what not to pay attention to. It is recognized that admonishing a student to "pay attention" or teaching a student to ask "Am I paying attention?" is likely to accomplish nothing unless the student already knows exactly what it is she should be paying attention to. In solving long

Continued on Page 5

Pretask Requests - *Continued from Page 2*

1987), there is a need for nonaversive techniques in managing sever behavior disorders. These procedures must be acceptable in integrated community settings and be referenced against normal standards of managing the behavior of nonhandicapped persons. One of these techniques is pretask requests which has had promising results in applied settings.

References

Catania, A.C. (1984). *Learning (2nd Ed.).* Englewood Cliffs, NJ: Prentice-Hall.

Dunlap, G. (1984). The influence of task variation and maintenance tasks on the learning and affect of autistic children. *Journal of Experimentol Child Psychology, 37*(1), 41-64.

Engelmann, S., & Colvin, G. (1983). *Generalized compliance training: A Direct-Instruction program for managing severe behavior problems.* Austin, TX: Pro-Ed.

Guess, D., Helmstetter, E., Turnbull, H.R.III., & Knowlton, S. (1987). Use of aversive procedures with persons who are disabled: An historical review and critical analysis. *Monograph of The Association for Persons with Severe Handicaps, 2*(1).

Hill, B.K., & Bruininks, R.H. (1984). Maladaptive behavior of mentally retarded individuals in residential facilities. *American Journal of Mental Deficiency, 88*(4), 380-387.

Horner, R.H., & Billingsley, F.F. (in press). The effect of competing behavior on the generalization and maintenance of adaptive behavior in applied settings. In R.H. Horner, G. Dunlap, & R.L. Koegel (Eds.), *Generalization and maintenance: Life-style changes in applied settings.* Baltimore, MD: Paul H. Brookes Publishing Company.

Mace, F.C., Hock, M.L., West, B.J., Lalli, J.S., Belifore, P., & Brown, D.K. (1987). *Applications of behavioral momentum concepts in the treatment of noncompliance.* Unpublished manuscript, Lehigh University, Bethlehem, PA.

Nevin, J.A., Mandell, C., & Atak, J.R. (1983). The analysis of behavioral momentum. *Journal of the Experimental Analysis of Behavior, 39*(1), 49-59.

Schalock, R.L., Harper, R.J., & Genung, T. (1981). Community integration of mentally retarded adults: Community placement and program success. *American Journal of Mental Deficiency, 85*(5), 478-488.

Singer, G.H.S., Singer, J.H.G., & Horner, R.H. (in press). Using pretask requests to increase the probability of compliance for students with severe disabilities. *Journal of the Association for Persons with Severe Handicaps.*

DI Gains in Big Piney Middle School Basic Skills Class

by Jonita Sommers

Big Piney, Wyoming

The Big Piney Middle School in Big Piney, Wyoming implemented a basic skills program in 1985-86. A class for reading and math in each grade was developed along with a spelling class for grades six, seven and eight. The second year, a language class for seventh graders was implemented along with the reading, math, and spelling classes. The third year, there were only classes in reading and math for sixth, seventh, and eighth graders. The basic skills classes were designed to help students who were having difficulty in the regular classroom, but were not qualified for placement in the resource room. This classroom was also to be used as one alternative before a student was referred for testing and placement in the resource room. However, if students were placed in the resource room, they were not to be placed in the basic skills classes except in very special cases.

A student participated in the basic skills program only if he or she met the placement criteria. All the children were given the Gates-MacGinitie Reading Test and the Stanford Mathematics Test when they entered the middle school. If a student scored below the 50th percentile, and the classroom teacher felt he or she was having difficulty in class, the student's achievement scores and last class grade were then evaluated. If the student was below the 50th percentile on the standard achievement test, and he or she had a D or F for his or her last class grade, the parents were then consulted. If the regular classroom teacher, the basic skills teacher, and the parents were in agreement, the student was placed in the basic skills class.

Following the recommendation procedures, the students were diagnostically tested and placed in the appropriate Direct Instruction program. The *Corrective Reading Program (Decoding)* was the core of the basic reading class. The *Corrective Math* programs were used along with the regular classroom book, *Heath Mathematics*. *Expressive Writing* was used in the basic language class. Warriner's *English Grammar and Composition* textbook was also used along with the DLM *Growth in Grammar* workbooks for the parts of speech. For the spelling class, the *Corrective Spelling Through Morphographs* program was used.

Each basic skills class contained 5 to 10 students and was blocked next the the regular, corresponding class so that the students could be moved as needed. In these classes, the students learned the skills they did not know, and they were then placed successfully back in the regular classroom.

Results

The Direct Instruction material has been very effective in our school. Over 70% of the students have gained 12 months in an 8 month period through their participation in the basic skills program. Plus, some of the students even gained over two years in this amount of time. Conclusively, this basic skills program has been very successful and a productive addition to the Big Pine Middle School.

The results of the basic skills program at the Big Piney Middle School appear in Table 1. The type of Direct Instruction program along with the testing instrument are listed with each set of results. The grade-equivalent years gained are listed for each student, except for the Test of Written Language, where standard scores (like I.Q. scores with a mean of 100 and a standard deviation of 15) are reported. On the Test of Written Language, no change (zero gain) would represent a year's gain in grade-equivalent scores. The gains for the second year of the program (1986-87) appear to be much greater than those for the first year of the program (1985-86).

Table 1. Summary of Student Gains: Grade-Equivalent Gains on the Gates-MacGinitie Reading Test using Decoding C.

Students	Months in Program	1985-86
8th Graders		
A	7	+2.3
B	7	+3.5
7th Graders		
C	7	+1.5
D	7	+1.8
E	2	+ .4
F	7	+2.1
G	7	- .1
H	7	+1.3
6th Graders		
I	7	+ .9
J	7	+ .9
K	7	+1.4
L	5	+2.1
M	3	+ .6
N	7	+ .7
O	7	+ .7
		Mean = 1.34
		1986-87
8th Graders		
P	8	+3.2
Q	8	+5.0
R	8	+1.7
S	8	+2.2
T	8	+2.0

Table 1. (continued)

Students	Months in Program	1986-87
7th Graders		
U	7	+1.8
V	7	+2.8
W	7	+1.4
		Mean = 2.51
6th Graders		
X	8	+1.4
Y	8	+ .2
Z	8	+ .5
AA	8	+1.1
BB	8	+1.8
		Mean = 1.0

Grade-Equivalent Gains on the Key Diagnostic Test using Corrective Math.

Students	Months in Program	1985-86
7th Graders		
A	8	+2.0
B	8	+ .7
C	8	+1.1
D	8	+ .5
E	6	+1.2
F	8	+1.7
		Mean = 1.2
		1986-87
G	8	+1.0
H	8	+2.0
I	8	+2.1
J	8	+1.5
K	8	+1.1
		Mean = 1.54
6th Graders		
L	8	+1.1
M	8	+2.0
N	8	+1.3
O	8	+1.3
P	8	+1.4
Q	8	+2.8
		Mean = 1.65

Grade-Equivalent Gains in Spelling on the Kaufman Test of Educational Achievement using Corrective Spelling Through Morphographs.

Students	Months in Program	1985-86
8th Graders		
A	7	+ .7
B	7	+1.0
C	7	+1.0
D	7	+ .7
E	7	+ .4
7th Graders		
F	7	- .9
G	7	+1.6
6th Graders		
H	4	+1.3
I	6	+ .4
J	7	+ .3
K	7	+2.3
		Mean = .80
		1986-87
F	7	+2.0
H	7	+1.0
L	8	+2.0
M	8	+1.9
N	8	+1.9
		Mean = 1.76

Standard Score Gains on the Test of Written Language using Expressive Writing.

Students	Months in Program	1986-87 (Written Language Quotient)
8th Graders		
A	6	-6 WLQ
7th Graders		
B	6	+7 WLQ
C	6	+21 WLQ
D	6	-2 WLQ

ivision problems, for example, she must now the steps involved in long division, which parts of the problem to attend to in rder to accomplish step 1, step 2, and so on. Specific instructions in how to solve long division problems may be described, from an attentional perspective, as instruction in what to pay attention to.

This increased emphasis on the teaching of specific academic strategies is also consistent with current thinking within the mainstream of educational psychology:

> The growing body of evidence in support of the role of domain-specific knowledge in skilled performance undermines approaches to training that rely almost exclusively on abstract, all-purpose strategies and skills (Warner & Sternberg, 1984, p. 213).
>
> These changes (in the child's reasoning and learning abilities) come about with the acquisition of specific knowledge, and these knowledge structures comprise theories that enable different kinds of thinking (Glaser, 1984, p. 97).

In short, the view that specific knowledge (which is composed of specific skills and strategies) is prerequisite to the development of higher level, more abstract thinking is now widely accepted. A question that remains to be answered is: Do the higher level thinking abilities come about more or less spontaneously as the child acquires a rich base of specific knowledge, or is it necessary to provide direct teaching in the higher level strategies as well as the more specific skills and strategies? This is a question of particular relevance to the study of learning disabilities, one to which I will return in the final discussion section of this paper.

Bottom-up vs. Top-down

Debate about bottom-up vs. top-down approaches has centered around the teaching of reading. Because the DI and holistic advocates have been more directly involved in reading instruction, this debate has more relevance to those two approaches than to the CBM approach.

The bottom-up vs. top-down distinction is closely related to what has been called the part-whole distinction. In terms of reading instruction, this part-whole distinction translates to bottom-up approaches in which reading is broken down into many component parts (i.e., skills and strategies) and top-down approaches in which the whole of reading (i.e., getting meaning) is not broken down into parts. Getting meaning from the print is the goal of both bottom-up and top-down approaches; however, the means by which they seek to accomplish that goal are very different.

The DI model of reading depicts reading as consisting of two major components-decoding and comprehension. Both decoding and comprehension are further subdivided into numerous subcomponents. Decoding accuracy and fluency are pre-requisites to comprehension; thus, instruction begins with specific decoding skills (e.g., letter-sound associations) and strategies (e.g., a sound blending strategy) and progresses in a highly structured, spiraling fashion to the higher level comprehension skills and strategies (Carnine & Silbert, 1979).

The holistic view is that getting meaning is the whole of reading and that attempts to break that whole down into parts will simply destroy the essence of the whole. Thus, in the language experience approach adopted by the holists, getting meaning is emphasized from the beginning of reading instruction and meaningfulness of reading materials is assured by having the students construct their own stories. Because the sounding of unfamiliar words is thought to interfere with the student's construction of meaning, both the teaching of phonics and corrective feedback for decoding errors are opposed in early reading instruction (Smith, 1983).

Although DI is appropriately classified as a bottom-up approach, it differs from other more behaviorally oriented bottom-up approaches (e.g., precision teaching, direct teaching, Staats' (1973) token reinforcement paradigm) in some important respects and it is similar to the holistic approach in other respects. Most relevant to the part-whole distinction is DI's concern for the "whole" of reading in contrast to the behaviorists' focus on isolated skills (Kazdin, 1981). This distinction is reflected in DI's development of curricula composed of a multitude of reading skills and strategies, in contrast to the behaviorists' development of techniques and procedures for teaching any isolated skill.

This is not to say the behavioral techniques are not important components of the DI programs; they are. However, behavior analysis is only one of three analyses involved in the DI approach. To understand DI's concern for the whole as well as the parts of any academic domain, it is necessary to understand the purposes of the other two analyses — the knowledge systems analysis and communications (stimuli) analysis. The knowledge systems analysis is conducted for the purpose of identifying samenesses across seemingly disparate bits of knowledge within the domain. The identification of relevant sameness(es) across different problems within a domain is essential to the organization of problems into sets (or classes and subclasses) and the subsequent design of problem-solving strategies that will be generalizeable to all examples within any given set. The communications (stimuli) analysis is conducted to determine ways of communicating those samenesses and generalizeable strategies to the learner in a faultless manner. Faultless communications prevent the acquisition of misrules and erroneous concepts (and therefore prevent over- and under-generalization) and assure acquisition of the intended rules and concepts (and therefore assure appropriate generalization). The knowledge systems and communications analyses together have been referred to as a "logical analysis" or a "structural analysis." It is important to note that the logical analysis involves not only the breaking down of knowledge systems into parts, but the identification of interrelations (revealed as samenesses and not-samenesses) among the parts. After the knowledge systems and stimuli analyses have been completed, behavior analysis comes into play for the purpose of assessing or evaluating the effectiveness of the teaching formats derived from the first two analyses. Engelmann and Carnine (1982) stress, however, that generalizeable and efficient learning cannot result from behavior analysis alone; the behavior analysis must be preceded by the logical analysis.

DI's concern for the whole of reading can be further illustrated by the way in which the numerous components are integrated to form larger and larger wholes. In the comprehension strain of Corrective Reading (Engelmann, Haddox, Hanner, & Osborn, 1978), for example, series of exercise are devoted to the teaching of thinking operations (e.g., analogies, deductions, classification, similarities inferences), comprehension skills (e.g., reasoning skills, vocabulary, information, writing skills), and concept applications (using information, organizing information, operating on information). As instruction progresses, the bits of knowledge acquired previously within a given series are integrated into other series. For examples, after the students has learned to complete analogies (e.g., a bear is to a paw as a man is to a __________; birds are to flying as fish are to ________) in analogies exercises and has learned classes (e.g., that bears, men birds, and fish are all in the class of animals) in classification exercise, then the two kinds of learning are integrated to teach the student a general strategy for constructing analogies: Begin with two things from the same class (e.g., a man and a bear,; or, a bird and a fish) and tell the same thing about both of the (e.g., a part of the body, how they move).

A complete grasp of the intricacy with which bits of knowledge are integrated both within and across DI programs is likely to be achieved only by those who experience a broad span of DI lessons either as a teacher or a student. The fact that classroom teachers and their students are not frequent contributors to the professional literature may account for the fact that this "integration" feature of DI has not been widely recognized. Yet it is an important feature, one that adds a holistic dimension to this approach that has most often been described as bottom-up and behavioristic.

In summary, the holists express a primary concern for the whole of reading; they do not attempt to specify the parts that constitute the whole. In contrast, DI curriculum developers begin with an analysis of the whole knowledge system known as reading; this analysis produces many parts which are then sequenced and recombined to reconstitute the whole.

Structured vs. Unstructured

The major distinctions to be discussed in this section can be stated as two questions: (a) Who should the instruction be structured by? and (b) Which elements of the instruction should be structured?

The holists contend that learning, if it is to be meaningful, must be a product of the learner's constructions or discoveries; meaningful learning cannot be programmed in advance by either teachers or curriculum developer. According to Smith (1983), the learner will learn so long as the environment does not communicate an expectation that she will not learn; the teacher's role is to simply guide and assist the learner as she is actively engaged in learning. Although Smith provides few suggestions as to how teachers might guide that learning, Brown (1984) describes this guiding process as diagnostic teaching or "response-contingent instruction, in which a learner's responses are analyzed carefully in order to determine the next instructional steps" (p. 58). Interestingly, this emphasis on analysis of the learner's responses (i.e., behavior analysis) is characteristic of approaches stemming from both holism and its antithesis, behaviorism. This response-locus of the holistic and behavioral approaches is in clear contrast to the stimulus-locus of DI that was described earlier.

The response-guidance provided by the holistic teacher is likely to be much less structured than the stimulus-oriented instructions contained in DI programs. DI teaching formats specify the exact wording to be used by the teacher as well as the exact responses to be expected of the students. The particular examples selected to teach concepts, rules, operations, and routines are carefully selected and sequenced. Techniques of presenting the formats (i.e., signalling, pacing, correcting) are also predesigned and specified in great detail. This type of structured instruction is a product of many hours of curriculum developers' time; it is not likely to be reproduced momentarily by a teacher as she is engaged in the ongoing activities of the classroom. Nonetheless, the holists oppose preprogrammed instruction, contending that is is unresponsive to the learner and to the individual differences among learners.

Like most behaviorists, Engelmann (1977) contends that individual differences in learner characteristics (e.g., learning styles) have less to do with learning than does good teaching. However, unlike the behaviorists but like the holists, he acknowledges the active role that the learner plays in learning. In discussing the limitations of behavioral theory and contrasting it with DI theory, Engelmann and Carnine (1982) stress the learner's inductive reasoning and organizational capacities. They differ from the holists, however, in that they believe that instructional stimuli can be structured and presented to the learner in such a way that she will use her inductive reasoning to discover the relevant structure of the problem at hand and she will use her organizational capacity to construct increasingly larger knowledge structures. To leave the analysis and structuring of stimuli to the learner, they contend, is to leave too much to chance.

The stimulus-vs. response-locus distinction is also relevant to the way in which CBM programs have been structured. Early CBM approaches, like the purer behavioral and the holistic approaches, adopted a response- rather than the a stimulus-locus. That is to say that they were more concerned with structuring or specifying the self-verbalizations to follow the learner's responses than they were with structuring or specifying self-verbalizations to reflect the structure of the problem to be solved. Self-monitoring, self-evaluation, and self-reinforcement were structured; self-instruction was not. The current recognition that new cognitive learning requires instruction, not just regulation, may be described as a trend toward a stimulus- rather than a response-locus, because it is a trend toward the structuring of events that precede the learner's responses.

To further illustrate the relationship between the stimulus-vs. response-distinction and the instruction vs. monitoring distinction, consider the verbal rehearsal strategy training involved in an early serial memory study by Tarver, Hallahan, Kauffman, and Ball (1976):[1]

> It will help you to remember if you say the name of each animal out loud as you see its picture and rehearse the names in groups like this: Say the name of each of the first two animals as you see them. Then repeat the names of both animals in the order in which you them (demonstrate). Then, say the names

Continued on Page 6

Cognitive Behavior Mod., DI, and Holistics —

of each of the next three pictures as you see them and repeat all three of those names in order (demonstrate). Then name the last two animal pictures as you see them. After that I will hold up a card just like one of the cards on the table and ask you to find one just like mine and turn it over. Let's do some for practice first (p. 379).

This type of training is instructional rather than regulatory; it is designed to communicate the cognitive strategies underlying skilled serial memory performance. It has a stimulus-locus; the instructions are delivered before the student is expected to perform the task. The self-monitoring, response-locus counter-part to this training might be training in asking "Am I remembering?" while engaged in the task.

Even though the Tarver et al. (1976) study was instructional, the results of the study later came to be interpreted as support for self-monitoring training (Hallahan & Reeve, 1980). In retrospect, it seems clear that interpretation was not consistent with the cognitively-oriented studies of memory on which the Tarver et al. (1976) study was based. More specifically, it was not consistent with Flavell's production deficiency hypothesis (Flavell, 1971) which states that young children fail to produce verbal mediation strategies spontaneously but that they are able to use such strategies to improve memory performance if the strategies are made available to them. Somehow, Flavell's hypothesis came to be misinterpreted by learning disabilities researchers as meaning that learning disabled children (like chronologically younger nondisabled children) have verbal mediation strategies available to them but simply do not use them. From this misinterpretation, it was concluded that training need not be designed to communicate the strategy to the child, and instead, should be designed to motivate and/or train the child to self-monitor her own performance. This conclusion was readily accepted, probably because it was in line with the 1970s trend toward adoption of CBM programs that were actually more behavioral than they were cognitive. In short, then, although Flavell's work had been conducted for the purpose of analyzing the cognitive structure of memory so that structure could then be communicated to the learner via verbal instructions, it came to be used as part of the rationale for CBM programs that failed to recognize structural analysis as a first-step in cognitive training.[2]

Meichenbaum's (1983) more recent writings, like those of the other CBM advocates, reveal an increased awareness of the need to determine component cognitive strategies before devising a behavioral training program. To accomplish this, Meichenbaum recommends that target behaviors be analyzed by: (a) taking the task oneself and performing an introspective analysis, (b) interviewing students who perform the task, and (c) observing students performing the task and inferring the nature of the skills and strategies involved. His consistent reference to "the task" suggests that Meichenbaum still has in mind an analysis that is more like the typical behavioral task analysis than a knowledge systems analysis. The target behavior analysis is likely to be focused on an isolated task (e.g., a particular math problem or a particular type of math problem) rather than on the larger cognitive domain (e.g., "mathematics"). Apparently, the inclusion of introspection, interviewing, and inferencing as appropriate methods of analysis is thought to add a cognitive dimension to the behavioral analysis; nonetheless, the analysis described by Meichenbaum is very different from the more holistic and more cognitively oriented structural analysis described by Engelmann and Carnine (1982) as essential to generalizeable cognitive learning. So long as CBM program developers focus on isolated tasks rather than cognitive domains and so long as they focus on behavioral responses rather than on stimuli, their training programs are likely to be composed of regulatory and/or self-regulatory activities rather than instructional and/or self-instructional activities.

As previously discussed, the structural analysis on which DI programs have been built has a stimulus-rather than a response-locus; instructional stimuli form the core of the programs. Although DI's early success was commonly attributed to the behavioral elements of DI (i.e., the behavior analysis), it is currently recognized that the cognitive elements (i.e., the knowledge systems and stimuli analyses) are more important. Several of Engelmann's colleagues have expressed the view that, if the DI technology is to be developed further by others in the future, a structural analysis of Engelmann's unique logical analysis must be conducted so that that structure can then be communicated to other program designers (Becker, 1984).

To summarize: (a) in holistic approaches, structuring of the instructional environment is left largely to the learner; the limited structure provided by the teacher has a response-rather than a stimulus-locus, (b) in the earlier CBM approaches, self-verbalizations that had a response-locus were structured by program developers; more recently, self-instructions that have more of a stimulus-locus have been structured also, and (c) in the DI approach, knowledge systems, instructional stimuli, and behavioral responses are analyzed and structured by curriculum developers.

Effectiveness vs. Ineffectiveness

The effectiveness of any instructional approach must be assessed in terms of the goals of the instruction. Because the discrepancy clause of the criteria for identifying learning disabilities specifies underachievement in language, reading, writing, or mathematics, it is assumed here that the primary goal of any approach to the education of students with learning disabilities is increased academic achievement in one or more of those areas.

The recent CBM literature acknowledges that attempts to teach broad cognitive strategies have had little success at achieving generalization. Meichenbaum (1983) suggests that increased emphasis on training at the metacognitive level may solve the generalization problem; however, Wagner and Sternberg (1984) caution that training in the use of general metacognitive strategies may be no more effective than training in the use of general cognitive strategies. If CBM programs designed to teach broad strategies are to become more successful at achieving new academic learning and/or generalization, it seems likely that changes over and above a change from the cognitive to the metacognitive level will be required.

The Deshler et al. (1983) and Hallahan et al. (1983) attempts to teach general strategies that are not quite so broad as Meichenbaum's (1983) have yielded equivocal results. Deshler et al. (1983) claim success at teaching specific learning strategies (e.g., scanning) and Hallahan et al. (1983) claim success at improving attention (e.g., time on task). However, neither of these research teams has provided evidence that improved performance on their experimental measures is related to increased academic achievement per se. It may be that scanning is unrelated to reading achievement; it may be that the direction of the cause-effect relationship, if one does exist, is the opposite of that predicted. In other words, it may be that increased reading achievement (accomplished by some means other than scanning training) improves scanning, but that improved scanning does not increase reading achievement. Similarly, it may be that increased math achievement (accomplished by some means other than self-monitoring training) increases time on task, but that time on task does not increase math achievement. In short, it may be that neither Deshler's scanning training nor Hallahan's self-monitoring training is meaningfully related to academic achievement. To avoid the type of cause-effect misinterpretations that have been all too prevalent in the field of learning disabilities, it is imperative that researchers measure not only performance on their experimental tasks, but performance on broader measures of academic achievement as well.[3]

Another flaw in much of the cognitive and metacognitive research with learning disabled students is a failure to control for subjects' possession of the prerequisite skills and strategies. The net result of this limitation is that research results have been interpreted as support for general metacognitive training when, in fact, instruction in the more specific prerequisites might have been more appropriate. In metacomprehension studies, for example, researchers usually have not pre-determined their subjects' ability to decode the reading passages accurately and fluently; thus, the subjects' poor performance on metacomprehension measures may have been due, not to metacomprehension deficits per se, but to deficiencies in the more basic decoding skills and strategies.

The DI model has been included in several large-scale field experiments in which a variety of performance measures have been collected and analyzed. In Project Head Start, the "Bereiter-Engelmann program and other highly academically oriented programs like it seemed to produce greater gains in both IQ and achievement test performance than did the less academically oriented programs" (Wagner & Sternberg, 1984, p. 188). Similarly, evaluations of the National Follow Through Project revealed significantly greater increases in basic skills, cognitive problem solving, and affective measures for students enrolled in the DI model than for students in an Open Education Model, a Cognitively Oriented Curriculum model (based on Piagetian theory), a Tucson Early Education Model (a language experience approach), or a Behavior Analysis model (Abt Associates, 1976-1977; Becker et al, 1981; Carnine, 1983).

A review of DI research with special populations led Gersten (1982; 1983) to conclude that "a reasonably large number of studies have shown that DI reading and language programs consistently produce higher academic gains than traditional approaches in both mainstreamed settings and self-contained classrooms across a range of handicapping conditions" (p. 14). And, finally, in a field experiment with learning disabled subjects, DI reading was compared to the eclectic reading instruction typically delivered in resource rooms; results revealed greater gains for the students receiving DI in word recognition, reading comprehension, speed of reading, and spelling. In summary, positive outcomes have been reported for DI across a variety of populations and a variety of performance measures (Lloyd, Epstein & Cullinan, 1981).

It has been said that holistic education has not been, and perhaps cannot be, the subject of formal evaluation. The pure holists contend that truly meaningful learning is too elusive to be measured; if that is the case, then there is no scientifically acceptable way to evaluate the approach. As mentioned earlier, however, several educational models based on Piagetian theory and the language experience approach were subjected to measurement and evaluated in the Head Start and Follow Through Projects; they were found to produce few, if any, gains on basic skills, cognitive problem solving, or affective measures. Other comparative studies that have failed to show favorable results for the language experience approach are summarized by Hallahan, Kauffman, and Lloyd (1985, p. 221). These findings are consistent with Wagner and Sternberg's (1984) conclusion that Piagetian theory " . . . lacks sufficient empirical support to serve, at present, as a basis for educational interventions. . . successively larger chunks of the theory are being undermined by new data" (p. 198).

In summary, research to date provides strong support for DI, equivocal support for some CBM programs and little or no support for the holistic approach.

Discussion

Future attempts to develop more effective approaches to the education of students with learning disabilities are more likely to involve some combination, integration, or synthesis of DI and CBM practices. Because the DI programs have already been demonstrated to be highly successful at producing academic achievement gains at the elementary level, it is likely that future efforts will be focused more exclusively at the secondary level. At the elementary level, the problem is not one of program development, but one of program implementation.

As attempts to develop effective secondary programs progress, the question posed at the outset of this paper will no doubt be

[1] This discussion should not be interpreted as a recommendation that researchers return to the study of memory and attention processes; to the contrary, direct teaching of academic strategies and skills is preferable. This memory study is discussed here to show how a misinterpretation of early process research may have misdirected some early attempts to develop programs to teach cognitive strategies directly.

[2] For a discussion of cognitive research and training that is more instructional in nature than the CBM programs included in the this paper, see Brown, Bransford, Ferrara, & Campione (1983).

[3] For a more in-depth discussion of this and related, issues, see Bereiter's (1985) article in which he states that much of the instructional research tied to a behavioral epistemology is flawed by the assumption that thought is actually defined by the task performance used to assess it.

Continued from Page 5

raised in a variety of contexts. In learning disabled students, will the higher level cognitive and metacognitive strategies come about more or less spontaneously with the acquisition of more specific skills and strategies, or will it be necessary to provide direct training in the higher level thinking strategies also? One way of addressing this question might be to conduct a series of studies in which performance gains under DI are compared to performance gains under DI + metacognitive training. For example, DI lessons on identifying contradictions might be compared to that same DI + "Am I identifying the contradiction?" Because DI programs are designed to assure prior knowledge of prerequisite skills and strategies (e.g., decoding accuracy and fluency, informational skills and strategies), subjects' possession of the prerequisite skills and strategies could be easily ascertained and controlled; thus, a major limitation of much of the existing meta-research could be avoided and the effects of self-regulatory training could be assessed more adequately. If DI + self-monitoring produced performance gains greater than these produced by DI alone, it could be concluded that approaches to the education of learning disabled students should involve direct training in self-monitoring as well as effective academic instruction. If, on the other hand, the self-monitoring treatment failed to produce gains greater than those achieved by DI alone, it could be concluded that self-monitoring training is unnecessary.

The latter hypothetical conclusion is consistent with Glaser's (1984) contention that self-regulation comes about with the acquisition of the specific knowledge that is "attained in learning situations that constrain this knowledge to serve certain purposes and goals" (p. 99). Accordingly, Glaser (1984) recommends that instead of thinking in terms of teaching the specific knowledge first and then teaching the self-regulation of that knowledge (i.e., the kind of thinking underlying the DI + self-monitoring approach described above), we should think in terms of "teaching specific knowledge domains in interactive, interrogative ways so that general self-regulatory skills are exercised in the course of acquiring domain-related knowledge" (p. 102)

It is my contention that Glaser's (1984) recommendation has already been implemented, to a significant degree, in existing DI programs. The editing and proof-reading exercise contained in several of of the DI programs may well constitute general self-monitoring or general self-correction training. Self-interrogation strategies are taught in many of the cognitive operation and cognitive routine formats; students are taught to ask themselves "How do I know?" after having produced the correct answer to a problem or question.

In addition, DI teaches a variety of reading comprehension skills and strategies that appear to be what the meta-people are calling executive decision making strategies. For example, DI teaches not only a variety of rules, but strategies for inducing rules in a variety of situations. As this type of rule learning progresses, it may grow into the executive decision making strategies that govern thinking. Rules, by definition, are selective; they define the situation in which a particular response or activity is or is not appropriate. Carnine and Silbert (1979, 343-347) have also designed discrimination of three types of faulty conclusions — those based on tradition, those based on improper generalization, and those based on coincidence. This kind of instruction appears to be a form of executive decision making instruction. In short, it may be that DI's success at increasing students' performance on measures of cognitive problem solving is due to the fact that many of the general cognitive and metacognitive strategies described by the meta-people are actually taught in DI programs.

In conclusion, current knowledge suggests that DI theory, principles, and programs provide a strong base on which to build effective instructional programs for learning disabled students at the secondary level. DI programs that employ a new videodisc technology are currently being developed to teach mathematics and science in the secondary grades; meta-instruction will no doubt be inherent in those programs just as it has been in the elementary DI programs. It may be, however, that CBM program developers can produce even higher levels of executive decision making training that can be combined with the DI programs to enhance their effectiveness.

It is suggested here that, if CBM program developers are to contribute to the development of effective secondary programs, it will be necessary that they pay more attention to the specifics of instructional stimuli.[4] For it is the stimulus-locus distinction, more than any other addressed in this paper, that separates the effective DI approach from the other less successful approaches. Specificity of instruction is important; but it is possible to have specific, response-oriented instruction that fails to produce new learning because it fails to communicate cognitive thinking that is not already in the students' repertoire. The integration of parts into wholes is important; but it is possible to teach parts that don't add up to a meaningful whole (i.e., skills and strategies that are unrelated to the ultimate goals of instruction). Who is to analyze the structure of cognitive learning may also be an important consideration; but it is possible that learners, teachers, curriculum developers, and researchers can produce equally valid and/or invalid analyses. Similarly, it can be argued that although a stimulus-locus will not necessarily assure valid analyses of knowledge systems and stimuli. If that is the case, then the extent to which the CBM advocates do or do not make meaningful contributions to future developments at the secondary level may be dependent, to a large degree, upon the extent to which they do or do not come to know and apply Engelmann's particular kind of logical analysis (as reflected in the DI theory of cognitive learning) to the higher levels of metacognitive learning.

About the author

Sara G. Tarver is an Associate Professor and Coordinator of the Learning Disabilities Teacher Certification Program in the Department of Rehabilitation Psychology and Special Education at the University of Wisconsin-Madison. She has been a public school teacher and consultant in both special and regular education. She received her Ph.D. from the University of Virginia. Address: Sara G. Tarver, Ph.D., Associate Professor, Department of Rehabilitation Psychology and Special Education, University of Wisconsin, Madison, WI 53706.

[4] See Durkin (1981) for a discussion of the absence of direct, explicit, reading comprehension instruction in regular classrooms and Bereiter (1985) for an in-depth analysis of instructional approaches that present a learning paradox because they must attribute to the learner prior knowledge that is at least as complex as the new learning to be acquired.

References

Abt Associates. (1976-1977). *Education as experimentation: A planned variation model* (Vols. 3A and 4). Cambridge, MA: Author.

Alley, G., & Deshler, D (1979). *Teaching the learning disabled adolescent: strategies and methods*. Denver: Love Publishing Company.

Becker, W.C. (1984). *Direct Instruction-A twenty year review*. Paper presented at the Annual Banff International Conference on Behavioral Science.

Becker, W.C., Engelmann, S., Carnine, D.W., & Rhine, W.R. (1981). Direct Instruction model. In W.R. Rhine (Ed.), *Making schools more effective; new directions from Follow Through*. New York: Academic Press.

Bereiter, C. (1985). Toward a solution of the learning paradox. *Review of Educational Research, 55*, 201-266.

Brown, A.L., Bransford, J.D., Ferrara, R.A., & Campoine, J.C. (1983). Learning, remembering, and understanding. In J.H. Flavell & E.M. Markman (Eds.), *Handbook of child psychology: Vol. 3. Cognitive development (4th ed.)* (pp. 77-166). New York: John Wiley & Sons.

Carnine, D. (1983). Direct Instruction: In search of instructional solutions for educational problems. In *Interdisciplinary voices in learning disabilities and remedial education*. Austin, Texas: Pro-ed.

Carnine, D., & Silbert, J. (1979). *Direct instruction reading*. Columbus, Ohio: Charles E. Merrill.

Deshler, D.D., Warner, M.M., Schumaker, J.B., & Alley, G.R. (1983). Learning strategies intervention model: key components and current status. In J.D. McKinney & L. Feagans (Eds.), *Current topics in learning disabilities*. Norwood, NJ: Ablex.

Durkin, D. (1981). Reading comprehension instruction in five basal reader series. *Reading Research Quarterly, 16*, 515-544.

Engelmann, S. Sequencing cognitive and academic tasks. In R.D. Kneedler & S.G. Tarver (Eds.), *Changing perspectives in special education*. Columbus: Charles E. Merrill.

Engelmann, S., & Carnine, D. (1982). *Theory of instruction: principles and applications*. New York: Irvington Publishers.

Engelmann, S., Haddox, P., Hanner, S., & Osborn, J. (1978). *Corrective reading: Thinking basics*. Chicago: Science Research Associates.

Flavell, J.H. (1971). What is memory development the development of? *Human Development, 14*, 272-278.

Gersten, R. (1982). A review of evaluation research (Part I) *Direct Instruction News, 2(1)*, 11-13.

Gersten, R. (1983). A review of evaluation research (Part II). *Direct Instruction News, 2(2)*, 11-16.

Glaser, R. (1984). Education and thinking: The role of knowledge. *American Psychologist, 39(2)*, 93-104.

Hale, G.A., & Lewis, M. (Eds.). (1979). *Attention and cognitive development*. New York: Plenum Press.

Hallahan, D.P., Kauffman, J.M., & Lloyd, J.W. *Introduction to learning disabilities. 2nd ed.* Engelwood Cliffs, NJ: Prentice-Hall.

Hallahan, D.P., Kneedler, R.D., & Lloyd, J.W. (1983). Cognitive behavior modification techniques for learning disabled children: Self instruction and self monitoring. In J.D. McKinney and L. Feagans (Eds.), *Current topics in learning disabilities*. Norwood, NJ: Ablex.

Hallahan, D.P., & Reeve, R.E. (1980). Selective attention and distractibility. In B.K. Keogh (Ed.), *Advances in special education (Vol. 1)*. Greenwich, Connecticut: J.A. I.

Kazdin, A.E. (1981). Behavior modification in education: Contribution and limitations. *Developmental Review, 1*, 34-57.

Lloyd, J.W. (1980). Academic instruction and cognitive-behavior modification: The need for attack strategy training. *Exceptional Education Quarterly, 1*, 53-63.

Lloyd, J., Epstein, M.H., & Cullinan, D. (1981). Direct teaching for learning disabilities. In J. Gottlieb & S.S. Strichart (Eds.), *Developmental theory and research in learning disabilities* (pp. 278-309). Baltimore, MD: University Park Press.

Meichenbaum, D. (1983). Teaching thinking: A cognitive-behavioral approach. In *Interdisciplinary voices in learning disabilities and remedial education*. Austin, Texas: Pro-ed.

Meichenbaum, D., & Goodman, J. (1971). Training impulsive children to talk to themselves: A means of developing self-control. *Journal of Abnormal Psychology, 77*, 115-126.

Poplin, M.S. (1984). Toward a holistic view of persons with learnings disabilities. *Learning Disability Quarterly, 7(4)*, 290-294.

Silbert, J, Carnine, D., & Stein, M. (1981). *Direct Instruction mathematics*. Columbus: Charles E. Merrill.

Smith, F. (1983). How children learn. In *Interdisciplinary voices in learning disabilities and remedial education*. Austin, Texas: Pro-ed.

Staats, A.W. (1973). Behavior analysis and token reinforcement in educational behavior modification and curriculum research. In C. Thoresen (Ed.), *Behavior modification in education, seventy-second yearbook of the National Society for the Study of Education, Part I* (pp. 195-229). Chicago: University of Chicago Press.

Stauffer, R.G. (1980). *The language-experience approach to the teaching of reading (2nd ed.)* New York: Harper & Row.

Tarver, S.G., Hallahan, D.P., Kauffman, J.M., & Ball, D.W. (1976). Verbal rehearsal and selective attention in children with learning disabilities: A developmental lag. *Journal of Experimental Child Psychology, 22*, 375-386.

Wagner, R.K., & Sternberg, R.J. (1984). Alternative conceptions of intelligence and their implications for education. *Review of Education Research, 54(2)*, 179-223.

Send Your Nominations for 1988 ADI Excellence Awards

Nominations are now open for the 1988 ADI Awards for Excellence in Education. Each year, ADI recognizes several individuals who have distinguished themselves by their commitment to excellence for all students through the technology of Direct Instruction. Since the awards were inaugurated in 1982, they have been given in three categories — teaching, (elementary and/or secondary), administration/supervision, and teacher training/research. We invite nomination in these categories again for the 1988 awards. In addition, we would like to encourage you to nominate people who, through Direct Instruction, have shown exemplary commitment to the education of all children — regardless of their job title or position.

It seems that people who advocate for students through Direct Instruction play different roles in different school systems. Often they are teachers, supervisors, or trainers, as our present categories indicate. But they can also be school psychologists, counselors, teacher aides, parents, school board members, etc. No role has the corner on the student advocacy market. Thus, we plan to accept nominations in an "open" category (in addition to our previous categories) in the 1988 ADI awards competition. If you know of someone who has been a long-time ardent supporter of students through Direct Instruction, please consider nominating them for an ADI award, regardless of their position or title.

Nominations should be made through a letter submitted to the ADI Board of Directors by June 15, 1988. The letter may be signed by more than one person, and you may enclose any supporting documentation which you deem relevant to your nomination. Send materials to:

Association for Direct Instruction
1988 Awards Committee
P.O. Box 10252
Eugene, OR 97440

ADI August 1988 Conferences & Institutes

• Training on all current Direct Instruction programs
• College Credit Available

The Association for Direct Instruction invites you to take advantge of these opportunities to get updated training on DI methods and materials. The presenters at these workshops are the Authors, Innovators and Researchers that have shown Direct Instruction works. . . for all students!.

14th Eugene Direct Instruction Conference

August 1-5, 1988

Eugene Hilton Hotel • Eugene, Oregon

Presenters include: *Zig Engelmann, Paul McKinney, Wes Becker, Bob Dixon, Randy Sprick, Marilyn Sprick, Gary Davis, Gary Johnson, Ann Arbogast, Ann Glang, Phyllis Haddox, Jerry Silbert, Maria Collins, Marcy Stein, Kathy Madigan, Linda Youngmayr*

Kansas City Direct Instruction Institute

August 8-12, 1988

Hyatt Regency Crown Center • Kansas City, Missouri

Presenters include: *Zig Engelmann, Paul McKinney, Ann Arbogast, Bob Dixon, and other ADI Trainers*

The Third Salt Lake City Direct Instruction Institute

August 15-19, 1988

Salt Lake City Red Lion (formerly Sheraton) • Salt Lake City

Presenters include: Randy Sprick, Marilyn Sprick, Adrienne Allen, Ann Arbogast, Bob Dixon, Phyllis Haddox, Gary Johnson, Pepe Quintero

Write or Call ADI for brochures with complete session descriptions and information.

Association for Direct Instruction
P.O. Box 10252
Eugene, Oregon 97440
(503) 485-1293

Direct Instruction in Kindergarten Part 1: The Model and the Curriculum

by Douglas Carnine*
Linda Carnine
Joan Karp
Paul Weisberg

In the United States, the proportion of our children living in poverty in the 1980's is the highest since 1967. A child's socio-economic status weighs heavily on the quality of the education she or he receives in the U.S. Former Secretary of Education Terrel Bell, recently claimed that, "The school reform movement has benefitted about 70 percent of our students, but has had no significant impact on the other 30 percent. . . The 30 percent are the low-income minority students, and we are still not effectively educating them." The cycle of failure begins early for these students. We know, for example, the 82 percent of the fourth graders scoring in the bottom quartile on standardized tests will never graduate from high school.

Yet, schools need not be powerless in breaking the link between poverty and failure in school. The intervention I will describe begins with five-year-olds, when most public schools begin teaching children. This intervention, called Direct Instruction, focuses on building students' academic competence. It's rationale is fairly simple and straight forward. Many five-year-olds from low income backgrounds enter school with far fewer academic skills and concepts than their more advantaged peers. Delaying academic instruction for disadvantaged students, because they are not "ready", will only widen the gap. Narrowing this gap requires early, intensive intervention.

This intervention requires assessing the students' skills and knowledge and beginning instruction at the children's level. Many children will have not had any preschool experience, and be unfamiliar with classroom schedules and activities. These children would not receive Direct Instruction during the first few weeks and then only instruction in oral language. Similarly, non-English and language delayed students would begin with just oral language instruction. Others will enter with the requisite skills for more sophisticated oral language tasks as well as for reading instruction.

Careful assessment is intended to take into account each individual's needs, including developmental maturity. Individual needs are not only met in initial placement but also in the rate at which children progress through the instructional programs. Ability groups allow students to progress more closely to their optimal rates. Group composition changes as the children's learning rates change.

The Kindergarten Child

Most preschool programs for four-year olds are child centered. Children are not only given a wide latitude in choosing what to do, but also experience virtually complete acceptance of their responses. A picture of scribbles is acknowledged for its pretty colors, the jangle of toy cymbals for the making of music. Working with others to cut out figures and paste then together is cooperative problem solving. Major goals are participation, cooperation, and expression. Consequently, the child explores more, participates more, expresses more and develops trust, seeing school as a safe place outside the home. The child is a success. An important transition from home to school has begun.

In contrast, first grade is almost always centered on academic content in reading, language arts, and mathematics, which creates the need for more rigid schedules. Choices are curtailed. Mere participation and expression by the children are no longer enough. A much narrower range of responses is acceptable. Reading the sentence "I saw the cat" and "Once upon a time" won't do; nor will calling a six, "nine." Success for some is much more elusive. Many of these children feel their success and confidence slowly erode.

The transition from preschool (as a four-year old) to first grade (as a six-year-old) is difficult. Educators vary in their beliefs about what should happen during this kindergarten transition. Many would like it to be more child centered like preschool; some advocate a content-centered approach. The resolution may be less crucial for children from middle class families than for children from low income backgrounds. Without a well-orchestrated transition from a child-centered to a content-centered environment, many of these children will not be successful in first grade and will all to soon fall into the ominous fourth quartile.

While kindergarten children need familiar activities, they must also experience success with content-centered activities. Although the kindergarten day is often no more than 200 minutes, both types of activities can be scheduled. In our experience, the difficult task is planning and implementing the content-centered activities so that students from a low-income background will succeed, and will enjoy themselves, producing competence and positive self-esteem.

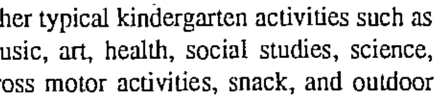
A Typical Direct Instruction Kindergarten Program

Though Direct Instruction kindergartens are similar to traditional kindergarten programs in many respects, there are several important differences. Children learn language arts and mathematics in groups of 6 to 12. Teacher's explain, demonstrate, and ask questions for 15 to 20 minutes in each subject area. The children write, answer questions and ask questions themselves. The small-group lessons are composed of short segments, each segment focusing on a specific skill or combination of previously-taught skills. These short segments closely approximate the attention span of kindergarten children, capturing their interest through fast moving and interesting learning activities. Frequent teacher-pupil verbal interactions with many games and races provide the children with a great deal of active participation and high engagement rates—about ten responses per minute with about 80 to 90% of the responses being correct. The teacher and a paraprofessional teach the small group lessons, running two groups concurrently while a third group of children works more independently at a learning or activity station.

Actual Direct Instruction with groups of children could take as little as an hour a day. The remaining kindergarten activities are often the same as those found in a typical kindergarten classroom. Children at activity stations have free choice. They choose from among a variety of child-centered activities such as building with blocks, looking at books, and playing with a doll house, sand and water table or computers. A fine-motor and manipulatives table would be equipped with puzzles, crayons, clay, and so forth. The remainder of the daily schedule includes other typical kindergarten activities such as music, art, health, social studies, science, gross motor activities, snack, and outdoor play. Direct Instruction is part of a complete kindergarten program. Its role is most crucial for children who are likely to have difficulty later with academic subjects.

Direct Instruction Curricula Content

The academic content of a Direct Instruction kindergarten program falls into two main areas: language arts and mathematics. In the language arts area, at least half of the instructional time is devoted to oral language instruction and practice that focuses on vocabulary, concept development, syntax, and logical thinking. Important instructional words and concepts such as *and, or, same* and *different*, comparatives, superlatives and inferences are systematically introduced and taught. The vocabulary component deals with the general knowledge concepts of time, space, location, classification, part-whole relationships, occupations, colors, shapes and patterns are also taught. Concept application activities synthesize earlier taught instructional goals. For example, multiple attributes, inferences, and knowledge of patterns are integrated in this Direct Instruction language activity. Students are shown these boxes:



The teacher states that the package with a ribbon and polka dot wrapping paper has paints in it. For each package the teacher then asks these questions:

Does this package have paints in it?

Why did you give that answer? For the first package, the students would answer . . . "Maybe". . . "Because it doesn't have polka dot wrapping paper."

The other half of language arts instruction entails actual reading instruction. The reading curriculum begins with brief segments, discrete reading subskills such as sound-symbol identification, blending, orally segmenting words, visual directionality, rhyming, and word reading. For the most part, however, reading instruction is holistic in nature. Within 4 weeks students have acquired a few sound-symbols correspondences and blending strategies; they are then given meaningful words to read in context. Although the subskills of the decoding process are taught in each lesson, an increasing amount of the student's time is spent using these skills to determine the meaning of words in context. Initially, students read short sentences and short simple stories. The children are encouraged to take their reading books home and read them to their families. The stories are written with meaningful vocabulary yet controlled for regularity, to provide the students the opportunity to practice the sounds the students have been taught. The number of irregular words in the stories is kept to a minimum, to reduce confusions about sound/symbol relationships. Reading a wider range of stories, including ones the children write themselves, is put off until later in the year.

Probably the biggest difference between the Direct Instruction and traditional reading readiness program is the way in which students learn sound symbol relationships. Direct Instruction teaches sound/symbol correspondences directly. The students learn, for example, that the sound "*mmmm*" is represented by the symbol *m*. The letters are not introduced in alphabetical order, but rather according to usefulness in creating words for the student to read. In addition letters that are likely to be confused are separated. For example, b and d, which appear very close together in the alphabet and cause most initial readers considerable confusion, are separated by many lessons, which reduces these confusions (Carnine, 1981).

Another difference is the way in which new letters are introduced and practiced. Each new letter is introduced on one day and then practiced until it's mastered, which usually takes no more than three days. (Although this rate of introduction is slower than in any other major reading program, a faster rate would overwhelm many kindergarten students. Faster-learning kindergarten students would be together in a group that would spend possibly only one day on each new sound.) Each previously introduced sound is also reviewed, in sound/symbol correspondence tasks and in word reading tasks in each lesson.

The distinctive characteristic of the math curriculum is that students practice a wide variety of skills every day. In a 20 minute lesson during the fall of the year, students will count pennies, claps, and pictures of various objects, identify numerals, write numerals and rote count to larger numbers. In the spring of the kindergarten year, students learn specific steps to solve addition and subtraction equations, translate orally-presented story problems into simple equations, and derive unknown facts from familiar facts. As is the case for the reading instructional program, the mathematics program has provisions for moving students through the material at a slow enough rate so that they master the content. This thoroughness is not characteristic of other mathematics programs.

Curriculum Design

Direct Instruction curriculum materials (*Mastery Reading, Mastery Spelling, DISTAR Language, DISTAR Arithmetic*) are designed to engage the teacher and students in frequent exchanges. A crucial aspect of curriculum design is specifying the explanations and questions teachers will use. As Lee Shulman recently noted ("Conversations from Wingspread", on PBS):

> ...at least as important is the ability to take the content they're teaching and find the ex-

Continued on Page 10

DI Kindergarten Model– *Continued from Page 9*

amples, the analogies, the demonstrations, the metaphors and the comparisons that will bring alive what is otherwise dead material. That is something you cannot do without having a very deep and rich understanding of teaching methods.

As paradoxical as it may sound, a deep and rich understanding of how to teach a subject requires an awareness of what students typically *mis*understand in the subject. For example, in beginning arithmetic, students will often write 8 as the answer to this missing addend problem: 3 + [ ] = 5. This error is common because in all previous problems, such as 3 + 5 = [ ] and 4 + 1 = [ ], students add two numbers and write the answer in the box: 3 + 5 equals [8]; but 3 + [8] does not equal 5. The cause of the error is a lack of understanding of the concept of equality. Students do not understand that the equal sign sets off two sides, both of which must have the same value. The sides must "balance."

Being aware of this potential misunderstanding, a well designed curriculum takes a proactive stance. So, in teaching simple addition, such as 3 + 5 = [ ], the students are required to circle the side that tells how many: 3 + 5 = [ ]. They then use "counters" in following these steps:

1. Make 3 lines for 3 and 5 more lines to show plus 5.
2. Count all 8 lines.
3. Indicate that they counted 8 on the side with 3 + 5, so they must count 8 on the side with the box (this is the equality rule), and then
4. Write an 8 in the box.

Note that each of these steps is taught as an individual skill before students ever encounter an addition problem. Automaticity on component skills facilitates integration of the components into a more complex skill (Kameenui & Carnine, 1986).

Once students become facile at simple addition problems, they are introduced to missing addend problems: 3 + [ ] = 5. The skill of circling the 5, the side that tells 'how many', highlights that the students already know the number for one side of the equation. Students who circle 3 + [ ] are reminded that the box doesn't tell how many, so 3 + [ ] can't be the side that tells how many.

After students circle the side with 5 in 3 + [ ] = 5, they are asked to apply the equality rule: "I count 5 on this side, so I must count 5 on the side with 3 plus box." The teacher points out that there are already 3 on that side, so the students must count from 3 until they reach 5. Each time they count, they make a mark under the box: "four", "five"

3 + [ ] = 5.
 ||

The two marks under the box indicate that two have been added, so the students write a two in the box.

Student mastery of missing addend addition grows out of the curriculum's anticipation of likely misunderstandings. This anticipation leads to preventive measures, which are built into the teaching of simple addition. Moreover, the steps in simple addition and missing addend addition employ the same component skills, further easing the transition to missing addend problems. In fact, the curriculum design analysis encompasses simple subtraction and missing subtrahend subtraction problems as well:

Simple Subtraction

7 - 3 = [ ]	Student circles side that tells how many.
7 - 3 = [ ]	Student makes mark for the first number.
7 - 3 = [ ]	Student minuses marks that must be removed.
7 - 3 = [ ]	Student counts four remaining marks on side with 7- 3 and makes same number of marks on side with box.
7 - 3 = [4]	Student writes 4 in box

Missing Subtrahend Subtraction

7 - [ ] = 4	Student circles side that tells how many.
7 - [ ] = 4	Student makes 7 marks for first numeral.
7 - [ ] = 4	Student circles 4 marks that must be counted on the side with 7 - [ ].
7 - [ ] = 4	Student minuses marks that must be removed.
7 - [3] = 4	Student counts how many marks were minused and writes the number in the box.

Note that the component skills are the same for addition, missing addend, subtraction, and missing subtrahend. This represents a tremendous efficiency, that is particularly important for lower-performing students. These students are more likely to succeed when they can learn fewer skills and learn to apply them in many different ways, such as in addition, missing addend, subtraction, and missing subtrahend problems. Efficiency and understanding are two overriding goals in instructional design.

These goals are often slighted in conventional basals. One mathematics basal introduced missing addend problems in this way: The teacher was instructed to write these problems on the board.

9 + [ ] = 10

9 + [ ] = 11

9 + [ ] = 12

The teacher then asked one student what number went in the box of the first problem. The teacher was then told to explain the second problem in the same way!

Teaching Techniques

The Direct Instruction teacher's guides specify the exact wording of explanations and questions that have been found to work well with a range of students. Consequently, the teachers can focus their energy on presenting the material to students and interacting with students who have particular difficulties.

There are numerous empirically-derived techniques for presenting Direct Instruction lessons to groups of students. The technique selected for illustrative purposes in this paper has to do with helping students who make mistakes. The idea is quite simple. When students make a mistake in carrying out a multi-step procedure, such as the one described for missing addend problems, the teacher should remind the students of the appropriate steps and not just give the correct answer. For example, if students make this mistake—4 + [10] = 6—, typically a teacher might say, "The answer is 2. Write 2 in the box." However, telling the answer doesn't help students learn the process. In a Direct Instruction lesson the correction procedure is specified; the teacher would remind the students of the steps they've learned: First circle the side that tells how many... How many do you count on that side?...So how many must you count on the side with three plus box?...You've got 4. Count until you have 6. Make a mark under the box for each number you count...Now write the answer that goes in the box..." When the teacher reminds students of the steps in the process, students receive helpful feedback about the process just when they need it, right after their mistake.

Time Utilization

The biggest problem facing a kindergarten teacher is insufficient time to give children the individual attention they need. Having children sit at their desks for an hour or more at a time and complete worksheets does not provide effective individualization. Young children need to interact more with people, not so much with sheets of paper. And, the teacher needs to maximize the amount of time spent with each child.

Direct Instruction responds to this dilemma with a compromise; academic instruction is done in small groups of 6 to 12 students in all subject areas—reading, language, and math. This compromise is best achieved by redefining the role of paraprofessionals. They do not just run off dittoes, prepare activities, and monitor seatwork; they *teach* a group of students, while the teacher teaches a second group of students. When paraprofessionals are not available, other options include recruiting volunteers to teach or making the instructional groups larger.

The other aspects of effective time utilization are familiar: Scheduling enough time for academic instruction (while still allowing for free play, music, and so forth), minimizing interruptions, employing motivation techniques to keep students on-task, and cutting wasted time in transitions.

Assessment

Two forms of assessment are important in planning and implementing Direct Instruction in kindergarten. The first has to do with identifying children who are in particular need of intensive academic instruction. The second is on-going monitoring of how students are learning during kindergarten, an early warning system for students who are not learning successfully or at an acceptable rate.

Identifying eligible students. The process of identifying potentially at-risk five-year olds is about as reliable as identifying gifted five-year olds. It can be done only with a large margin of error. Some children from low income backgrounds, although not exposed to books, papers and writing implements at home, are quite bright and will quickly learn academic skills. Yet, they may do quite poorly on readiness tests. Nevertheless, there are indicators that are reasonable predictors of later success in school.

A number of specific norm-referenced instruments for identifying at-risk students entering kindergarten are available. Measures such as the Preschool Screening Survey (Hainsworth & Hainsworth, 1980), Cooperative Preschool Inventory (Caldwell, 1971) and the Boehm Test of Basic Concepts (Boehm, 1971) provide valuable information for determining which kindergarten children might need a more systematic instructional program.

Informal assessments of student's academic and pre-academic skills–alphabet and numeral identification, knowledge of rote counting and object counting, matching letters, and holding a pencil and copying marks—should also be used by the kindergarten teacher. The best predictors of kindergarten success are those which most closely match the types of activities that children usually do in school (Keogh & Becker, 1973). This statistic is of some use: The average kindergarten child knows 13 letters of the alphabet upon entry to school (Anderson, Hiebert, Scott, & Wilkinson 1985); therefore, students who can identify six or fewer letters may need extensive work early on. Especially worthy of consideration are students who have difficulty matching letters. Most kindergarten children can also identify at least five or six numerals. Those who identify four or fewer numerals may need intensive intervention. Certainly children who have difficulty holding a pencil, writing or identifying the letters in their names merit thorough assessment.

A simple, yet important type of oral language item that can be used to identify at-risk students is verbatim statement repetition. A child is given a long statement such as "I go to the store to buy bread, butter and milk", and asked to say the entire sentence exactly as the examiner said it. Those students who, in four attempts, are unable to repeat the statement may be particularly good candidates for Direct Instruction.

Monitoring student progress. Criterion-referenced tests to monitor student (and teacher) performance are built into (or are available for) each Direct Instruction program. Items on these criterion-referenced measures are designed to correspond to specific instructional tasks so that remedial implications are clear. Student performance on specific classes of items can be easily utilized to define areas where additional instruction is required. Administrators can also utilize the results of these measures to identify areas in which there may be weaknesses in the instruction being provided.

In addition to criterion-referenced tests student progress is measured in terms of content coverage. Content coverage is typically measured in terms of lessons, where it is expected that a high-ability group will cover an average of from 1.2 to 1.5 lessons per day and the lowest group is expected to cover, on the average, at least .7 lessons per day. If groups are progressing at a slower than expected rate, the teacher evaluates how time is being used in the classroom. Changes in scheduling to increase the amount of instructional time and work on behavior management techniques to improve the utilization of instructional time are two frequent remedies for problems with content coverage.

Transportability

Direct Instruction is a system that works and can be made to work in many diverse situations. This transportability is extremely important. Consider Thomas Edison, who is well known for inventing the light bulb. What we forget is that the light bulb was fairly useless without an electric outlet. Po

Continued on Page 1

Direct Instruction in Kindergarten Part 2: Research Findings

y Douglas Carnine*
inda Carnine
ɔan Karp
aul Weisberg

Research on Direct Instruction

A Direct Instruction kindergarten is not ttractive to many early chilhood educators, ecause of its content-centered orientation. he larger issue, though, is the effect of such program on young children. As often is the ase, educators would like to be able to turn o research findings for guidance. This turns ıut to be difficult to do. The ideal require-nents for research that guides education ɔolicy include having

a. A sufficiently large number of students, both experimental and control.
b. Data collection and analysis conducted by outsiders.
c. A representative research setting.
d. Representative students.
e. Reasonably objective and reliable measures for major conclusions.
f. Random assignment of students to instructional program. Research on school-based programs rarely meet all the criteria. Educators are thus forced to weigh findings within the context of the adequacy of the research.

Such tempered judgments are clearly needed in looking at research on early childhood education. For example, almost all the recent attention to Direct Instruction in kindergarten stems from David Weikart and colleagues' research reports (e.g., Schweinhart, Weikart, & Larner, 1986). There are many reasons to be cautious in interpreting their data, even though they were able to randomly assign students to treament.

Only a very small number of students, about a dozen, completed both years of the Direct Instruction preschool program.

The Direct Instruction preschool program was administered by Weikart and carried out by teachers he hired. His staff collected and analyzed the data.

The research setting was his lab school located at the headquarters of his foundation.

The major conclusions were based on self-report data, not collaborated by objective measures.

Finally, Weikart's data are only for three- and four-year-old children. His results do not address the education of five-year-old children and therefore have no direct implications for kindergarten.

In short, national policy about organizing kindergartens should not be based on laboratory school research with self-report data conducted by program developers on about a dozen children who received Direct Instruction when they were three- and four-year olds.

Findings from Independent Researchers

There are research findings where students were five-years old in public school kindergartens, where thousands of students were involved, where students were taught in many public schools across the United States, where findings were based on more objective, reliable measures, and where data were collected by an outside, impartial agency. A quite different set of implications for organizing kindergartens emerge from these data.

The National Follow Through Project included a large scale longitudinal study of 13 major different approaches (including Weikart's and Direct Instruction) to teaching economically disadvantaged students in kindergarten through third grade. At the project's peak 75,000 low-income children, from 170 communities participated each year. A wide range of low-income communities was represented.

The evaluation of Follow Through was conducted by two impartial, independent agencies. The basic data for the Follow Through Evaluation were collected by Stanford Research Institute and analyzed by Abt Associates (Stebbins, 1976; Stebbins, Pierre, Proper, Anderson & Cerva, 1977.) A critique of the Abt findings (House, Glass, McLean, and Walker, 1978) and rebuttals by several groups were published in the same issue of the *Harvard Education Review*. (See also Bereiter & Kurland, 1981-82.) Many points of the House et al (1978) critique are valid, particularly those citing limitations of research designs where students are not randomly assigned to the experimental or control groups. However, the major findings of the national evaluation of Follow Through (summarized below) stand in spite of its shortcomings, in part, because of the consistency of the findings over time and across different school districts. These findings indicate very different effects for the Direct Instruction and Weikart High Scope programs for kindergarten students from low-income backgrounds.

Results: Normative performance. A major objective of the Direct Instruction Follow Through Program was to bring the achievement levels of disadvantaged primary-grade students up to the national average. The Abt Reports (Stebbins, 1976; Stebbins et al, 1977) provide median percentile scores by school(s) and by sponsor for four Metropolitan Achievement Test measures: Total Reading, Total Math, Spelling, and Language. The average of medians for the Direct Instruction sites (converted to percentiles) for students entering in kindergarten are presented in Figure 1. Figure 1 indicates that students in Direct Instruction from kindergarten through third grade are close to or at national norms on all measures. These positive findings were supported from interviews with the parents of Direct Instruction students and parents of students from other approaches. Parents of Direct Instruction students felt that their children had learned more than did parents of students in other instructional approaches (Haney, 1977).

A second objective in Follow Through was to determine whether some approaches were more effective than others. Each approach had the same amount of additional funding for each student and funds to help each school implement its approach. As shown in Figure 2, the differences between the Direct Instruction and the Weikart program were substantial in all four areas—1/2

Continued on Page 13

DI Kindergarten Model— *Continued from Page 10*

sibly a much greater accomplishment was Edison's engineering of the delivery system of electricity to our homes, offices and factories—power lines, transformers and the like. Similarly Direct Instruction is of only academic interest if we are not cognizant of its staff development requirements (Carnine and Gersten, 1984) and the educational change process with its stages of awareness, planning, implementation and institutionalization (Carnine, in press). Understanding the requirements for staff development and the change process allows educators to successfully install major innovations such as Direct Instruction and maintain them.

As Weikart noted in his recent essay (Schweinhart, Weikart, & Larner, 1986), "As such, its findings cannot be generalized beyond *well-implemented* versions of these curriculum models. . ." (p. 28). Weikart's research was conducted with students in his own High Scope laboratory school, with hand-picked teachers under his his direct supervision. No data on replications of the preschool are reported.

Schools seeking to improve kindergarten need programs that have been validated in real-world public schools, with tenured teachers, far from a program developer's tutelage. For this to be possible, the educational program must be explicitly described with reasonable requirements for implementation. With scripted lesson plans, an intensive, continuous staff development program (Carnine & Gersten, 1984), highly skilled local consultants, and other features, Direct Instruction is sufficiently explicit.

Being explicit does not make Direct Instruction simple or easy to implement. The thoroughness of the instructional programs and teaching procedures reveals student difficulties on a moment by moment basis. Responding quickly and constructively is extremely demanding. Similarly when students are moved too quickly or too slowly through the instructional programs, serious problems can result.

However, adequate implementation is quite feasible when teachers participate in appropriate staff development activities. This feasibility has been confirmed in a variety of communities by the Department of Education's Joint Dissemination Review Panel that validates educational programs as exemplary and qualifies them for national dissemination. During the 1980-81 school year, all 12 of the active Direct Instruction Follow Through projects were submitted for validation. Of the 12 districts 11 had 8 to 10 years of data on successive groups of children. The schools sampled a full range of students: large cities (New York, San Diego, Washington, D.C.); middle-size cities (Flint, MI; Dayton, OH; E. St. Louis, IL); rural white communities (Flippin, AR; Smithville, TN); a rural black community (Williamsburg, SC); a Mexican American community (Uvalde, TX); a Spanish American community (E. Las Vegas, NM): and an American Indian community (Cherokee, NC). One hundred percent of the projects were certified as exemplary in reading and mathematics for the primary grades, thus providing replication over 8 to 10 years and in a dozen quite diverse communities.

Expectations

Direct Instruction can benefit students in a number of ways and in a lasting fashion. These accomplishments are quite difficult to achieve, however. The cycle of failure found in many low-income schools reaches far beyond the students themselves. The cycle of failure and complacency must be broken for the staff of a school before it can be broken in the students. Yet, the staff will not, and actually shouldn't be expected to change their expectations until they see their students succeed. It's a circular problem; higher expectations come from demonstrations that the expectations are reasonable; yet, demonstrations that students can succeed require increased expectations. The resolution of this contradiction requires true educational leadership. Using the stick and the carrot, the educational leader creates an environment that leads to success for both the staff and the students—bringing to bear appropriately designed curricular materials, effective teaching techniques, all available time for instruction, a system for identifying eligible students and monitoring their progress, and intensive staff development. Teachers initially resist major changes such as those represented by Direct Instruction. However, once teachers see the results, most teachers accept the program (Gersten, Carnine, Zoref & Cronin, 1986).

References

Anderson, R.C., Hiebert, E.H., Scott, J.A., & Wilkinson, I.A.G. (1985). *Becoming A Nation of Readers*. Washington, D.C. National Institute of Education.

Boehn, A.E. (1971). *Boehn Test of Basic Concepts*, New York: Psychological Corporation.

Caldwell, B.M. (1971). *Cooperative Preschool Inventory*. Princeton, New Jersey.

Carnine, D.W. (in press). Barriers to improving reading instruction. In S.J. Samuels and P.D. Pearson (Eds.), *Building exemplary reading programs and initiating changes*. Newark, DE: International Reading Association.

Carnine, D.W. (1981). Reducing training problems associated with visually and auditorily similar correspondence. *Journal of Learning Disabilities*, 14, 276-279.

Carnine, D.W., & Gersten, R. (1984). The logistics of educational change. In J. Osborn, P.T. Wilson, and R.C. Anderson (Eds.), *Reading Education: Foundations for a literate America*. Boston: D.C. Heath.

Gersten, R., Carnine, D., Zoref, L., & Cronin, D. (1986). A multifaceted study of change in seven inner city schools. *Elementary School Journal*, 86(3), 319-331.

Hainsworth, P.K., & Hainsworth, M.L. (1980). *Preschool Screening System*. Pawtucket, Rhode Island: ERISYS.

Kameenui, E., Carnine, D., (1986) Preteaching versus concurrent teaching of the component skills of a subtraction algorithm to skill-dificient second graders: A component analysis of Direct Instruction. *The Exceptional Child*, *33*(2), 103-115

Keogh, B.K., & Becker, L.D. (1973). Early detection of learning problems: Questions, cautions and guidelines. *Exceptional Children*, 40, 5-11.

Schweinhart, L.J., Weikart, D.P., & Larner, M.B. (1986). Consequences of three preschool curriculum models through age 15. *Early Childhood Research Quarterly*, 1(1), 15-35.

Distar Language—
A powerful tool for teaching

A powerful tool for teaching:

- A basic vocabulary
- A rich body of knowledge about the world
- The oral language and writing skills needed to ask precise questions and to communicate ideas.

These are the abilities that a new report, *Becoming a Nation of Readers*, lists as being *important* to all children who are learning to read... *critical* for children who have not grown up with oral language that resembles the language of school and of books...because these abilities are the basis of comprehension.

And these are the abilities that teachers have been successfully teaching children for almost twenty years with Distar Language programs.

But Distar Language does more than teach the complex language skills needed to understand classroom instruction and comprehend written text. Distar Language programs go beyond the content of other language programs to give you the help you need to teach critical thinking skills, skills that enhance a child's intellectual development.

With Distar Language you teach logical thinking through:

Classification
Analogies
Deductive reasoning
Inductive reasoning

You teach students to be "THINKERS" who use language as a tool. And that is the foundation for eventual success in all school subjects.

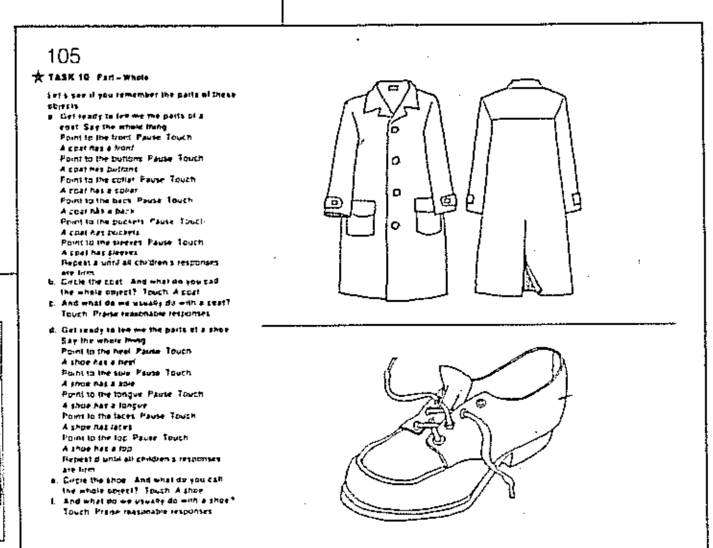
And now the Distar Language program is better than ever! Distar Language I has been revised to give you:

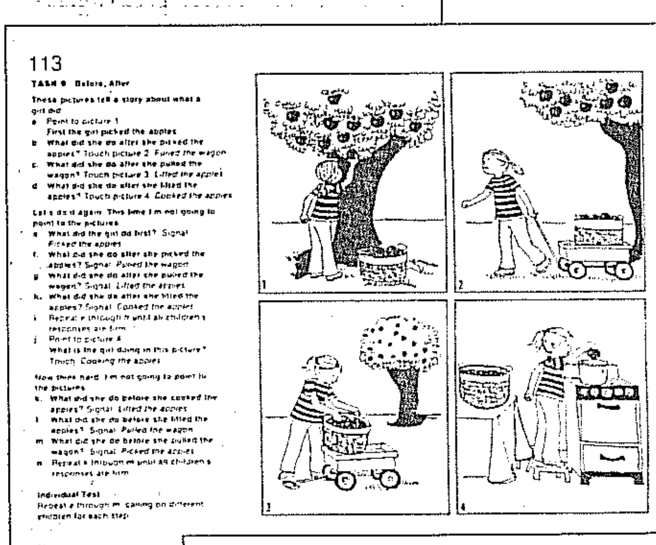
Expanded Language Activities—ideas for fun-to-do songs, read-aloud stories, nursery rhymes, and plays. These informal lesson extensions encourage students to apply their language skills in classroom activities. Language achieves full naturalness at a remarkably early stage.

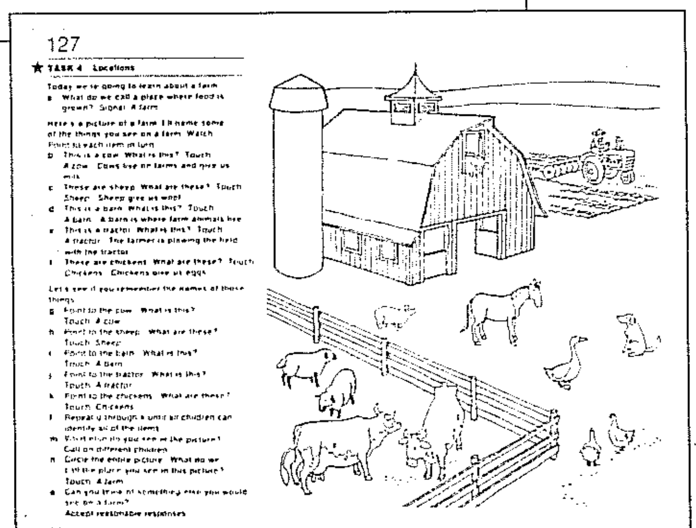
Fast Cycle—an in-lesson skipping schedule eliminates unnecessary drill and practice for average and above-average students. A "star" identifies the tasks that you teach to all students. You are free to skip the remaining exercises with the faster children. Lessons are easier to adapt to student ability.

Take-Homes—lively pencil and paper activities teach color, shape and workbook skills. Activities reinforce skills, demonstrate that students can apply language concepts. Illustrations are improved. There is more to do on each page.

Use this order form to receive these exciting new materials as soon as possible.







Examples from Teacher Presentation Book D

SRA®

Mail to: SRA, 155 N. Wacker Drive, Chicago, IL 60606

Quantity			Price	Extension
______	7-7340	Distar Language I Classroom Kit	$290.00	______
______	7-7346	Additional Teacher's Guide	10.00	______
______	7-57347	Take-Home Workbook 1 (pkg of 5)	$15.30	______
______	7-57348	Take-Home Workbook 2 (pkg of 5)	14.85	______
______	7-57349	Take-Home Workbook 3 (pkg of 5)	14.85	______

Ship to:

Date ______ SRA Account Number ______
Purchase Order Number ______
Ordered By ______
Account Name ______
Address ______
City, State, Zip Code ______
Attention ______
Telephone Number ______ Good time to reach ______

Sold to:

SRA Account Number ______
Account Name ______
Address ______
City, State, Zip Code ______
Attention ______
Telephone Number ______ Good time to reach ______
Tax Exemption Number ______
Preferred Delivery Method ______

All orders are offers to purchase, subject to acceptance or rejection by SRA in Chicago, Illinois, in accordance with SRA's published terms and conditions of sale. Customer pays all shipping charges. Prices subject to change without notice.

DI Kindergarten Research Findings— *Continued from Page 11*

standard deviation in reading, 3/4th of a standard deviation in spelling, and 1 1/4th standard deviation in math and language.

Results: Comparisons with districts' traditional programs. The results portrayed in Figure 2, which describe students' levels of performance, have a serious limitation; they do not compare students of comparable backgrounds from the same communities. Stanford Research Institute anticipated that potential short coming and incorporated comparison groups in their research design. An overview of the percent of statistically and educationally significant differences between an1 approach and the comparison groups is found Figure 3[1] (Becker & Carnine, 1980). The results are summarized across three groups of measures—affective, basic and cognitive academic. Positive percent numbers along the left border indicate more significant positive than negative comparisons; the negative percent numbers indicate more significate negative comparisons than positive. The net effect of the Weikart program ranges from slightly negative on affective measures to strongly negative on basic skill and cognitive academic measures. Over a third of the academic comparisons were negative in terms of both statistical and educational significance. This means that compared to similiar low income students in traditional K-3 programs, in about a third of the cases students in Weikart's program scored significantly lower on academic measures. In contrast, the net effect of Direct Instruction was positive, about a third of the comparisons being positive for academics and about a fourth for affective measures.

The affective findings from the Abt report are particularly noteworthy, although the measures suffer from low reliability (Stebbins et al, 1977).

> "...the performance of FT children in Direct Instruction sites on the affective measures is an unexpected result. The Direct Instruction model does not explicitly emphasize affective outcomes of instruction, but the sponsor has asserted that they will be the consequence of effective teaching. Critics of the model have predicted that the emphasis on tightly controlled instruction might discourage children from freely expressing themselves, and thus inhibit the development of self-esteem and other affective skills. In fact, this is not the case." (Abt IV-B: p. 73)

While these results indicate a clearly positive effect for students who begin Direct Instruction in kindergarten and continue through third grade, just the opposite seems true for students in Weikart's program. One explanation is that Weikart's High Scope curriculum provides benefits for only three- and four-year-olds, but not public-school age students. Another possible explanation comes from Weikart and his colleagues:

> "...previous research had found no outcome differences for programs lasting 1 year versus programs lasting 2 years... and extensive preliminary analysis of the data revealed no indication of program-duration effects in this study." (p. 22, Schweinhart, et al, 1986)

Shorter interventions with Weikart's High Scope program may in fact be better than longer interventions.

Figure 1. Percentile Scores for Third Graders on Four Scales of the Metropolitan Achievement Test for Direct Instruction and the Average USOE Findings for Title 1.

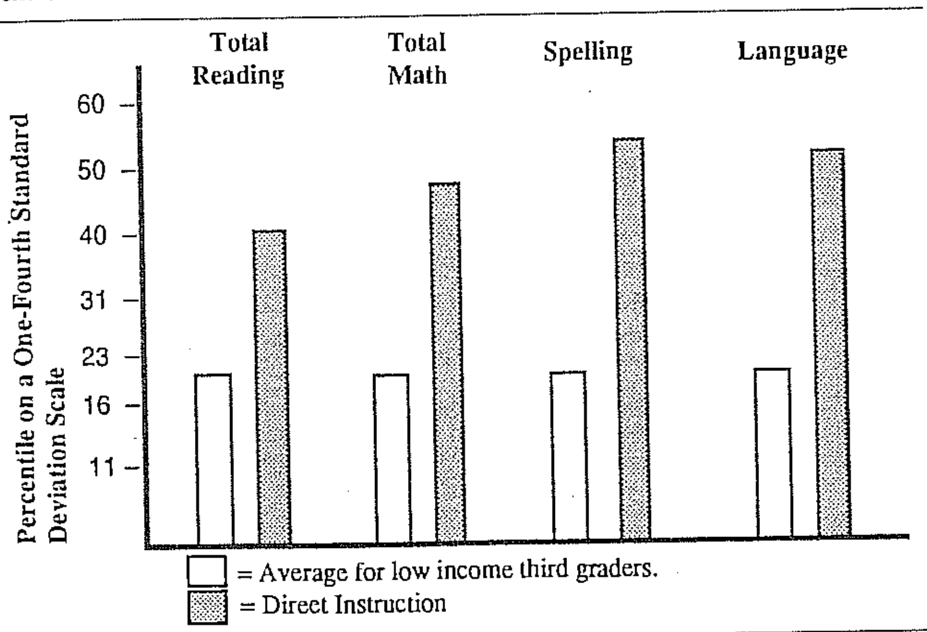


Figure 2. Percentile Scores for Third Graders on Four Scales of the Metropolitan Achievement Test for Direct Instruction, Weikart and the Average USOE Findings for Title 1.

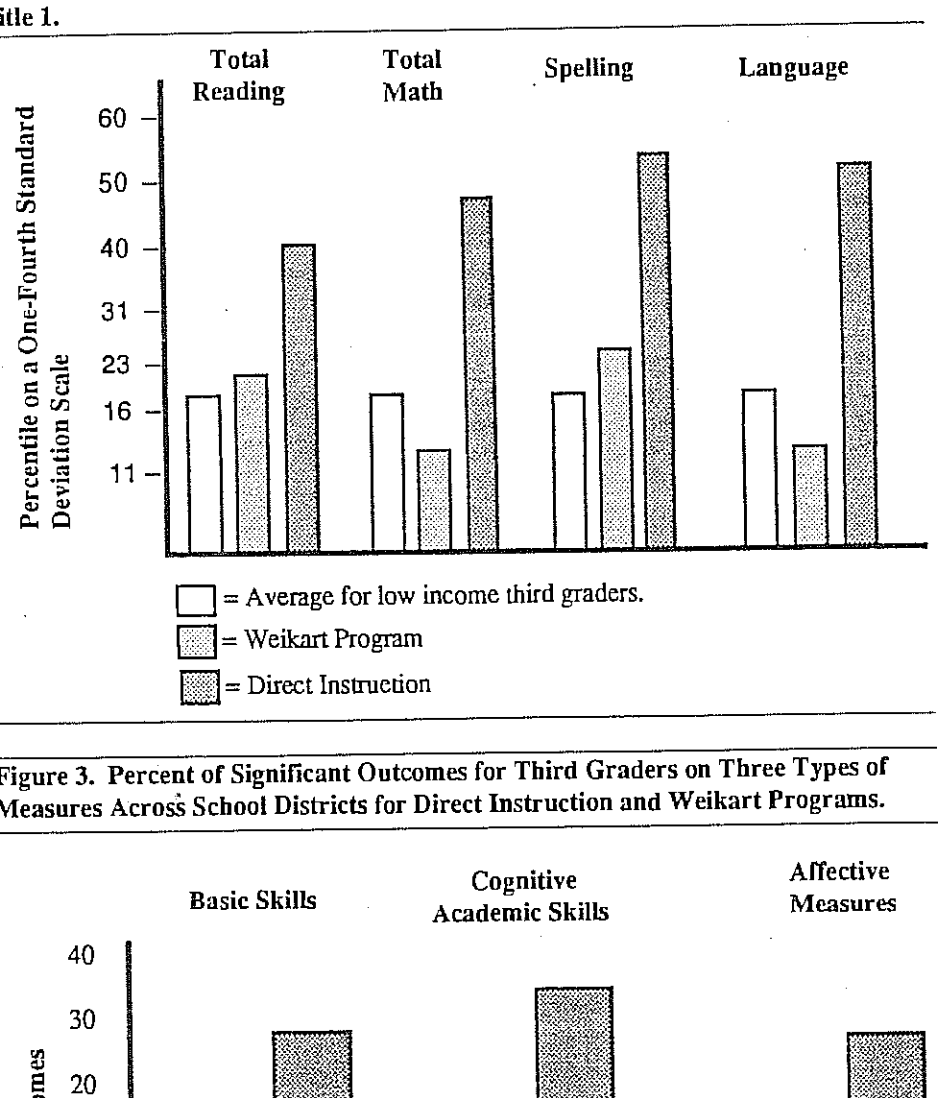
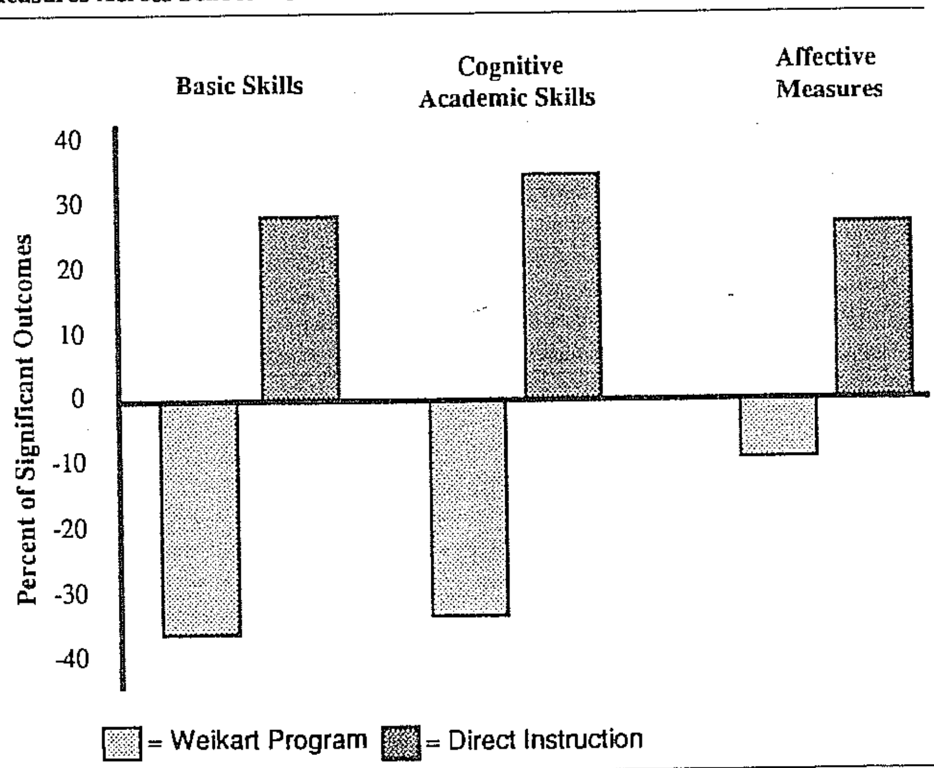


Figure 3. Percent of Significant Outcomes for Third Graders on Three Types of Measures Across School Districts for Direct Instruction and Weikart Programs.



Findings from Direct Instruction Researchers

The Follow Through results for Direct Instruction and for Weikart's High Scope program are for third-graders who entered school in kindergarten. The data provide information on the comprehensive K-3 intervention, but little information about the relative contribution of the kindergarten year. Partial answers to this question come from data gathered by the Direct Instruction Model itself.

The first data are from comparisons of students who entered Direct Instruction during the kindergarten year with those who entered the program in first grade. Third-graders who entered school in kindergarten and spent four years in Direct Instruction scored significantly higher on achievement tests than students who entered school in first grade (Becker & Engelmann, 1978). Also, Direct Instruction students who entered in kindergarten with IQ scores below 71 gained an average of 17 IQ points by the end of third grade. Students who entered school in first grade had an average gain of 9 IQ points. (These data include corrections for regression artifact.) For students with IQ scores between 71 and 90, the respective gains were 16 for kindergarten-entering students and 9 for first-grade entering students (Gersten, Becker, Heiry, & White, 1984). While these data suggest a powerful effect from kindergarten, they are not as conclusive as they might seem. The kindergarten and first-grade entering students were from different school districts, which is a serious confound.

This confound was avoided in one school district, which started a kindergarten program after having initially had the Direct Instruction program begin at first-grade (Gersten, Darch & Gleason, in press). This situation permitted comparisons within the same district of students who had Direct Instruction in kindergarten with students who began Direct Instruction in first grade. The upper-left quarter of Table 1 compares end-of-third-grade percentiles for Direct Instruction students who began Direct Instruction in kindergarten (four years of intervention) with students who began in first grade (three years of intervention). The differences are substantial in all cases. The lower-left quarter of Table 1 makes the same comparisons at the end of the ninth grade. The advantages of beginning Direct Instruction in kindergarten are still evident at the end of ninth grade even though the students were in traditional programs for six years.

The right side of Table 1 lists the scores for the comparison students who were in school from kindergarten through third grade or first grade through third grade. The p values in parentheses indicate significant differences between Direct Instruction and comparison students. For example, Direct Instruction students who entered the program in kindergarten scored at the 56th per-

Continued on Page 14

Footnote

[1]*The major findings of the ABT Report are given in a series of tables, one for each sponsor. For each measure, a covariance adjusted comparison was made with a local comparison group and with a pooled national comparison group. When the mean for the Follow Through students exceeded the non-Follow Through mean by at least 1/4th standard deviation on a given measure, and when the difference was statistically significant, this was considered an educationally significant outcome, and a plus (+) was placed in the table. When non-Follow Through exceeded Follow Through by the same criteria, it was considered to be a significant negative outcome, and a minus (-) was placed on the table. When the results fell between these limits, the difference was considered null and the table left blank. The number of pluses for Direct Instruction and for the Weikart program for each of the three types of measures was counted for the cognitive academic skills. (The Raven's Progressive Matricies test, which is not an academic measure, was excluded). Then, the number of minuses was subtracted, and the result was divided by the number of comparisons. Both local and pooled comparisons were included. Decimals were converted to percents by multiplying by 100.*

DI Kindergarten Research Findings— *Continued from Page 13*

centile in mathematics at the end of third grade. Comparison third graders who entered school in kindergarten scored at the 26th percentile. This difference is significant at the .01 level. All the differences are significant for students who entered in kindergarten; only four of the six differences are significant for students who entered in first grade.

An interesting pattern found in the data for the comparison students (the right side of Table 1) is that *they also benefit from the extra year of kindergarten instruction.* At both third grade and ninth grade, kindergarten-beginning students scored higher than first-grade-beginning students, though the differences are much smaller by ninth grade.

The importance of kindergarten is more dramatically demonstrated with the Direct Instruction students. The differences between Direct Instruction students starting in first grade and students starting in kindergarten—at third and ninth grade—suggest a dramatic, enduring effect from the extra year of intensive instruction provided by the Direct Instruction kindergarten.

Other longitudinal research. Follow up studies of Direct Instruction and comparison students were carried out with high school students in four other districts. All the significant differences favored the Direct Instruction students—five on academic measures, three on attendance, two on college acceptance and three on reduced retention rates (Gersten & Keating, 1987).

Research on Direct Instruction Preschools. Other researchers have conducted evaluations of just Direct Instruction preschool programs for four and five-year olds. One large longitudinal evaluation was conducted by the Seattle public schools. The report was co-authored by Weikart's High/Scope Foundation. The 2,883 economically disadvantaged children who participated in Seattle's Direct Instruction preschool program "achieved better educational placements than a comparable control group. . . only 11% of these youngsters left high school before graduation, which is a dropout rate two-thirds the size of the control group's 17% dropout rate . . . had more than twice the percentage of students in gifted education and a rate of placement at or above the age-appropriate grade that was 10 percentage points higher than that of the control group" (p. 18-19, Schweinhart & Mazur, 1987). The findings on placement in gifted programs are particularly noteworthy. The percent for Direct Instruction students was about the same as for the district as a whole, 8% versus 9%. Yet 95% of the Direct Instruction students were minority, while less than 50% of the students in the district as a whole were minority.

A final study was conducted by Weisberg (1983-84, 1987) at the University of Alabama. A total of 108 children, virtually all from low income backgrounds with 34% of the children from families receiving public assistance and 14% of the children in foster homes, received instruction over a nine year period.

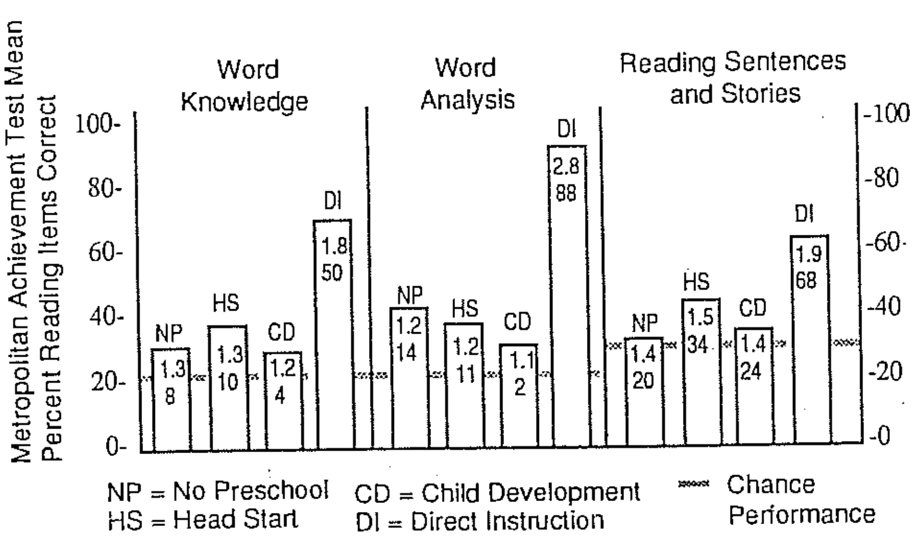
The first finding was that students who received two years of instruction, as four-year olds and five-year olds, scored significantly higher on standardized reading achievement tests than did students who had only one year of instruction. The extra year of instruction allowed the children to complete most of the second level of the Direct Instruction Reading program. (During this second year of instruction reading periods lasted 40 rather than 20 minutes.) This coverage of additional lessons seems largely responsible for the higher achievement of the students who had two years of instructions. In fact, the correlation between number of lessons completed and reading achievement was .92 ($p<.0001$), an extremely strong correlation.

Table 1. Percentile Scores for Direct Instruction and Comparison Students who Entered in First Grade and Entered in Kindergarten at the end of Third Grade and Ninth Grade.

	Direct Instruction Students		Comparison Students	
	Kindergarten Entering	First Grade Entering	Kindergarten Entering	First Grade Entering
End of 3rd	(*N*=56)	(*N*=96)	(*N*=45)	(*N*=45)
Reading	43	28	37 (.01)	28
Math	56	36	26 (.01)	16 (.01)
Language	68	56	52 (.01)	20 (.01)
End of 9th	(*N*= 54)	(*N*=59)	(*N*=121)	(*N*=13)
Reading	40	23	26 (.01)	18 (.05)
Math	30	19	20 (.01)	18
Language	59	42	39 (.01)	32 (.05)

(.01) or (.05) indicate significant differnce between Direct Instruction and comparison students. All significant differences favor the DI students.

Figure 4. Percent Correct Reading Subtest Performance on the MAT for First Grade Starting Age Students. Top Value in Bar Graph is Grade Equivalent Score; Bottom Value is the Percentile Score on the Test, not the Percent Correct.



The second finding stemmed from a comparison of students in Direct Instruction, Child Development, Head Start, and No Preschool programs. Students were given the standardized achievement test for end of first grade at the beginning of first grade. As shown in Figure 4, the Direct Instruction students scored at or above the expected grade level for the end of first grade. Moreover, the Direct Instruction students scored significantly higher than students in all the other groups, who scored at about the chance level. The Direct Instruction students' scores continued to be significantly higher than those of comparison students at the end of first grade and at the end of second grade.

Especially provocative was the word reading performance of the Direct Instruction students on the Wide Range Achievement Test. They were able to decode a large number of never-presented words, such as *size, weather, stalk, cliff, glutton,* and *threshold*. Students correctly read, on average, 95% of the 220 Dolch sight words, extending from pre-primer to third grade. Weisberg's results in Alabama as well as the Seattle findings and the Direct Instruction Follow Through results from 13 districts reflect the benefits of well-implemented Direct Instruction programs.

Conclusion

These results demonstrate that children from low-income backgrounds benefit from beginning Direct Instruction in kindergarten. These benefits were evident across a variety of measures, both at the end of third grade and in high school.

The most impressive results from Direct Instruction kindergarten involve personal experiences with individual students. For example, Antonio was the shyest student in his Direct Instruction kindergarten class. He would not talk in group for the first month and only then would whisper his answers. The teacher called on him each day and accepted his responses and encouraged him when he did answer. In April, one of the teachers from a non-Direct Instruction classroom came down the hall and said to the Direct Instruction kindergarten teacher, "I understand that your children can read. I would like to hear them." Antonio overheard the conversation and spontaneously said in a loud voice, "You want to hear me read." He promptly and proudly read her a passage from his book.

Stories like this are rare because school administrators are often too cautious to create the necessary environment for change or lack the needed knowledge of effective instructional process (Carnine, in press). The cliche "no guts, no glory" aptly describes the challenge and the failure of administrators in low- income schools. Phrased more mildly, if the problem were easy to solve, it would have been solved long ago. Remember though, we are the problem, not the children.

References

Becker, W.C., & Carnine, D.W. (1980). Direct instruction—An effective approach to educational intervention with disadvantaged and low performers. In B. Laney & A. Kazdin (Eds.) *Advances in child clincial pyschology: Vol. 3.* New York: Plenum.

Becker, W.C., & Engelmann, S. (1978). *Analysis of achievement data on six cohorts of low income children from 20 school districts in the University of Oregon Direct Instruction Follow Through Model.* Follow Through Project, Technical Report #78-1. Unpublished manuscript, University of Oregon.

Bereiter, C., & Kurland, M. (1981-2). A constructive look at Follow Through results. *Interchange*, 12, 1-22.

Carnine, D.W. (in press). Barriers to improving reading instruction. In S.J. Samuels and P.D. Pearson (Eds.), *Building exemplary reading programs and initiating changes.* Newark, DE: International Reading Association.

Gersten, R., Becker, W.C., Heiry, T.J., & White, W.A.T. (1984). Entry IQ and yearly academic growth of children in Direct Instruction programs: A longitudinal study of low SES children. *Educational Evaluation and Policy Analysis*, *6*(2), 109-121.

Gersten, R., Darch, C., & Gleason, M. (in press). The effectiveness of academic kindergartens for low income students: analysis and discussion. *Elementary School Journal.*

Gersten, R., & Keating, T. (1987). Improving high school performance of "at risk" students: A study of long-term benefits of direct instruction. *Educational Leadership*, *44*(6), 28-31.

Haney, W. (1977). *Reanalysis of Follow Through parent and teacher data.* Boston: Huron Institute.

House, E.R., Glass, G.V., McLean, L.D., & Walker, D.E. (1978). No simple answer: Critique of the "Follow Through" evaluation. *Harvard Educational Review*, 48, 128-160.

Schweinhart, L.J., & Mazur, E. (1987). *Prekindergarten Programs in Urban Schools.* Ypsilanti, Michigan: High/Scope Foundation.

Schweinhart, L.J., Weikart, D.P., & Larner, M.B. (1986). Consequences of three preschool curriculum models through age 15. *Early Childhood Research Quarterly*, *1*(1), 15-35.

Stebbins, L. (Ed.). (1976). *Education experimentation: A planned variation model (Vol.IIIA).* Cambridge, Mass.: Abt Associates.

Stebbins, L., St. Pierre, R.G., Proper, E.L., Anderson, R.B., & Cerva, T.R. (1977). *Education as experimentation: A planned variation model (Vol.IVA-D).* Cambridge, Mass: Abt Associates.

Weisberg, P. (1983-84). Reading instruction for poverty-level preschoolers-a seven year progress report. *Association for Direct Instruction News*, *3*(2), pp. 1, 16-18, 21.

Weisberg, P. (1987) *Accelerating the Reading Achievements of Poverty-Level Preschoolers by Extensive Training in Synthetic Phonics.* Unpublished manuscript. Tuscaloosa, Alabama: University of Alabama.

Language Experience Research—*Continued from Page 1*

—Continued from Page 1

Readiness vs. Beginning Reading

When Language Experience was used in kindergarten (or in 2 cases in first grade) as a readiness program (prior to another beginning reading approach), 10 comparisons favored Language Experience, 2 favored Basal, and 8 were non-significant. In first grade studies where Language Experience was the primary approach, 11 comparisons favored Basal approaches, 8 favored Language Experience, and 29 were non-significant. These grade differences were significant and imply that Language Experience may be more useful as a "readiness" program. A similar comparison was not possible with the meta-analysis studies because of their small number and the use of different measures (print concept measures as opposed to reading performance measures).

Recognition vs. Comprehension

The Language Experience Groups showed better effect sizes for word recognition measures than comprehension measures (means of .17 vs. .09 for USOE studies, and .33 vs. -.42 for non-USOE studies). The effects favor Language Experience Groups for word recognition and Basal Groups for comprehension and are both moderately large. The difference for type of measure is statistically significant for the non-USOE group.

Older vs. Newer Studies

Grundin (1985) has implied that Language Experience approaches have become more effective over time. To test this, we correlated year of publication with effect size for the non-USOE studies. (Since most of the USOE studies were done at the same time in the late 1960's, they could not really contribute to this analysis.) The overall Pearson r was -.18($N = 42$) and was not significant. However, the correlation for readiness (kindergarten) programs was +.46($N = 10$) and for beginning reading (first grade) studies was -.57 ($N = 32$). Only the later correlation was significant, and it implies that the use of Language Experience approaches between 1967 and 1986 became *less effective* over time when used as a beginning reading (first grade) program.

Standardized Testing vs. Naturalistic Measures

Some authors have suggested that children in basal reading programs are exposed to more test-like events in their instruction, biasing research findings toward basic-skills-oriented programs (e.g., Harste, 1985; House, Glass, McLean, & Walker, 1978). It has been suggested that more naturalistic measures should be used to assess more naturalistic programs—measures such as oral reading miscue analysis and attitude measures. In our analysis, however, the results for these more "naturalistic" measures mirrored those from standardized measures.

Discussion

The findings suggest that Language Experience approaches are more effective when used in kindergarten instead of a typical "reading readiness" program and seem to have greater effects on measures of word recognition than on measures or comprehension in the more recent non-USOE studies.

In looking at outlier studies showing strong effects (more than +1 or -1 s.d.), four favoring Language Experience focused on beginning reading either in the first grade or kindergarten. One other outlier study strongly favoring Language Experience was Stauffer's USOE study (Stauffer & Hammond, 1969) which provided a special program through three years, not just one. Four additional outlier studies showed Language Experience to be considerably poorer than Basal approaches. These were all evaluations of existing programs rather than experimental innovations. Two other studies involving the Follow Through Project (Stallings, 1975; Abt Associates, 1977) also found Basal programs superior to Language Experience approaches. In addition, they found the code-emphasis approaches (Oregon's Direct Instruction and Kansas' Behavioral Analysis Models) to be more effective than either the Language Experience or Basal approaches.

These results fit with stage models of reading acquisition. For example, Chall (1983) suggest that prior to formal reading instruction, children need to learn oral language, concepts about print, and expectations about reading— skills that Language Experience approaches deal with. Children next need to learn to decode print. The latter appears to be best accomplished through direct instruction of sound-symbol correspondences, rather than more indirect approaches such as Language Experience (see Anderson et al., 1985).

Downing (1979) also suggests three phases in learning to read: (1) a cognitive phase where the child becomes aware of the tasks involved, (2) a mastering phase where skills are practiced, and (3) an automaticity phase where practice leads to performing skills in larger "chunks" without conscious attention. Language Experience may best work in the "cognitive" phase by showing how written words relate to spoken words and provide for disadvantaged children the incidental learning about books that goes on in middle-class families. In the mastering phase, a more systematic approach to decoding than Language Experience may be needed. The data reviewed support the value of more systematic code-emphasis programs in the mastering phase.

For some fo the Language Experience approaches reviewed, it is possible that students actually spent less time reading and more time talking about what they were going to read or write. Harris and Serwer's (1966) observations of Language Experience and Basal programs found that children in Basal programs spent more time reading and this was directly related to reading achievement. Time spent on indirect activities were negatively correlated with achievement. This latter finding has been replicated by a number of researchers (see review by Berliner, 1981).

In summary, the question should not be whether Language Experience approaches are effective, but when effective, what are they effective for? It could be that the philosophy behind Language Experience— that the function of reading is to communicate— needs to be learned by children early, but that once learned, children need direct practice in decoding written language fluently and automatically.

References

Abt Associates (1977). *Education as experimentation: A planned variation model, Volume IV-B, Effects of Follow Through models*, Cambridge, MA: Abt Associates.

Anderson, R.C., Hiebert, E., Scott, J., & Wilkinson, I.G. (1985). *Becoming a Nation of Readers*. Champaign, IL: Center for the Study of Reading and National Academy of Education.

Berliner, D.C. (1981). Academic learning time. In J.T. Guthrie (ed.) *Comprehension and teaching: Research reviews* (pp. 203-226). Newark, DE: International Reading Association.

Chall, J.S. (1983). *Stages of reading development*. New York: McGraw-Hill.

Crismore, A. (1985). *Landscapes: A state-of-the-art assessment of reading comprehension research* 1974-1984. Bloomington, IN: Language Education Dept., Indiana University.

Downing, J. (1979). *Reading and reasoning*. New York, NY: Springer-Verlag.

Glass, G.V., McGaw, B., & Smith, M.L. (1982). *Meta-analysis in social research*, Beverly Hills, CA: Sage.

Grundin, H. (1985). A commission of selective readers: A critique of Becoming a Nation of Readers. *The Reading Teacher*, 39, 262-266.

Hall, M.A. (1977). *The language experience approach for teacher reading: A research perspective*. Newark, DE: International Reading Association.

Harris, A.J., & Serwer, B.L., (1966). The CRAFT project: Instructional time in reading research. *Reading ResearchQuarterly*, 2(1), 27-56.

Harste, J. (1985). Becoming a nation of readers: Beyond risk. In J. Harste (ed.) *Toward practical theory: A state of practice assessment of reading comprehension instruction*. Bloomington, IN: Language Education Department, Indiana University.

House, E.R., Glass, G.V., McLean, L.D., & Walker, D.F. (1978). No simple answer: Critique of the Follow Through evaluation. *Harvard Educational Review*, *48*, 128-160.

Stallings, J. (1975). Implementation and child effects of teaching practices in Follow Through classrooms. *Monographs of the Society for Research in Child Development*, *40*(7-8) Serial No. 163.

Stauffer, R.G. (1976). *Action research in L.E.A. Instructional Procedures*. Newark, DE: University of Delaware.

Stauffer, R.G. & Hammond, W.D. (1969). The effectiveness of language arts and basic reader approaches to first grade reading instruction - extended into third grade. *Reading Research Quarterly*, *4*, 468-499.

The Second Yakima Direct Instruction Conference
Washington State Inservice Day, Friday, March 18 & Saturday, March 19

Sessions:

Teaching Beginning Readers • Phyllis Haddox
Teaching Expressive Writing Skills • Jerry Silbert
Managing Chronic Behavior Disorders and Serious Emotional Disturbances • Geoff Colvin
Using Advanced Direct Instruction Skills • Ann Glang

Registration Form

Name ______________________________

Address ______________________________

City, State & Zip ______________________________

Day Phone ______________________________

__ I have enclosed $75.00 Conference Registration fee ($60.00 for ADI Members)

I would like to attend the session titled:

____

Conference Registration Information

Fees & Discounts: The fee for the conference is $75.00 per person, which includes lunch on Friday, and all workshop materials. ADI Members receive a 20% discount ($15.00). Contact Bryan Wickman at (503) 485-1293 for additional information.

Conference Dates and Times: March 18, 8:30 - 4:00 and continuing March 19, 8:30 - 1:00.

Optional College Credit: One unit of Graduate credit is available from the University of Oregon for $20.00 (in addition to the workshop fee).

Conference Location: Towne Plaza Inn, North 7th Street and Yakima Avenue, Yakima, Washington.

To Pre-Register: Please fill out the registration form. If none is available please write your name, address, phone and which workshop you wish to attend. Enclose with check or Institutional Purchase Order for the proper fee and mail to the Association for Direct Instruction, P.O. Box 10252, Eugene, Or., 97440.

For a brochure with session descriptions, write or call ADI.

The Association for Direct Instruction Presents–

The Second Midwest Direct Instruction Institute

June 27-29, 1988 • Woodfield Hilton & Towers
Arlington Heights, Illinois

Institute Sessions and Presenters:

"A" Sessions

DISTAR Reading Mastery I & II • Maria Collins
Reading Mastery III-VI • Jean Osborn
Teaching the Corrective Reader • Jane Fineberg
Issues in Implementation & Evaluation of Instructional Programs • Paul McKinney
Managing the Full Range of Behavior Problems • Geoff Colvin

"B" Sessions

Teaching Expressive Writing • Jane Fineberg
Effective Spelling Instruction • Maria Collins
DISTAR Language I & II • Jean Osborn
DISTAR Arithmetic I & II • Paul McKinney
Managing the Full Range of Behavior Problems (continued) • Geoff Colvin

Institute Registration Information

Where-When: To be held June 27–29, 1988, at the Woodfield Hilton Hotel & Towers, 3400 West Euclid Ave., Arlington Heights, Illinois, 60006.
How to Pre-Register: Use the form provided or write to ADI for a full brochure with session descriptions and Institute Preregestration form.
Training Fees and Discounts: The fee for the 3-day Institute is $145.00. Association members receive a 20% discount ($29.00). Groups of 5 to 9 participants receive a 10% discount. Groups of 10-19 receive a 20% discount. For groups of 20 or more, call for a quotation. Ask for Bryan Wickman at (503) 485-1293.
Lodging: The Association has negotiated a very special $69.00 single, $79.00 double room rate for the week of the Institute with theWoodfield Hilton Hotel. We encourage out-of-town participants to take advantage of the convenience of the free, secure parking, excellent location and quality service that the Hilton will provide. If you would like to make reservations by phone you may contact theWoodfield Hilton at (312) 394-2000. You need to tell them you are with the ADI Institute to receive the reduced rate. Early reservations are recommended.
College Credit: An optional 1 or 3 semester units of graduate or undergraduate college credit from Northern Illinois University are available for an additional fee of $72.00 per unit. For more information contact Kay Roddick at NIU (815) 753-6915.

Institute Schedule:

Monday, June 27, 1988
8:00–9:00 Institute Registration
9:00–9:30 Institute Opening
9:30–9:45 Coffee Break
9:45–12:00 "A" Sessions Meet
12:00–1:00 Get-Acquainted Lunch (included in fee)
1:00–3:30 "B" Sessions Meet

Tuesday, June 28, 1988
8:30–12:00 "A" Sessions Meet
12:00–1:00 Lunch (on own)
1:00–3:30 "B" Sessions Meet

Wednesday, June 29, 1988
8:30–12:00 "A" Sessions Conclude
12:00–1:00 Lunch (on own)
1:00–2:30 "B" Sessions Conclude

Institute Preregistration Form

Please print your name & agency affiliation as you would like it to appear on your name tag.

Name: ______________________

Agency: ______________________

Street Address: ______________________

City, State, Zip: ______________________

Phone: ______________________

___ I wish to attend the Institute. I have enclosed $145.00 ($116.00 for ADI members).

My "A" and "B" session choices are listed below.

"A" ______________________

"B" ______________________

For office use	Date	Fee	Check	PO#	By

Join the Association for Direct Instruction

Membership Options:

A) Regular Membership: $15.00 per year (includes one year of *DI NEWS* and a 20% discount on ADI sponsered items and events).
B) Student Membership: $7.00 per year (includes one year of *DI NEWS* and a 40% discount on ADI sponsered items and events).
C) Sustaining Membership: $30.00 or more per year (includes regular membership privileges and recognition of your support in the *DI NEWS*).
D) Institutional Membership: $50.00 per year (includes 5 subscriptions to the *DI NEWS* and membership privileges for 5 staff people).
E) *DI NEWS* Subscription only: $5.00 per year (outside North America and Hawaii $10.00 per year).

ADI sponsored products and events include books and other materials published or marketed by the Association for Direct Instruction. The ADI NEWS is published 4 times a year (Fall, Winter, Spring and Summer).

To join the Association, complete the lower portion of this form and mail it, with your check in U.S. funds to:

Association for Direct Instruction
P.O. Box 10252
Eugene, OR. 97440

Check one:
I wish to become an Association member. Please enroll me as a:

____ Regular Member ($15.00 annually)
____ Student Member ($7.00 annually)
____ Sustaining Member ($30.00 or more annually)
____ Institutional Membership ($50.00 annually)
____ I wish to subscribe to the DI NEWS only ($5.00 annually; $10.00 outside North America & Hawaii)

Name: ______________________

Address: ______________________

City, State, Zip: ______________________

ADI MATERIALS PRICE LIST

Theory of Instruction
By Siegfried Engelmann & Douglas Carnine
Membership Price $20.00 — List Price $25.00

Direct Instruction Reading
By Douglas Carnine & Jerry Silbert
Membership Price $24.00 — List Price $30.00

Direct Instruction Mathematics
By Douglas Carnine, Marcy Stein & Jerry Silbert
Membership Price $24.00 — List Price $30.00

Teach Your Child To Read in 100 Easy Lessons
By Siegfried Engelmann, Phyllis Haddox & Elaine Brunner
Membership Price $12.00 — List Price $15.00

Generalized Compliance Training
By Siegfried Engelmann & Geoff Colvin
Membership Price $16.00 — List Price $20.00

Structuring Classrooms for Academic Success
By Stan Paine, J. Radicchi, L. Rosellini, L. Deutchman, C. Darch
Membership Price $8.00 — List Price $10.00

Members of the Association for Direct Instruction may purchase copies of the materials listed above at the Membership price. Shipping charges are $1.50 per book for 1-5 books and $1.00 per book for orders of 6 or more. Orders are to be paid in U.S. Funds, in advance. Purchase orders are also accepted. Please allow 4 weeks for delivery.
ADI cannot provide copies for entire classes nor can we provide desk copies. All such requests must be made to the publisher of the specific book.

SEND YOUR CHECK OR PURCHASE ORDER TO:

ADI

Association for Direct Instruction
P.O. Box 10252
Eugene, OR. 97440
(503) 485-1293