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Children's First Reading Lesson: Variables Influencing Within-Lesson Emotional Behavior and Postlesson Achievement

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Variables related to reading achievement were hypothesized also to be related to emotions during reading instruction. Test variables selected were skill in word analysis and synthesis (WASS) and reading instruction approach (phonics, blending required, versus whole word, nonblending). The children were 20 5-year-old prereaders and the reading materials were from the Ball–Stick–Bird system. Lessons were videotaped and the children's emotions were rated along the dimensions of hyperactive/distractible, hostile/aggressive, and anxious/fearful. Their WASS was related to hostile/aggressive behaviors. Reading instruction approach was related to hyperactive/distractible behaviors. The interaction of WASS and reading instruction approach reveal that the two kinds of reading training are differentially effective for different children.

Emotional behaviors of children during reading instruction have not received much, if any, attention from researchers. One can think of possible reasons for this cognitive bias, some of which are (a) it is difficult to define and measure emotional behaviors, (b) emotional behavior measures may not provide any new information beyond the more easily quantified achievement measures, and (c) emotional reactions may not change in a systematic way with independent variables. These reasons for neglecting emotional behaviors during reading instruction can be evaluated experimentally, and the present study attempts to do this.

The research strategy employed was as follows. Two independent variables were identified that research has shown to affect achievement measures of learning to read. Children were given reading lessons according to the experimental design determined by the independent variables, and achievement measures of learning were obtained after each reading lesson. The children were videotaped during the reading lessons. Emotional behavior measures were derived from the videotapes by means of a group of raters who were unaware of the different experimental conditions. The raters used a specially designed rating scale that defined three dimensions; namely, hyperactive/distractible, anxious/fearful, and hostile/aggressive. The impact of the two variables on achievement measures and emotional behavior measures were assessed and compared.

One variable selected, reading instruction approach, is a task variable that refers to the inclusion or exclusion of "blending" training within reading instruction. Children who receive blending training are provided with explicit strategies that will enable them to pronounce a word if the word's pronunciation is not known on sight. Educators often label this as a phonics versus a whole word approach. Research in phonic letter training with preschoolers indicates that phonic blending training is necessary for positive transfer to a word-learning task (Carnine, 1977; Silberman, Note 1).

The effect of blending versus nonblending reading instruction appears to be related to

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the second variable selected for study (Fox & Routh, 1976). The second variable is a subject variable that measures metalinguistic functioning, or a child's sensitivity to the linguistic properties of spoken words, and will be labeled "word analysis-synthesis skill" (WASS; Goldstein, 1976). High scorers in WASS are good at segmenting a spoken work into syllabic and phonemic parts (analysis) and are good at saying the whole word from which a sequence of spoken word parts originated (synthesis). Studies indicate that WASS correlates with reading achievement (e.g., Calfee, Lindamood, & Lindamood, 1973; Chall, Roswell, & Blumenthal, 1963; Ehri, 1975; Goldstein, 1976; Rosner, 1973).

With respect to the possible reasons that researchers do not study emotional behaviors during reading instruction, the expected results were (a) it is possible to reliably measure emotional behaviors during beginning reading instruction, (b) achievement measures would be affected by the variables of reading instruction approach and children's WASS, and (c) emotional behavior measures would also be affected by these two variables and would provide novel insights beyond those obtained from the achievement measures. Separate from the emotional behavior data, it was anticipated that the variables of WASS and reading instruction approach would interact. That is, the best reading instruction approach would be the one that matched children's WASS; namely, phonics for high-WASS children and whole word for low-WASS children.

Method

Subjects

Twenty 5-year-olds (10 males and 10 females) from four summer day care centers in Nacogdoches and Lufkin, Texas, completed the study. Thirty-one children were initially screened. Two were excluded because they knew some of the training words and/or letters. Nine were excluded because they were absent from one of the reading sessions. All but one of the children were Caucasian and all were from middle-class backgrounds. Average chronological age was 5 years and 4 months (range = 5 years, 0 months to 5 years, 8 months), with a standard deviation of 2 months. Average IQ based on the American Peabody Picture Vocabulary Test (PPVT) was 105.1, with a standard deviation of 11.5.

Training and Test Materials

WASS Test

A shortened version of the WASS was used to determine levels of metalinguistic functioning. This task has children break spoken words into phonemic or syllabic segments (word analysis) and also has them guess the whole word from which a sequence of spoken word segments was derived (word synthesis). Two criteria were used to determine high or low metalinguistic functioning: total number correct and total number of words analyzed or synthesized using phonemes.

PPVT

The Peabody Picture Vocabulary Test was used to estimate the intellectual functioning of 20 children. The administration of the PPVT followed the standard format (Dunn, 1966).

Reading Instructional Materials

Reading instruction for all children was based on the Ball–Stick–Bird reading system developed by Fuller (1974, Note 2). In this phonics system a distinctive features approach is used to teach visual recognition of the 26 uppercase alphabet letters. For example, the letter *K* is described as a big stick, |, with a bird, <, flying into it. One sound is assigned to each letter, except for the letters *E* and *O*, which are given two sounds. The letters are introduced in a nonalphabetical sequence. Children are taught to build up the sound of a word through a procedure in which consecutive letter sounds are blended two at a time. The reading system is embedded within a fictional story that begins with the first lesson.

All 20 children received reading training based on the first 10-minute reading lesson from the Fuller method. In this lesson, four letter sounds are introduced (T, I, O, D), formed into words (TOD, IT, DID, DOT), and put into two sentences (TOD DID IT and DOT DID IT). The reading lesson was repeated for the three reading training sessions.

The blending group received the first lesson of Fuller's system as it is usually given. The nonblending group also received the first lesson. However, they were required simply to say the words that were usually blended after the experimenter pronounced them. Both blending and nonblending groups received the same words in the same order. Although the nonblending group seemed to require somewhat less time to finish a session than the blending group, this time difference was considered to be minimal and was not quantified.

Achievement Measures

Letter/word test. The letter/word test was used to assess achievement after each of the three reading training trials. It consisted of all the letters and words used in the training session (T, I, O, D and DOT, TOD,

DID, IT). Each letter or word was printed on a separate index card.

The test was introduced to each child with a standard set of instructions. The cards were randomly presented. For a card with a letter on it, the child was asked, "What sound does this letter make?" If the card had a word on it, the child was asked, "What does this word say?"

The experimenter followed a standardized script for presentation of the letters and words. At certain timed intervals, if the child had not made a response, in the case of letters, or had made only a partial response, in the case of words, the experimenter asked whether the child would like to continue or move on to the next letter or word. A maximum of 12 sec was allowed for each letter and 42 sec for each word. The task required approximately 3 to 4 min to complete.

Story test. The story test consisted of the last two pages of the first 10-minute reading lesson from the Fuller reading system. In these two pages, the words presented to the child during the reading lesson (TOD, DOT, DID, and IT) are placed into a story context. The child was asked to read the following: "TOD" (accompanied by a picture of a boy), "DOT" (accompanied by a picture of a girl), "TOD DID IT" (accompanied by a picture of Tod blowing a bubble-gum bubble), and "DOT DID IT" (accompanied by a picture of Dot blowing a bubble-gum bubble). The number of words that the child was able to spontaneously recall (out of a maximum of 8) was used as the score for the story test.

Transfer task. The transfer task consisted of all words or near words that could be formed from the four letter sounds used during the reading training sessions other than the training words. These include TID, IT, TOT, DIT, OTO, and DOD. A procedure similar to that employed for the letter/word test was followed for presentation of the transfer task and the task instructions were the same.

Emotional Behavior Measures

Twenty undergraduate students obtained from summer psychology courses at Stephen F. Austin State University served as raters. Raters assessed a child's emotional behavior during a particular reading session by observing each videotaped reading training session for that child and completing a behavior rating questionnaire for that session. Some of the behaviors for the questionnaire were based on Spivack and Swift (1966) and the remainder were generated by the authors.

One child, out of the 20 children, was randomly designated the "common child." The common child's videotaped reading training sessions were rated by all 20 raters. Each of the 20 raters also rated the videotapes of one other child, randomly selected from the group of 20 children. Thus, each rater rated the videotaped reading sessions for two children: the common child and the individual child assigned to him. The common child was included as a member of the group of 20 children. In order to do this, one of the raters rated the common child and a child who was also assigned to another rater. The common child's ratings as given by that rater were then included in both the overall ratings for the common child and the ratings for all the children. The other child's ratings as rated by that rater were not included in the experiment.

Each rater scored the videotaped reading training sessions on 2 successive days. On the first day, the rater scored the first and second reading training sessions for both children. On the second day, the same rater again rated the second reading training session and also the third session for both children. If on the second day the rater noticed that one of the reading sessions from the previous day had been repeated, the rater was informed to rate the session as it appeared today. A total of eight questionnaires, one questionnaire per reading training session, were completed by each rater.

The raters were instructed as follows:

> Today you will be shown four videotaped sessions of children learning to read. It will take you about 30 minutes to view them. Tomorrow you will also have four sessions to view. Before each session you will receive a behavior questionnaire [see Table 1]. On this questionnaire there are three questions. Each question has a number of behaviors listed under it.
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> Those behaviors describe the way a child might react to the reading training. For example, the behaviors listed under the first question are those that a child who has a hostile/aggressive attitude toward the reading training might engage in. Those behaviors for the second question might be considered anxious-fearful behaviors. The third question lists behaviors that might be engaged in by a child who has a hyperactive/distractible attitude toward the reading training.
>
> At the end of each videotape, look at the first question. If the child ever engaged in the particular behaviors listed, place a check mark in the "yes" column. If the child did not engage in those particular behaviors, then place a check mark in the "no" column. After you have done this, mark down on the percentage line for this question the percentage of time, out of the total time spent in the session, during which the child engaged in the particular behaviors you are judging. When you make your decision, consider the particular behaviors listed under that category and/or similar behaviors that the child might have engaged in. Above each mark on the percentage line, write the percentage number out (examples: 0, 35, 100). Follow the same procedure for each question.
>
> The percentages for the three questions do not need to sum to 100. It may be that the child never showed these or similar behaviors and you would mark the "0" percent point for each question. On the other hand, you may decide to mark the "100" percent mark for one or all questions. It is up to you. Please take as long as you wish. After you have finished, hand me [the experimenter] the questionnaire, take a new questionnaire from the stack, and wait for the next videotape to be shown.

Procedure

Each child received three reading training sessions preceded by two pretesting sessions and followed by one posttesting session, one session per day for 6 consecutive days. The experimenter performed all pretesting and posttesting and taught the reading lessons. In the two pretesting sessions the child received the letter/word

test, the PPVT, and a shortened version of the WASS test. If a child knew any of the letters or words on the letter/word test, the child was excluded from consideration as a participant in the experiment.

Children were assigned to high- or low-WASS conditions based on an examination of the frequency distribution of the scores of 20 children who took the WASS test (see Table 2).

Table 1
The Behavior-Rating Questionnaire

Behavior	Presence: Yes	Presence: No
Hostile/Aggressive Behavior		
Did the child ever:		
act defiantly?	____	____
speak disrespectfully to the teacher?	____	____
not follow instructions?	____	____
behave rudely?	____	____
appear antagonistic?	____	____
deliberately make mistakes?	____	____
refuse to work?	____	____
mime the teacher?	____	____
resist feedback?	____	____
start working before receiving instructions?	____	____
For what percentage of time did the child show hostile/aggressive behaviors such as the ones above?		
• • • • • • • • • • •		
0 10 20 30 40 50 60 70 80 90 100		
Anxious/fearful behavior		
Did the child ever:		
get upset when he made a mistake?	____	____
answer slowly?	____	____
show sensitivity to criticism?	____	____
sit quietly?	____	____
give up easily?	____	____
cry?	____	____
get upset when he/she did not know the answer?	____	____
appear outwardly nervous?	____	____
hesitate or seem anxious about knowing the right answer?	____	____
ask to stop the lesson or leave the room?	____	____
For what percentage of the time did the child show anxious/fearful behaviors such as the ones above?		
• • • • • • • • • • •		
0 10 20 30 40 50 60 70 80 90 100		
Hyperactive/distractible behavior		
Did the child ever:		
give an irrelevant answer to the teacher's questions?	____	____
interrupt the teacher?	____	____
squirm?	____	____
become impatient?	____	____
make irrelevant remarks?	____	____
look at things other than testing booklet?	____	____
call out answers before being asked?	____	____
ask when the lesson would be over?	____	____
often ask the teacher to repeat instructions?	____	____
For what percentage of the time did the child show hyperactive/distractible behaviors such as the ones above?		
• • • • • • • • • • •		
0 10 20 30 40 50 60 70 80 90 100		

Table 2
Subject Characteristics of the Four Groups

High WASS					Low WASS				
Child	Age in Months	IQ	Sex	WASS	Child	Age in Months	IQ	Sex	WASS
		Blending					Blending		
1	67	117	F	12	11	65	114	M	6
2	65	100	F	7	12	68	97	M	4
3	62	123	M	6	13	60	109	F	3
4	67	107	F	6	14	65	92	M	2
5	63	111	M	6	15	60	89	F	0
M	64.80	111.60		7.40		63.60	100.20		3.00
SD	2.04	7.93		2.33		3.14	9.70		2.00
		Nonblending					Nonblending		
6	65	127	M	9	16	68	89	M	5
7	64	105	F	7	17	64	123	F	4
8	68	113	F	6	18	66	101	M	3
9	65	100	F	6	19	62	101	F	4
10	61	92	M	6	20	65	92	F	1
M	64.60	107.40		6.80		65.00	101.20		3.40
SD	2.24	11.94		1.17		2.00	11.91		1.36

Note. WASS = word analysis-synthesis skill; M = male, F = female.

The original plan was to assign the children above the median score to the high group and the children below the median score to the low group. The median WASS score was 6. In order to maintain equal size groups, it was necessary to assign one of the seven children whose WASS score was 6 to the low group. To help do this in as nonarbitrary way as possible, we took into consideration a child's number of WASS items correct that involved phoneme segments. The basis for this action was the fact that WASS for syllable segments is acquired earlier than that for phoneme segments (Liberman, Shankweiler, Fischer, & Carter, 1974). Four of the seven children with a WASS score of 6 were assigned to the high group because they had one item correct that involved phoneme segments. One of the remaining three children was randomly selected and assigned to the low group. The effect of doing this was to reduce slightly the size of a WASS effect, and thus this action is a conservative one in terms of rejecting the null hypothesis.

The 20 children were assigned to the four experimental conditions, each consisting of 5 children: (a) high WASS–blending, (b) high WASS–nonblending, (c) low WASS–blending, and (d) low WASS–nonblending. Within high- and low-WASS groups, subjects were randomly assigned to blending or nonblending conditions. Once the children had been assigned to either blending or nonblending training, the experimenter did not consult the children's WASS scores until completion of the study. Table 2 presents the subject characteristics of the four groups. A 2 × 2 analysis of variance performed on PPVT IQ scores with independent variables of (a) score on the WASS and (b) type of reading training, revealed no significant differences among groups (all $ps > .10$).

Behavioral ratings of the children's usual classroom emotional behavior were obtained by having each child's primary teacher complete the Behavior Rating Scale for the Preschool Child (Behar & Stringfield, 1974) for that child. Four teachers completed the scale.

Three reading training sessions followed on consecutive days. Recall that the same author (Charles Scherzer) was involved in giving reading instruction and testing but efforts were made to minimize the possible bias of this "nonblind" procedure. For each session, the child received the letter/word test followed by presentation of the first lesson of Fuller's (Note 2) Ball–Stick–Bird reading method. Blending training was included or excluded in the reading method, depending on the child's experimental condition. Each reading lesson lasted approximately 10 minutes and was videotaped. The letter/word test was again presented following the reading lesson. In the posttesting session the child received the letter/word test and the transfer task. On completion of the reading training, videotapes of the three reading training sessions for all children were rated using the author-designed behavior questionnaire.

Results

Reading Achievement Measures

Letter/word test. Two analyses of variance were performed on the number of correct responses made to the letter/word test given after each of the three reading training sessions. Both analyses included three in-

dependent variables: (a) score on the WASS (high or low), (b) type of reading instruction approach (blending or nonblending), and (c) session, which is a within-subject variable (Session 1, 2, or 3). The sex of a subject was not included as a factor because of the small and unequal number of males and females per cell and because of our lack of theoretical interest in this factor for this study.

The first analysis had as its dependent variable the number of letters correctly recalled after each reading training session. For this analysis, score on the WASS approached significance, $F(1, 16) = 4.16$, $.05 < p < .10$, $MS_e = 2.71$. The mean number of letters recalled for the high-WASS group was 1.23, and for the low-WASS group, .37. Neither of the other two main effects reached significance (both $ps > .10$).

The interaction between the factors of score on the WASS and sessions proved to be significant, $F(2, 32) = 9.01$, $p < .01$, $MS_e = .25$. The mean numbers of letters recalled in the first, second, and third sessions for the high-WASS group were .80, 1.30, and 1.60, respectively. For the low-WASS group, the means were .50, .60, and .00. Simple main effects analyses revealed that the high-WASS scorers knew significantly more letters than the low-WASS scorers after the third session: Session 1, $F(1, 18) = .50$, $MS_e = .894$; Session 2, $F(1, 18) = 2.15$, $.10 < p < .25$, $MS_e = 1.14$; Session 3, $F(1, 18) = 11.33$, $p < .01$, $MS_e = 1.13$. Furthermore, the change over sessions in number of letters known by high-WASS scorers was significant, $F(2, 18) = 6.21$, $p < .01$, $MS_e = .26$, as was the change over sessions for the low-WASS scorers, $F(2, 18) = 4.04$, $p < .05$, $MS_e = .26$. None of the other interactions reached significance (all $ps > .05$).

The second analysis of variance performed on the number of words remembered at the end of each reading training session revealed no significant effects for any of the three independent variables or their interactions (all $ps > .25$).

Story test. A 2 × 2 analysis of variance was performed on the number of words recalled by a child while reading the story at the end of the third reading training session. Independent variables included score on the WASS and type of reading instruction approach. The analysis revealed that high-WASS scorers recalled significantly more words than did the low-WASS group, $F(1, 16) = 6.15$, $p < .025$, $MS_e = 2.35$. The mean number of words recalled by the high-WASS group was 3.20, and by the low-WASS group, 1.50. The independent variable, type of reading instrument approach, was not significant ($p > .25$).

There was a significant interaction effect, $F(1, 16) = 6.15$, $p < .025$. The mean number of words recalled by the high-WASS–blending group was 4.00, and for the high-WASS–nonblending group, 2.40. The mean for the low-WASS–blending group was .60, and for the low-WASS–nonblending group, 2.40. Simple main effects analyses revealed that high-WASS scorers recalled significantly more words than did low-WASS scorers when both groups received blending training, $F(1, 16) = 12.30$, $p < .01$. These two groups did not differ when both received nonblending training. Also, high-WASS scorers did better, but not to a significant degree, with blending than with nonblending instruction, $F(1, 16) = 2.72$, $.10 < p < .25$, whereas low-WASS scorers did better, almost to a significant degree, with nonblending than with blending instruction, $F(1, 16) = 3.45$, $.05 < p < .10$.

Transfer task. The results of the children's performance on the transfer task were not computed. Only one child, from the high-WASS–blending group, successfully pronounced any of the transfer words.

Emotional Behavior Measures

Prestudy emotional measures. Were children in different experimental conditions different in emotional behaviors before participation in the experiment? To answer this question, the following analyses were performed. Three 2 × 2 analyses of variance were performed on the teacher ratings of the children's usual classroom emotional behaviors given prior to any reading training (Behar & Stringfield, 1974). Independent variables included (a) score on the WASS and (b) type of reading instruction approach. The dependent variable for the first analysis was score on the hyperactive/distractible dimension of the Behar-Stringfield scale; for the second analysis, score on the anxious/fearful dimension of that scale; and for the

third analysis, score on the hostile/aggressive dimension. None of the main effects or their interactions were significant for any of the analyses (all $ps > .10$). These results suggest that prior to reading training, the experimental groups did not differ significantly on any of the emotional/behavioral dimensions.

Reliability of emotional measures in study. Were raters in different experimental conditions different in the way they applied the rating scales? To respond to this question, the following analyses were carried out. Three analyses of variance were performed on the emotional behavior percentage scores (0%–100%) given by the raters to the common child's three reading training sessions. For these analyses, the scores given to the common child's second session of reading training as viewed on successive days were averaged to form one set of ratings. In all the analyses, the independent variables were (a) score on the WASS, (b) type of reading instruction approach, and (c) sessions. A rater's scores for the common child were placed into an experimental condition in these analyses based on the experimental condition to which the rater's individual child had been assigned. For example, if a rater had rated an individual child who was in the high-WASS–nonblending condition for the other analyses, the scores he or she gave to the common child were placed in the high-WASS–nonblending condition in these analyses. The dependent variables for the three analyses were percentages of time in a reading training session during which the common child engaged in behaviors classifiable as hyperactive/distractible, hostile/aggressive, and anxious/fearful, respectively.

No significant effects were found for any of the independent variables or their interactions (all $ps > .10$), with the exception of the sessions factor. Sessions was significant for the hyperactive/distractible and hostile/aggressive analyses, $F(2, 32) = 19.18$, $p < .001$, $MS_e = 253.7$, and $F(2, 32) = 15.32$, $p < .001$, $MS_e = 207.9$, respectively. Mean hyperactive/distractible behaviors for Reading Sessions 1, 2, and 3 were 31.45, 47.10, and 62.65, respectively. Mean hostile/aggressive behaviors for Reading Sessions 1, 2, and 3 were 4.95, 15.63, and 30.10, respectively. The nonsignificant results for the variables of WASS and type of reading approach suggest that the different groups of raters in the different experimental conditions applied the emotional measures in a uniform enough way so as not to produce systematic effects on the emotional measures.

The significant effect for sessions may be due to real changes in the raters or in the common child. To explore this matter further, the following approach was taken. Recall that raters viewed the videotape of their child's second reading training session twice, once on one day and once on the next day. A comparison of the mean changes and correlation (Pearson product moment) between Day 1 and Day 2 ratings provides information about the direction of any systematic changes in the way the raters applied the emotional behaviors and the test–retest reliability of the emotional measures. There were no significant changes from Day 1 to Day 2 in anxious/fearful or hostile/aggressive measures ($p > .05$), but there was a significant decrease, 42.90 to 32.10 ($p < .005$), in the hyperactive/distractible measure. The correlation coefficient for hostile/aggressive behaviors was .510 ($p < .05$). For anxious/fearful behaviors the correlation was .602 ($p < .01$). For hyperactive/distractible behaviors the correlation was .797 ($p < .01$). These results indicate that there was only modest test–retest reliability for the ratings. They further suggest that the sessions effect found in the common child data was probably due to changes in the common child rather than in the raters, since the raters seemed to have decreased their hyperactive/distractible ratings over sessions, whereas the common child showed an increase in hyperactive/distractible behaviors over sessions.

Based on the analyses cited in this section, one may conclude that (a) there is no reason to believe that the children in different conditions were different emotionally before the study, (b) there is no reason to believe that the raters in different conditions were different in the way they applied the emotional behavior measures, and (c) there is some reason to believe that the raters systematically changed in the way they applied one of the emotional behavior measures over

sessions; namely, they tended to give lower ratings on hyperactive/distractible behaviors over sessions. However, the emotional measures showed only modest test–retest reliability, which must be taken into consideration when interpreting these and the following results.

Effects of independent variables on emotional measures. Three analyses of variance were performed on the behavior percentage scores (0%–100%) given to each child's reading training session by an outsider rater. In all the analyses of raters' ratings, the independent variables were score on the WASS test, type of reading instruction approach, and session.

The dependent variable for the first analysis was the percent of time in a reading training session during which a child engaged in behaviors classifiable as hyperactive/distractible. Type of reading instruction approach was significant, $F(1, 16) = 5.83$, $p < .05$, $MS_e = 711.78$. The mean percentage of time for the blending group was 45.08, and for the nonblending group, 28.45. Those children who received blending training were rated as having engaged in significantly more hyperactive/distractible behaviors than were those who received nonblending training. None of the other effects or their interactions approached significance (all $ps > .10$).

It should be noted that to arrive at an overall behavioral rating for a session, raters were encouraged to consider all the behaviors listed under a particular behavioral dimension on the Behavior-Rating Questionnaire and/or similar behaviors in which a child might have engaged during a reading session. Thus, it is argued that the preceding effect involving hyperactive/distractible behaviors is not dependent on any one particular behavior, such as asking for a repeat of instruction. Further, the hyperactive/distractible effect is not considered to be dependent on the amount of time spent by the children in blending versus nonblending training for, as was previously noted, this time difference was minimal.

In the second analysis the dependent variable was the percent of time during a session in which a child engaged in behaviors classifiable as hostile/aggressive. None of the three main effects reached significance (all $ps > .10$). However, there was a significant interaction between score on the WASS test and session, $F(2, 32) = 6.14$, $p < .01$, $MS_e = 40.92$. The mean percentages of time for the first, second, and third sessions for the high-WASS group were 3.50, 5.10, and 13.00, respectively. For the low-WASS group, the mean percentages of time were 4.50, 7.00, and 2.20 for the first, second, and third sessions, respectively. None of the other interactions reached significance (all $ps > .10$).

Simple main effect analyses of the WASS × Session effect revealed that the high-WASS scorers were significantly more hostile/aggressive than the low-WASS scorers after the third session: Session 1, $F(1, 18) = .11$, *ns*, $MS_e = 45.83$; Session 2, $F(1, 18) = .48$, *ns*, $MS_e = 37.41$; Session 3, $F(1, 18) = 5.94$, $p < .05$, $MS_e = 98.09$. In addition, the change in hostile/aggressive behaviors over sessions for the high-WASS scorers was significant, $F(2, 18) = 4.82$, $p < .025$, $MS_e = 53.61$, whereas the change for the low-WASS scorers was not, $F(2, 18) = 1.71$, *ns*, $MS_e = 33.65$.

A third analysis of variance performed on the percent of time during a session in which a child engaged in behaviors classifiable as anxious/fearful revealed no significant effects for any of the independent variables or their interactions (all $ps > .10$).

Discussion

The results are consistent with the hypothesis that variables that are related to beginning readers' reading achievement are also related to children's expressions of emotional behaviors during reading instruction. Metalinguistic skill as measured by WASS was related to both letter and word achievement measures and to the behavior dimension assessing hostile/aggressive behavior. Reading instruction approach, in interaction with WASS, was related to the word achievement measure. It was also related to the hyperactive/distractible behavioral dimension.

It was expected that the transfer measure would have been sensitive to the effect of reading instruction approach. However, the authors believe that the lack of a transfer effect may be explained by the limited time

spent in reading instruction, which resulted in specific learning but little transfer of learning.

The emotional behavior measures did provide some additional insights that were not evident in the achievement measures. Although not evident in the achievement measures, it seems that the children responded differently to the two instrumental methods. They were more hyperactive/distractible when learning by blending than nonblending instruction. It seems reasonable to conclude that blending instruction was more difficult for them. Although not evident in the achievement measures, it seems that the high-WASS scorers were becoming frustrated by the repetition of the same lesson, hence their increase in hostile/aggressive behaviors over sessions.

Although these insights are not dramatic, they are interesting and suggestive. We believe that a holistic concept of children learning to read is needed, which recognizes the importance and interdependence of cognitive, motivational, emotional, and behavioral variables (Powers, 1976; Weiner, 1979). We would like to see the cognitive bias in the learning-to-read literature replaced with a more balanced conceptual framework. Glasser (1981), who reworked reality therapy in terms of Powers' control system theory of brain functioning, presents the idea that feeling behaviors are purposeful for the person emitting them and function to accomplish unmet wants. For example, in the case of the high-WASS children, one can guess that they wanted to go on to new subject matter and were being frustrated by the repetition of the lesson. Their angry behavior might have encouraged the teacher to move on in order to control for the teacher's goal of "keeping the kids interested and not bored." This is the kind of balanced conceptual framework we have in mind. The high-WASS children were apparently concerned about learning (a cognitive goal) and novelty of subject matter (a goal unrelated to success in learning per se). The former goal was being met but the latter goal was not. If this continued, one might guess that the children would eventually stop being concerned about learning to read.

From a pedagogical standpoint, ongoing systematic emotional behavior assessment of the child learning to read enables the reading teacher to monitor the child's progress more efficiently and completely in terms of both the child's performance and the child's perception of that performance. Emotional behavior assessment also pinpoints quickly and accurately the influence of certain curriculum or subject variables on the learning-to-read process. Finally, emotional behavior information assists the reading teacher in modifying the reading situation on an ongoing basis in order to provide the child with a consistent, optimal learning environment.

Reading teachers have indirectly tried to incorporate emotional behaviors by distinguishing between independent, instructional, and frustration levels of reading skill (Ekwall, 1976). This requires the assessment of children's word accuracy and comprehension for each of a series of reading selections that differ in difficulty. The assessment procedure, called an informal reading inventory, requires a one-to-one situation and consumes ½ to 1 hour of time. Examiners could easily incorporate an emotional behavior rating scale into the assessment procedure. Plutchik (1980, pp. 206 and 208) has researched some theoretically based adjective checklists that might be useful for this purpose. The emotional behavior measures of the present study could be useful for this purpose but do not provide as complete an emotional description as would be obtained by Plutchik's checklists.

The interaction of type of reading instruction and level of WASS was somewhat different in nature than expected. Recall that the hypothesis being entertained was that the high-WASS children would do best with blending instruction. Although the trend of the results was in this direction, the simple main effects analyses did not yield significant results. The high-WASS children did better than low-WASS children when taught by blending instruction and the two groups of children did equally well when taught by nonblending instruction. If one were willing to generalize from these results to policy decisions concerning the placement of children in reading programs, one could take the position that (a) children who are high in WASS should be given blending in-

struction if one wants to maximize their learning, and (b) children should be given nonblending instruction if one wants to minimize their hyperactive/distractible behaviors.

The type of reading instruction by level of WASS results are consistent with those of Fox and Routh (1976) and further strengthen their suggestion that blending training is of value in reading training only for those children who have some ability at analysis and synthesis. It also suggests that children proficient in WASS will make use of blending training in order to increase their performance. Baron and Treiman (1979) failed to find such an interaction among nonreaders in their study. Among the two interpretations they presented to explain this result, the interpretation which says that the "segmental analysis test" they constructed may not be a valid measure of the knowledge needed to decode unfamiliar words seems to be more plausible than the interpretation that segmental analysis ability is not an important reading readiness variable.

The present authors propose that word synthesis skill is the skill needed for decoding unfamiliar words. Goldstein (1976) found that among a group of nonreaders who had been taken completely through Book 1 of the Ball–Stick–Bird system, word analysis skill with phonemic segments was not changed by the training but word synthesis skill was improved. Thus, although reading skill improved, word analysis skill with phonemic segments remained unaffected. Perhaps word analysis skill is important for acquiring spelling pattern-to-sound associations when these are not taught directly as in the Ball–Stick–Bird system. It seems reasonable that word analysis skill is more importantly part of the knowledge required in spelling words when a visual memory code is not activated by hearing the word spoken.

For beginning readers with minimal word analysis and synthesis skills, two pedagogical recommendations can be made. First, reading teachers may wish to encourage improvement in WASS. Studies have indicated that WASS becomes stronger in children between the ages of 5 and 7 years (Liberman et al., 1974). Goldstein (1976) further concludes that WASS is modifiable 1 to 2 years before significant changes in it typically occur. He suggests two approaches to improving this skill: reading readiness programs designed to improve WASS or simplified reading systems that are based on the syllable as the teaching unit (Gleitman & Rozin, 1973) or the phoneme as the teaching unit (Fuller, 1974).

A second recommendation is that for these children, it may be advisable to delay phonics-type instruction until the children have obtained a sight-word vocabulary (Fox, 1975). It has been suggested that this approach would be less demanding in initial reading training and would provide children with a more meaningful opportunity to learn about words and components of words (Corrillo, 1976; Harris & Sipay, 1975; Heilman, 1968). Moreover, as this study suggests, it would also provide the beginning reader with some initial reading success that the child would not get with an approach emphasizing the development of word-attack skills.

A final note about videotaping should be made. Once initial curiosity was satisfied during the pretesting sessions, the children in the experiment became oblivious to the videotaping equipment. Moreover, videotaping provided a systematic, reliable tool for observing and recording the child's emotional state during the experiment and required a minimum of effort and inconvenience. Taken together, these results reveal that videotaping is a particularly effective addition to the research arsenal.

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