

training to facilitate comprehension. The question arises though, what about those disabled readers who have not yet learned to benefit from contextual cues and for whom decoding skills are a necessary first step to contextual awareness?

This present study investigated the feasibility of enhancing literal and inferential comprehension in disabled sixth graders through single-word decoding training before the readers encountered the words in context. The study was carried out under the following circumstances: (1) atypical sixth grade readers (poor and very poor readers); (2) single-word decoding training without a meaning emphasis; (3) complete identification and pronunciation mastery of all the words the pupils read (both passages and questions); (4) measurement of literal and inferential comprehension through multiple choice, four distractor questions; (5) four, one to one (proctor and pupil) experimental sessions.

The major research questions were: (1) Will single-word decoding training leading to pronunciation mastery of words about to be read both in a passage and the accompanying comprehension questions, facilitate poor and very poor sixth grade readers' ability to answer literal and inferential comprehension questions about the passage? (2) Can a single-word decoding procedure that does not teach word meanings but instead brings about the correct pronunciation of words in isolation, be an effective instructional tool in facilitating or enhancing literal and inferential reading comprehension? The premise underlying the last question is that oral language can be an instructional link to print (Brown, 1958; Durkin, 1966, 1970; Mackworth, 1972). Over a decade ago, in a seminal investigation, Wiener and Cromer (1967) postulated a theoretical framework for empirically testing both research questions:

Comprehension which refers to the addition of some form of meaning associated with identification . . . can occur and be examined at any point at which identification can occur, once the visual forms are transformed to auditory forms, there is a possibility of comprehension given the presence of appropriate language skills. (p. 638)

THE ROLE OF SINGLE-WORD DECODING SKILL ON LITERAL AND INFERENTIAL CONTEXTUAL COMPREHENSION PERFORMANCE

JAY S. BLANCHARD
Murray State University

The effects of single-word decoding practice on reading comprehension of poor readers has been studied in the classroom and laboratory by educational theorists, researchers and practitioners with equivocal results. Some (Otterman, 1955; Jackson & Dizney, 1963; Goodman, 1965; Tuinman & Brady, 1973; Duncan, 1974; D'abre, 1977; Hughes, 1977; Kowal, 1977; Allington, 1978; Fleisher, Jenkins & Pany, 1979) argue that with most readers, decoding training does little to guarantee any appreciable improvement in reading comprehension.

Others (Langer, 1965; Bleyer, 1970; Sherk & Liebert, 1978; Blanchard, 1980) maintain that certain forms of single-word decoding instruction with most readers can facilitate reading comprehension. Singer, Samuels, and Spiroff (1974) and Ehri and Wilce (1980) seem to support this point. Ehri et al. (1980) suggests that cost-benefit considerations exist, both for introducing words in isolation and in context. Each offers unique advantages and disadvantages. Singer et al. (1974) seems to corroborate and finds that the best instructional practice is to provide both words in isolation and context

METHOD

Subjects

Ninety sixth grade pupils were randomly selected from a population of approximately 120 sixth grade disabled readers. The readers' total reading achievement grade placement levels on the California Achievement Tests (CAT) were at least 1.5 years behind chronological grade placement. The Peabody Picture Vocabulary Test (PPVT) was administered as a covariate. All readers were ranked by IQ scores and then randomly divided into three groups by alternation: control, non-content-specific (NCS), content-specific (CS). The top 15 readers in each group of 30 were designated poor readers and the bottom 15, very poor readers.

The mean PPVT IQ scores and CAT grade placement data for the poor reader groups were: 84 and 4.1 (control), 83 and 4.2 (NCS), and 4 and 4.2 (CS). For the very poor reader groups, the scores and data were: 68 and 2.6 (control), 70 and 2.9 (NCS) and 71 and 2.6 (CS).

Decoding Training

For the purposes of this study, single-word decoding training involved a proctor pronunciation and pupil echo procedure. CS pupils were asked to identify flash cards (1½" x 2½", primary type) representing words from the passage and questions they were about to read. If they correctly

identified a word by pronouncing it within two seconds, the next flash card was presented. If the pupil did not pronounce a word correctly within two seconds, the proctor pronounced the word and asked the pupil to echo that pronunciation. The word was presented later, but never without some intervening single word instruction or rehearsal. If necessary, the word was presented several times. It should be emphasized that neither of the three groups received contextual help for a word in the form of a definition or an example of its usage in sentence or phrase context.

NCS pupils were asked to identify flash card words from passages equal to those of the CS group in readability (fifth grade) (Fry, 1968) and structure (third person narrative prose, approximately 120 words in length) but never a part of the passages and questions they read as the comprehension criteria.

Control pupils received no training, they were merely given the passages (one at a time) to read and asked to answer the questions as best they could.

Comprehension Criteria

All pupils in the study read four passages from the *McCall-Crabbs Standard Test Lessons in Reading, Booklet A*. For each of the 4 passages there were 10 author-designed or adapted four-choice questions. Four questions measured inferential comprehension and 6 literal comprehension according to the following definitions: *Literal comprehension*—any question with the purpose of eliciting from the pupil a response which can be found explicitly stated in the written material, *Inferential comprehension*—any question with the purpose of eliciting from the pupil a response which is not explicitly stated in the written material. Pupils answered 24 literal and 16 inferential questions for the study. Test-retest reliability coefficients for the four sets of passages and questions averaged .65 and content validity was determined by a validation panel of reading specialists and two pilot studies.

Procedure

CS pupils, each day for four days, were presented on a one-to-one basis, a deck of flash cards by a trained parent-volunteer proctor. The passages (which included the appropriate questions and flash card deck) were randomly assigned to the pupils daily. Each flash card deck represented *all* the words the pupils were about to read. There was a flash card deck for each passage and its questions. The average number of flash cards in each deck was 81. Each card in a deck was presented for two seconds. If the word was identified and pronounced correctly, the next card was presented. If not, the proctor pronounced the word and the pupil echoed it. Pupils had to correctly identify and pronounce *all* words regardless of the number of presentations. To control for uniqueness of presentation on the unrecognized words, the minimum number of flash card words presented in a deck was 10. For example, if a pupil was unable to identify or pronounce 5 words on the first presentation of a flash card deck, on the next presentation the 5 words would be presented again but "shuffled" in with 5 known words and randomly presented. The pupils then read the passage and answered the comprehension questions (without the passage present).

NCS pupils followed the same procedures except the flash card words presented each day *never* appeared on any of the four passages and accompanying questions they read. In addition, since CS pupils could identify and pronounce all the words they might encounter, NCS as well as control pupils were allowed to ask the proctors to pronounce any word they

had a question about, to hopefully reduce biasing the results in favor of the CS pupils. Each of the flash decks contained 81 words and the sources of the words in each deck were other *McCall-Crabbs Standard Test Lessons in Reading, Booklet A* passages and questions of fifth grade readability, which included words not present in the passages and questions the NCS pupils read for the study.

Statistical Analysis

Three, 2 X 3 (ANCOVA) factorial analyses of covariance (PPVT-covariate) were used. The dependent measure in one ANCOVA was the number of literal comprehension questions answered correctly, another used the number of inferential comprehension questions answered correctly, and a third used the total number of comprehension questions answered correctly. Independent variables for the designs were group membership (control, NCS, CS) and level of reading achievement on the CAT (poor and very poor). Computations were accomplished using The Statistical Package for the Social Sciences (Nie, 1975) system of computer programs. The specific programs were analysis of variance and covariance, sub-program ANOVA, and default option.

RESULTS

Literal Comprehension

According to the data, reading achievement level and group membership did not have a statistically significant affect on the number of literal comprehension questions answered correctly, nor was the interaction statistically significant.

Inferential Comprehension

The data for inferential comprehension performance was somewhat different than that of literal comprehension performance. The main effects of reading achievement level $F(1,83) = 7.62, p = .007$ and group membership $F(2,83) = 4.01, p = .021$, each had a statistically significant affect on inferential comprehension performance. A moderate to small effect of size (Cohen, 1969) was found for both independent variables: η^2 of .29 and .30 for level and group, respectively. The interaction was not statistically significant. Approximately 8% of the variability in inferential comprehension performance can be explained as attributed to each of the independent variables. In addition, Duncan's New Multiple Range Test (Edwards, 1972) was used to determine the means between which significant differences existed on the group membership variable. It was found that the CS group significantly ($p < .05$) out-performed both its counterparts. They ($\bar{x} = 15.72$) differed significantly from the control ($\bar{x} = 13.95$) and NCS ($\bar{x} = 12.25$) readers. The test results also revealed that the NCS group differed significantly from the control readers.

Total Comprehension

Only the main effect of reading achievement level had a statistically significant affect on total reading comprehension performance: $F(1,83) = 6.30, p = .014$. A moderate to small effect of size was found, $\eta^2 = .26$. As was the case with inferential comprehension performance, approximately 8% of the variability in total reading comprehension performance can be explained as due to achievement level of the readers. The group membership X reading achievement level interaction was statistically significant ($p = .03$). Reading achievement level and group membership interacted in an

ordinal manner to affect total reading comprehension performance. Approximately 8% of the variance in total comprehension achievement can be accounted for by knowing simultaneously a reader's reading achievement level and group membership. The Duncan's Test ($p < .05$) was used to determine whether the total comprehension performance mean differences under the two levels of reading achievement differed from each other for the three groups in the study. It was found that the CS and NCS groups did not differ significantly from the other groups but that the control groups differed significantly from the other groups. It is also important to note that the very poor readers in the CS ($\bar{x} = 20.60$) and NCS ($\bar{x} = 17.95$) groups out-performed their control ($\bar{x} = 16.10$) counterparts; but, such was not the case with the poor readers. Control group poor readers ($\bar{x} = 24.25$) answered more comprehension questions correctly than did both the CS ($\bar{x} = 22.67$) and NCS ($\bar{x} = 19.87$) groups of poor readers.

DISCUSSION

The present study sought to determine if literal and inferential comprehension performance in sixth grade disabled readers could be enhanced by a procedure which ensured single-word decoding mastery of all the words to be read. It appears that literal comprehension amongst poor readers cannot be enhanced to any great degree but just the reverse is true with very poor readers. As a matter of fact, there was an increase in literal comprehension performance of approximately 12% in very poor readers. This represents approximately three more comprehension questions answered correctly by the CS group as opposed to the control group. Unfortunately, the inability of the procedure to change literal comprehension performance when it came to poor readers probably outweighed the gains made by the very poor readers when total reading comprehension data was analyzed. What is unexpected about literal comprehension data—is why the loss of the main effect for reading achievement? Did the CS very poor readers benefit from the procedure to point that their literal comprehension performance basically equalled that of the poor readers—despite the inherent differences in reading achievement levels? The answer seems to be yes. Interestingly enough, the NCS very poor readers ($\bar{x} = 12.07$) seem to have profited from decoding training which was not even content specific when compared to the control group ($\bar{x} = 10.80$).

Turning to a discussion of inferential comprehension performance, the same pattern established with literal comprehension, exists. Poor readers did not benefit; very poor readers did. The main effect for reading achievement level returned from its absence on literal comprehension performance. Poor readers ($\bar{x} = 7.97$) out-performed very poor readers ($\bar{x} = 6.01$). While this might signal that higher order comprehension processes are not quite so amenable to change through a decoding procedure; this is probably only true for poor readers since CS very poor readers did answer correctly approximately twelve percent more inferential comprehension questions than the control group. This represents approximately two more comprehension questions answered correctly. Thus, instructionally it can be anticipated that very poor readers will probably increase their inferential comprehension more through the study's procedures than poor readers.

The findings concerning total reading comprehension performance, as an amalgamation of literal and inferential comprehension, indicates that the main effect for reading achievement level is statistically significant. Despite the earlier

concern over a lack of literal comprehension main effect; the inferential comprehension main effect was powerful enough to cause a significant overall comprehension main effect. This is to be expected since the variable itself (reading achievement level) served as a grouping criterion for the readers in the study. There was no main effect for group membership; but, the group membership X reading achievement level interaction was statistically significant. According to the interaction, control poor readers out-performed NCS and CS readers. It thus seems that for total comprehension performance in poor readers the procedure not only did *not* enhance or facilitate comprehension performance it might even *hinder it*. On the other hand, for those readers who have reading achievement grade placement levels at least a year and one-half below the reading difficulty of the materials to be read (i.e., very poor readers in the study) the procedure seems to help literal and inferential comprehension performance. This seems the case for several reasons: (1) lack of a main effect for reading achievement levels on literal comprehension performance; (2) mean differences between control and CS very poor readers on literal comprehension performance; (3) a significant main effect for group membership on inferential comprehension; (4) mean differences between control and CS very poor readers on inferential comprehension; and (5) a significant interaction on total reading comprehension showing the CS very poor readers significantly out-performing control very poor readers.

In conclusion, it seems possible to experimentally enhance improved literal and inferential comprehension in very poor readers using only their oral and listening language backgrounds as "starting points." Since the study's single-word decoding training avoided a meaning emphasis it would seem that when very poor readers can correctly identify and pronounce a word familiar to their oral and listening language backgrounds they have at least one correct meaning in mind for that word. In addition, it would appear that very poor readers have more potential for improved literal and inferential comprehension than might be expected. In all probability their reading comprehension potential is seriously under-estimated. This would seem the case since a relatively simple decoding procedure improved their reading comprehension. It should be remembered, though, that this simple procedure had two unique characteristics which might have contributed to its success: (1) complete decoding mastery of all words to be read in both the passages and questions, and (2) four individual experimental sessions for each reader.

Notwithstanding the optimism surrounding the procedure with very poor readers, it seems to pay no instructional dividends when it comes to enhancing comprehension in poor readers. Consequently, it seems possible to conclude that single-word decoding training does not enhance comprehension in all categories of disabled readers. This historical dichotomy between those who support and those who do not support the positive effects of single-word decoding training might take a step towards resolution if methodological considerations are given to the differences between the reading achievement levels of the students and the reading difficulty of the materials to be read, complete decoding mastery of both passages and questions and more than one experimental session.

References

- Allington, R. L. Word identification abilities of severely disabled readers: a comparison in isolation and context. *Journal of Reading Behavior*, 1978, 10, 409-416.

- Blanchard, J. S. A preliminary investigation of the transfer effect between single word decoding ability and contextual reading comprehension in poor reading sixth graders. *Perceptual and Motor Skills*, in press.
- Brown, Roger. *Words and Things*. New York, N. Y.: The Free Press, 1958.
- California Achievement Tests*. Monterey, California: McGraw-Hill, 1970.
- Cohen, Jacob. *Statistical power analysis for the behavioral sciences*. New York, N.Y.: Academic Press, 1969.
- Durkin, Dolores. *Teaching them to read*. Boston, Mass.: Allyn and Bacon, 1970.
- Edwards, A. L. *Experimental design in psychological research* (4th ed.). New York: Holt, Rinehart and Winston, 1972.
- Ehri, Linnea, & Wilce, Lee. Do beginners learn to read function words better in sentences or in lists? *Reading Research Quarterly*, 1980, 15(4), 451-476.
- Fleisher, L. S., Jenkins, J. R., & Pany, D. Effects on poor readers' comprehension of training in rapid decoding. *Reading Research Quarterly*, 1979, 15, 30-48.
- Fry, Edward. Graph for estimating readability. New Brunswick, New Jersey: Rutgers University Reading Center, 1968.
- Goodman, Kenneth. A Linguistic study of cues and miscues in reading. *Elementary English*, 1965, 42, 639-643.
- Jackson, J. R., & Dizney, H. Intensive Vocabulary Training. *Journal of Developmental Reading*, 1963, 6, 221-229.
- Mackworth, Jane F. Some modes of the reading process: learners and skilled readers. *Reading Research Quarterly*, 1972, 7, 701-733.
- McCall, W. A., & Crabbs, L. M. *Standard test lessons in reading*. New York: Teachers College Press, Columbia University, 1961.
- Nie, N. H., Hull, C. H., Jenkins, J. C., Steinbrenner, K., & Bent, D. H. *Statistical package for the social sciences* (2nd ed.). New York: McGraw-Hill, 1975.
- Otterman, L. M. The value of teaching prefixes and root words. *Journal of Educational Research*, 1955, 48, 611-614.
- Peabody Picture Vocabulary Test*. Circle Pines, Minn.: American Guidance Service, 1965.
- Shankweiler, D., & Liberman, I. Y. Misreading: a search for uses. In J. G. Kavanaugh (I. G. Mattingly (Eds.), *Language by Eye and by Ear*. Cambridge: MIT Press, 1972.
- Singer, H., Samuels, S. J., & Spiroff, J. Effect of pictures and contextual conditions on learning to read. *Reading Research Quarterly*, 1974, 9, 555-567.
- Wiener, M., & Cromer, W. Reading and reading difficulty: a conceptual analysis. *Harvard Educational Review*, 1967, 37, 620-643.