

OSEP Research Institutes: Bridging Research and Practice



In this column, *Bridging Research and Practice*, three of the federally funded special education research institutes report to you, the practitioner, on their progress in areas that will be particularly helpful to you in working with your students. The U.S. Office of Special Education Programs (OSEP) has funded these three research institutes to study specific curricular and instructional interventions that will accelerate the learning of students with disabilities in curricular areas:

CASL (Center on Accelerating Student Learning) focuses on accelerating reading, math, and writing development in Grades K-3. The Directors of CASL are Lynn

and Doug Fuchs of Vanderbilt University. CASL research sites are also located at Columbia University (Joanna Williams) and the University of Maryland (Steve Graham and Karen Harris).

REACH (Research Institute to Accelerate Content Learning Through High Support for Students With Disabilities in Grades 4-8) is examining interventions that reflect high expectations, content, and support for students. The Director of REACH is Catherine Cobb Morocco at Education Development Center in Newton, MA. Research partners include the University of Michigan (Annemarie Palincsar and Shirley Magnusson), the University of Delaware

(Ralph Ferretti, Charles MacArthur, and Cynthia Okolo), and the University of Puget Sound (John Woodward).

The Institute for Academic Access (IAA) is conducting research to develop instructional methods and materials to provide students with authentic access to the high school general curriculum. The Institute Directors are Don Deshler and Jean Schumaker of the University of Kansas, Lawrence. Research partners include the University of Oregon and school districts in Kansas, California, Washington, and Oregon.

This issue features the CASL (Center on Accelerating Student Learning).

At-Risk Second Graders Can Improve Their Comprehension of Compare/Contrast Text

Joanna P. Williams

Many children who are at risk for academic failure do not easily understand what they read; in fact, this is their fundamental problem. Sometimes their difficulties are due to inadequate skill in decoding. But more often it is specifically a matter of poor comprehension. One common source of difficulty is their lack of sensitivity to text structure.

Text is organized into certain structures that reflect the logical connections among the ideas in the text. Sometimes there are explicit cues that guide the reader. For example, there may be signal words such as "first" or "because of" or "once upon a time." These signal words identify the genre of the text (narrative or expository) and the particular type of structure within a genre (cause/effect, compare/contrast, etc.). There may also be titles or headings that cue the overall organization of the text.

Sometimes there are no such surface cues to the text's structure. However, proficient readers have a sense of the structures that exist, and they can recognize these structures even in text that is not well organized.

How can we provide children with the knowledge about text structure that

will allow them to use the organization of the textual information effectively? This is a challenge, especially when it comes to expository text. Although young children usually start school with an awareness of narrative text structure, few have sensitivity to expository structure. The latter is more difficult; the relationship between the ideas that are presented are more complex than the simple sequences of familiar events that are depicted in most narratives.

In addition, expository text appears in a variety of different organizational structures. One list of such structures includes description, temporal sequence of events, explanation of concepts, definition and example, compare/contrast, and problem-solution-effect (Anderson & Armbruster, 1984). Moreover, most texts do not represent a single structure—they mix two or more of them (Meyer & Poon, 2001). It is no wonder that at-risk children, including many students with learning disabilities, have trouble picking up cues from text structure.

The Text Structure Program

At Teachers College, we have developed an instructional program to improve

second graders' comprehension of expository text. The program focuses on a single structure, compare/contrast, and follows a highly structured and explicit instructional model.

At first, we taught students three strategies: how to use (1) clue words to identify a text as a compare/contrast text; (2) a graphic organizer to lay out the relevant information in the text; and (3) a series of questions to help them focus on the important information in the text. Later, as will be explained below, we eliminated the graphic organizer as a text structure strategy.

Even though our main purpose was to teach text structure, we recognized that our program would inevitably be presenting content. We chose animal classification as the content, which is included in the standards for elementary-level science curricula in New York State.

Our goal was to teach students the characteristic features of each of the five classes of vertebrates (mammals, birds, fish, reptiles, and amphibians). To this end we selected one animal as a prototypical example of each of the five classes (lion, eagle, shark, crocodile, frog).

The four features of each class that we taught were: warm-blooded vs. cold-blooded; body-covering (hair, scales, smooth, feathers); bearing young (having babies, laying eggs); and breathing (getting oxygen from air, from water, or from both air and water).

The books we used included a comprehensive animal encyclopedia and a trade book about each of the five animals. In addition, we prepared short target paragraphs to be read and analyzed. Each of these paragraphs contained several comparative statements about two of the five animals, using information that was the basis for categorizing them into the five vertebrate classes. These paragraphs became longer as the lessons proceeded. Toward the end of the program, they also included distractor sentences, i.e., general information about one of the two animals that could not be put together with any other information in the paragraph, to construct a comparative statement.

Here are two examples of target paragraphs, one from an early lesson and one from a later lesson:

1. Eagles and crocodiles are wild animals. Eagles are warm-blooded; however, crocodiles are cold-blooded. Eagles and crocodiles both lay eggs.
2. Lions and sharks are interesting animals. Lions have hair covering their bodies, but sharks have scales. Sharks have fins to help them swim. Lions are warm-blooded; however, sharks are cold-blooded. Sharks get oxygen to breathe from the water, but lions get oxygen to breathe from the air. Lions live in groups called prides. Lions have babies; however, sharks lay eggs. Lions and sharks both have sharp teeth to help them hunt for food.

The program consisted of nine lessons, which were taught in 15 sessions. Each lesson focused on two of the five prototypical animals and contained the following sections:

- clue words
- trade book reading and discussion
- vocabulary development
- reading and analysis of a target paragraph
- graphic organizer

- compare/contrast strategy questions
- summary (with a paragraph frame as support)
- lesson review (The first lesson focused on two very familiar animals, cats and dogs, to help introduce students to the procedure without being distracted by new content.)

Clue words. At the beginning of each lesson, the teacher previewed the purpose of the lesson and introduced the eight clue words (alike, both, and, compare, but, however, than, contrast). The teacher wrote the clue words on the board and elicited sentences that used one of the clue words.

Trade book reading and discussion. During the next part of the lesson, teachers read to the class about the two animals from the encyclopedia and the trade books. Teachers then directed a discussion about the animals. This part of the lesson provided information about the animals beyond the specific information contained in the target paragraphs. It was also designed to heighten motivation—particularly important because difficulty in comprehending expository text may, in part, be attributed to lack of student interest.

Vocabulary development. Teachers then introduced vocabulary concepts related to animal classification (oxygen, hair, scales, feathers, warm-blooded, cold-blooded).

Reading and analysis of a target paragraph. The students read the target paragraph silently, and then the teacher re-read it as students followed along in their own copy. Students then analyzed the text, focusing on the compare-contrast structure. Students identified the individual sentences that represented the similarities and the differences. They then circled all the clue words. Finally, they took turns generating sentences that described how the two animals in the paragraph were the same or different. The teacher encouraged them to use well-structured comparative statements, that is, sentences that were based on accurate information from the paragraph and that included a clue word.

Graphic organizer. Next, students organized the paragraph's content with the help of a matrix, the graphic organ-

izer that best represents the compare/contrast structure (Calfée & Chambliss, 1987). An individual matrix was used for each animal feature that was compared in the paragraph. Students then wrote a well-structured comparative statement to match the content organized in the matrix. Paragraphs in earlier lessons contained less information (and, therefore, there were fewer matrices) than paragraphs in later lessons.

Compare/contrast strategy questions. The students then organized the statements they had generated according to the following three questions: (1) What two things is this paragraph about? (2) How are they the same? and (3) How are they different?

Summary. Next, students wrote summaries of the paragraph. Summarization skills are complex, so students were provided with a paragraph frame to use as a prompt. This structured approach to writing is particularly helpful to young children who are just beginning to develop their writing skills (Harris & Graham, 1996). In the later lessons, no frame was provided.

Lesson review. At the end of each lesson the teacher and students reviewed the vocabulary and the strategies (clue words, graphic organizer, and compare/contrast questions).

Evaluation of the Program

We have evaluated the effectiveness of our Text Structure program in three randomized trials. We will describe the first of these studies and then summarize findings from the other two studies. More detailed descriptions can be found in Williams, Hall, and Lauer (2004) and in Williams (in press).

In each case, we compared our Text Structure program to a program that was more traditional in orientation and that did not emphasize text structure. Both programs covered the same content. As a control, we also looked at students who received neither program. The main purpose of our studies was to determine whether instruction focused on text structure helped second grade students at risk for academic failure to improve their comprehension of compare/contrast expository text.

We also had a further question. The school day contains a finite amount of time, and choices must be made as to how to use that time. If teaching students about text structure means that they will learn less content, then we must be prepared to make a trade-off. But there might not be a decrease in content learning, which would be a happier outcome. Therefore, we asked whether this type of instruction on text structure would detract from students' ability to learn new content.

The Content program. The comparison Content program was designed to correspond to more traditional content-area instruction and was intended to be a viable program. We expected that students participating in this program would learn important content that would enable them to comprehend novel paragraphs about similar content.

The materials for this program, i.e., the actual texts used (encyclopedia, trade books, and target paragraphs) were the same as those used in the Text Structure program. Also, as in the Text Structure program, there were fifteen sessions, so that, overall, the same amount of time was given to the instruction. Each lesson consisted of the following sections:

- background knowledge
- trade book reading and discussion
- information web (a graphic organizer that organizes information topically)
- vocabulary development
- a reading of target paragraph
- general content discussion
- summary (with paragraph frame)
- lesson review

In our first study, teachers of 10 second-grade classrooms in three New York City public schools volunteered to participate. We randomly assigned the intact classes to the three treatments. A total of 128 students participated. After the lessons were completed, we interviewed students individually, asking them to respond to questions both orally and in writing.

First, we wanted to determine whether they had learned the strategies that we taught them. Several measures evaluated the acquisition of the strategies taught in the Text Structure program. We assessed recall of clue words

(i.e., the ability to identify the clue words in a paragraph), the ability to generate sentences (oral and written) based on information they had graphically organized, and finally, recall of the three compare/contrast questions. On the first three of those measures, the students who received the Text Structure instruction did significantly better than the students in the other two groups.

Outcome measures. Next, we asked whether the students improved in their ability to apply what they had learned. First, what was learned about text structure? We looked at the students' ability to summarize a compare/contrast paragraph that contained material explicitly taught in the program. The test paragraph compared two animals that had been directly compared during the instruction. We asked for written summaries. We counted the number of summary statements that were both accurate and included an appropriate clue word. The Text Structure group outperformed the other two groups.

Then we investigated the students' ability to transfer. The goal of reading comprehension instruction is to improve students' ability to read novel content, not simply to re-read material on which they have already practiced. Therefore, we developed a series of three compare/contrast texts that were structured in the same way as those used in the instruction. However, the content was different. In each of these three paragraphs, the content became further removed from the content used in the instruction. We asked for oral summaries.

We found that on all three paragraphs, the Text Structure group scored significantly higher than either of the two groups. Thus the Text Structure students had, in fact, transferred what they had learned. We were very pleased with these results. It is not uncommon to find that, after reading comprehension instruction, students do better on tests that involve the same material on which they were instructed. However, it is less common to find positive effects of the instruction when the tests involve new material not seen during instruction.

Now, let us turn to the second type of outcome measure, which focused on how much of the content about animals had been learned. We were interested in two types of content learning. First, did the students learn the vocabulary concepts (such as oxygen and warm-blooded) that we taught them? Here, we found a different pattern of results from what we found on the text structure outcome measures: The Text Structure group attained a higher score on the vocabulary measure than did the Content group; but, in addition, the Content group did better than the no-treatment control group—as indeed they should have, because they had been taught the content (without the text structure).

These findings concerning the amount of content learned are important because they indicate that spending substantial instructional time on text structure training did not detract from the amount of content the students learned. The Content group, whose instruction focused solely on content, did not acquire more information about animals than did the Text Structure group.

Further Findings

Because our first study yielded such positive results, we decided to refine the Text Structure program and replicate our findings. We made some small modifications in the program in response to teachers' comments and to our own classroom observations. We also extended the program by including lessons that helped the students generate their oral and written summaries without the support of the paragraph frame we had included in the first study. This meant that, by the end of the program, children were making completely independent responses. These changes in the program proved successful in this replication-and-extension study, which involved 15 classrooms. We also found that the students who went through the Text Structure program transferred what they had learned to authentic text (i.e., a paragraph taken from a tradebook written at the second grade level).

For our third study (11 classrooms) we refined the program further. We

decided that two of our strategies, clue words and compare/contrast questions, were sufficient for teaching structure. (We still included a graphic activity in the program, but it was geared toward teaching content, not structure.) Our main focus in this third study was on content goals, because we had achieved our goal of teaching text structure. We addressed the issue of how much content could be acquired in the context of a program that was primarily focused on teaching text structure. In this study, even with its heavy dose of content instruction, the students who got the Text Structure program scored highest on the text structure measures, as they had in the previous studies.

With respect to the content goals, as in the previous studies, there was no difference between the Text Structure and the Content programs (and both scored higher than the no-treatment control) on amount of vocabulary and amount of knowledge of animal classification learned. However, the Content students scored highest on detail questions, which tapped content tangential to the program's content goals but, of course, these students showed no improvement in knowledge of text structure.

Conclusion

Our Text Structure students improved in their ability to comprehend an important type of expository text. These findings indicate that highly structured and explicit reading comprehension instruction is appropriate for primary-grade children at risk for academic failure. Debriefing interviews with the teachers indicate that they felt their students responded positively to the Text Structure program. They themselves liked the program, especially its explicitness, built-in repetition and review, and organization. They were also pleased that the program was easy to teach without requiring an inordinate amount of training or class preparation.

We are encouraged by these results, and we are now working on the development of similar programs that focus on other common text structures, such as cause-effect.

To receive a copy of the manual containing lessons and materials for the Text Structure program, write to Stephanie Comer at the John F. Kennedy Center, Communication Services, Peabody Box 40, Vanderbilt University, Nashville, TN 37203-5701.

References

- Anderson, T. H., & Armbruster, B. B. (1984). Content area textbooks. In R. C. Anderson, J. Osborn, and R. J. Tierney (Eds.) *Learning to read in American schools* (pp. 193-226).
- Harris, K. R., & Graham, S. (1996). *Making the writing process work: Strategies for composition and self-regulation*. Cambridge, MA: Brookline Books.
- Meyer, B. J. F., & Poon, L. W. (2001). Effects of the structure strategy and signaling on recall of text. *Journal of Educational Psychology*, 93, 141-159.
- Williams, J. P. (in press). Instruction in reading comprehension for primary-grade students: A focus on text structure. *Journal of Special Education*.
- Williams, J. P., Hall, K. N., & Lauer, K. D. (in press). Teaching expository text structure to young at-risk learners: Building the basics of comprehension instruction. *Exceptionality*.