

Summarizing Expository Texts

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Purpose: This article reviews the literature on students' developing skills in summarizing expository texts and describes strategies for evaluating students' expository summaries. Evaluation outcomes are presented for a professional development project aimed at helping teachers develop new techniques for teaching summarization. **Methods:** Strategies for evaluating expository summaries were applied in a professional development project in which teachers learned to teach fourth- and fifth-grade students to identify the macrostructures of short expository texts. Outcomes were measured by comparing results for students in experimental classrooms whose teachers received instruction in text macrostructure with results for students in control classrooms. **Results:** Students in the treatment condition produced significantly higher microstructure and macrostructure scores than students in the control group. Differences were greater between treatment and control groups than between fourth- and fifth-grade groups. **Conclusions:** This study provided preliminary evidence that treatment involving identification of expository text structures and use of graphic organizers to highlight the organization promoted greater growth in summarization skills than age-related development for fourth- and fifth-grade students. **Key words:** *assessment of expository comprehension, expository instruction, graphic representations, mapping, summarization*

As students progress through school, the language demands of the curriculum increase. Stories and narrative texts that are common in the early elementary school years are replaced by a variety of expository texts. Educators are well-aware of what has been termed “the fourth grade slump” or “hitting the wall at fourth grade.” Facing new challenges of expository texts is offered as one

explanation for the difficulty that a number of students experience in later elementary school (Beck & McKeown, 1991). A number of factors affecting text macrostructures (e.g., gist and overall organization) and text microstructures (e.g., vocabulary and syntactic patterns) contribute to the difficulty many students encounter with expository texts, whether or not they have language disorders.

With respect to macrostructure, students often do not have the background knowledge that is necessary for recognizing the gist of the passage and building a mental representation of the text macrostructure. Furthermore, unlike narrative texts, which all have a rather similar structure, the structure of expository texts varies within and across curricular content. The macrostructure of texts is influenced by the relationships that are expressed. In narrative texts, the expressed relationships are of familiar, goal-directed experiences, whereas the relationships expressed in expository texts are focused on abstract, impersonal, logical rather than temporal dimensions (Graesser & Goodman, 1985).

Expository texts have linguistically complex microstructures. Linguistic complexity

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has two interrelated components—lexical and syntactic (Stromqvist, Johansson, Kriz, Ragnarsdottir, Aisenman, & Ravid, 2002). Lexical complexity involves lexical density (the amount of lexical content as measured by the number of content words per clause) and lexical diversity (the amount of novel lexical content in the text as measured by the ratio of word tokens to word types) (Richards & Malvern, 1997). Some texts, particularly in math and science, have many technical terms and deal with complex mechanisms that cannot be visualized. For example, one cannot see *air resistance*, *acceleration*, *force*, and *mass* which are key concepts in the following textbook paragraph about Galileo:

Galileo wanted to show that two different objects fall at the same rate (as long as we ignore *air resistance*). Galileo's experiment proved his *hypothesis* correct; the *acceleration* of a falling object is independent of the object's mass. A few decades after Galileo, Sir Isaac Newton would show that *acceleration* depends upon both *force* and *mass*. Although there is greater force acting on a larger object, this force is canceled out by the object's greater mass. (http://nongnu.askapache.com/fhsst/Physics_Grade_10.pdf)

Syntactic complexity can be defined in terms of interrelated factors of length, depth, and diversity. Length refers to the number of words per syntactic unit, depth is measured by the number of complex governed nodes in the unit (or number of dependent clauses), and diversity indicates different types of syntactic units, such as different types of dependent clauses. Expression of the complex, abstract relationships in expository texts requires the use of more complex syntactic structures (Scott & Balthazar, 2010).

By adolescence, conversational skills do not differentiate students with language impairments from typically developing students (Nippold, Mansfield, Billow, & Tomblin, 2008). By the end of elementary school, children typically are able to tell stories with all the narrative macrostructure elements (Westby, 2005). Because expository text plays such an important role in academic success,

educators need to assess and develop students' expository text comprehension and production. To do so, they need to know how students develop the skills underlying expository texts. At this time, most of the research on development of expository texts has focused on development of text microstructures (Berman & Nir, 2010; Nippold, Hesketh, Duthie, & Mansfield, 2005; Nippold, Mansfield, & Billow, 2007; Scott, 2010) and strategies to facilitate reading comprehension of expository texts (Ehren, 2010; Gajria, Jitendra, Sood, & Sacks, 2007). Relatively little information is available on development of expository text macrostructure and the relationship between expository text micro- and macrostructures.

THE NATURE OF SUMMARIZATION

Among a variety of strategies for teaching comprehension and production of expository texts, extensive research shows that summarization is one of the top most effective (e.g., Marzano, Pickering, & Pollock, 2001). The National Reading Panel (2000) report and the Writing to Read report (Graham & Hebert, 2010) concluded that summarization is one research-based reading strategy that should be taught during classroom instruction to improve comprehension. Summarization is reportedly an activity that has yielded the greatest gains in comprehension and long-term retention of text information. Summarization helps readers focus on the essential information in a text and promotes learning that lasts because students must spend time reflecting and processing what they have read (Wormeli, 2004). Summarizing benefits both the teacher and student. For the student it provides an opportunity to communicate what is important, serves as a way to check understanding, and provides practice in decision making and sequencing. For the teacher it provides evidence of the student's ability to select important information, is an informal indicator of comprehension, and reveals a student's ability to prioritize and sequence.

Summarizing is more than retelling; it involves analyzing information, distinguishing important from unimportant elements and translating large chunks of information into a few short cohesive sentences. Many students, however, do not know how to summarize and appear not to understand the nature and purpose of a summary. Consequently, they use inefficient strategies when producing written summaries, such as writing down everything, writing too much, not writing enough, or copying word-for-word, and they make no attempt to synthesize the information (Jones, 2007). They may be able to read and summarize short texts with familiar content fairly well. However, as text becomes more difficult, increases in length, and is less coherent, and if students have insufficient background knowledge, their comprehension falters and they exhibit more difficulty in producing coherent, meaningful summaries. Struggling readers may need instruction and practice in summarizing paragraphs; other students may need instruction and practice in summarizing larger chunks of information. However, if the material becomes more difficult to comprehend, students who previously could summarize multi-paragraph sections may need to return to summarizing at the paragraph level and work up to section summarization and summarization of whole chapters.

Instruction in summarization should teach readers to integrate ideas and generalize from the text information. When students learn to generate summaries, they must identify the most important information in a text, condense the information into a very brief form, and then restate the information in their own words. Brown and colleagues (Brown, Campione, & Day, 1981; Brown & Day, 1983) were among the first educational researchers to suggest teaching students a rule-based summary strategy. It was based on the van Dijk and Kintsch (1977) concept of macrorules (processes of deletion, generalization, and integration) that are used to operate on the macrostructure when summarizing. Brown and colleagues identified five macrorules for

summarization:

- Delete material that is trivial.
- Delete material that, although important, is redundant.
- Substitute a superordinate term or event for a list of items or actions, for example, if a text lists *cats, dogs, gerbils, and parrots*, one can substitute the word *pets*; or integrate events or concepts by substituting a superordinate action for a list of sub-components of that action.
- Select a topic sentence.
- If there is no topic sentence, invent your own.

The task of summarizing is cognitively complex and taxes working memory. To use these summarization strategies, students must analyze information at a fairly deep level while simultaneously manipulating the text. Being aware of the explicit structure of the text can be an aid to summarizing information. The more students are aware of this explicit structure the better able they are to summarize (Armbruster, Anderson, & Ostertag, 1987).

DEVELOPMENT OF SUMMARIZATION SKILLS

Brown and Day (1983) investigated how students in fifth, seventh, tenth grades and college read and summarized passages that were designed to enable use of their summarization macrorules. All age groups used the deletion rules effectively. For instances where superordination could be used, students' options were to (1) delete the unit, (2) repeat it exactly, (3) use a superordinate inefficiently, or (4) use a superordinate efficiently. Fifth graders typically just deleted lists. Seventh graders tended to repeat the unit exactly or attempted an inefficient subordination. Tenth graders and college students typically used superordination effectively; they rarely repeated units or used inefficient subordination. Use of topic sentences increased with age. The ability to invent explicit topic sentences to state the implicit main idea of paragraphs is difficult and develops with age. Fifth-grade students rarely attempted to invent

a sentence, and even college students did it only in half the cases where it would be appropriate to do so.

Kintsch (1990) investigated the type of organization and kinds of inferences made by sixth grade, tenth grade, and college students in their summarizations of texts. Students read texts with 7 paragraphs that compared two developing countries in terms of their future potential. The topic information was stated in the initial paragraph and at the conclusion of the passage. The three major subtopics—the attributes of the countries—were never explicitly mentioned and had to be inferred by the reader.

The summaries were evaluated in two ways: (1) for the total number of text propositions and several categories of inferences, and (2) for the macrostructure level of each statement. The following types of inferences were counted:

- **Generalizations** are inferences that reduce the number of text propositions. They are inferences about the overall gist or meaning of the text.
- **Elaborations** are inferences that are not directly implied by the text; they originate from the reader's own knowledge about the content or related information.
- **Reorderings** are inferences that rearrange text content in an order that is different from the original text.
- **Connectives** are the words that express bridging inferences and that function to provide coherence between expressed ideas.

Each statement in the summary was rated for its macrostructure level.

- Level 1 statements consisted of topic statements, either a label (e.g., "It's about Peru and Argentina") or a more elaborated topic statement (e.g., "that the two countries are compared").
- Level 2 statements were composed of inferred subtopics (e.g., geography, economy, and society) on which the countries were being compared.
- Level 3 consisted of other text-based macropropositions (e.g., government, ed-

ucation, farming) that could function as subheadings for groups of detailed statements.

- Level 4 statements were concrete details, not specifically tied to a macrostructure element.

All three groups of students produced summaries of similar length (number of propositions stated). A significant developmental effect was observed for all types of inferences and use of connectives. The sixth-grade students produced very few generalizations, elaborations, reorderings, and bridging inferences in the form of connectives. The 10th-grade students produced significantly more of all types of inferences compared to the sixth-grade students, and the college students produced significantly more generalizations, elaborations, and reorderings than the 10th-grade students. The limited use of inferred information in summaries of the younger students indicates that their summaries were composed largely of information selected sequentially from the original text. In contrast, older students, particularly college students, used inferences to formulate their summaries and would reorder the information to highlight the main points of the passage.

All groups produced a similar number of Level 4 details. Use of the other macrolevel propositions increased significantly with age, so there was a relative decrease in the prominence of text details. This indicates that older students were more aware of the major ideas in the text and the overall organization of the text.

By sixth grade, students had a good understanding of what summarizing means, but they had difficulty with identifying the important ideas and especially trying to formulate main point statements of their own. The developmental lag in macroprocessing of expository text shows up in other tasks such as study strategies, note taking, and rating the importance of ideas (Brown, Bransford, Ferrara, & Campione, 1983; Brown & Smiley, 1977), comprehension monitoring (Scardamalia & Bereiter, 1984), and essay writing (Bereiter & Scardamalia, 1987). Without

support for the summarization process, it appears that sixth-grade students have limited ability to produce true summaries.

By late elementary school, students are reading an increasing number of expository texts, and test data clearly shows that they are experiencing difficulty in comprehending such texts (Dubravac & Dalle, 2002; Saenz & Fuchs, 2002). This led us to ask: Could summarization skills be introduced in elementary school as a way to promote comprehension of expository texts, and if so, how should they be introduced? What types of summaries can children in late elementary school produce?

EVALUATING SUMMARIZATION IN THE UPPER ELEMENTARY GRADES AFTER INSTRUCTION IN TEXT MACROSTRUCTURE

Project ARC (Achievement in Reading and Content Learning) was a 3-year professional development program with five school districts in Utah that was designed to support teachers of fourth- and fifth-grade students in improving reading comprehension. Its goal was to raise students' reading scores (particularly of those in the lowest 20%) by educating teachers in current reading strategies. To evaluate the results of the main project, a delayed intervention design was employed. In each district, classrooms were selected to serve as control and treatment classes. In this design, classes that initially served as controls later served as treatment classrooms. Teachers in the treatment classrooms received professional development days in which they were presented with a wide range of strategies to promote fluency, vocabulary, and comprehension development. In addition, literacy specialists conducted monthly planning and evaluation meetings with the teachers and modeled teaching strategies in the classrooms. Yearly pre- and postmeasures of students' reading skills were the primary means of evaluating effectiveness of the training in the main study. These assessments included

the Gates MacGinitie Reading Test (MacGinitie, MacGinitie, Maria, & Dreyer, 2000), oral reading rate (words correct per minute), subtests from the Developmental Reading Assessment (Beaver & Carter, 2002), and the Utah Criterion Reference Test.

The current investigation was based on a secondary data set drawn from the larger project. This article reports on activities during the final semester of the project with students from two school districts whose teachers learned how to develop comprehension by teaching about expository text macrostructures. It was theorized that helping educators develop awareness of text micro- and macrostructure patterns could guide them toward the specific content of instruction needed by students.

Students in these treatment classrooms received training in identifying text structures by using graphic organizers. As part of the assessment activities, students wrote summaries of short expository texts. Using these written samples as the data set for the current investigation, two primary questions were asked:

- What microstructure and macrostructure differences do fourth- and fifth-grade students exhibit in their written expository text summaries?
- What effect does teaching of text structure have on the microstructures and macrostructures exhibited by students in their written summaries of expository texts?

Methods

Participants

In the ARC component reported here, fourth- and fifth-grade students from two school districts were participants. They were distributed across grade level as 240 fourth-grade students (155 treatment [7 classrooms] and 85 control [5 classrooms]) and 254 fifth students (168 treatment [7 classrooms] and 86 control [5 classrooms]). Pretesting indicated that the students in the treatment and control classrooms were not significantly

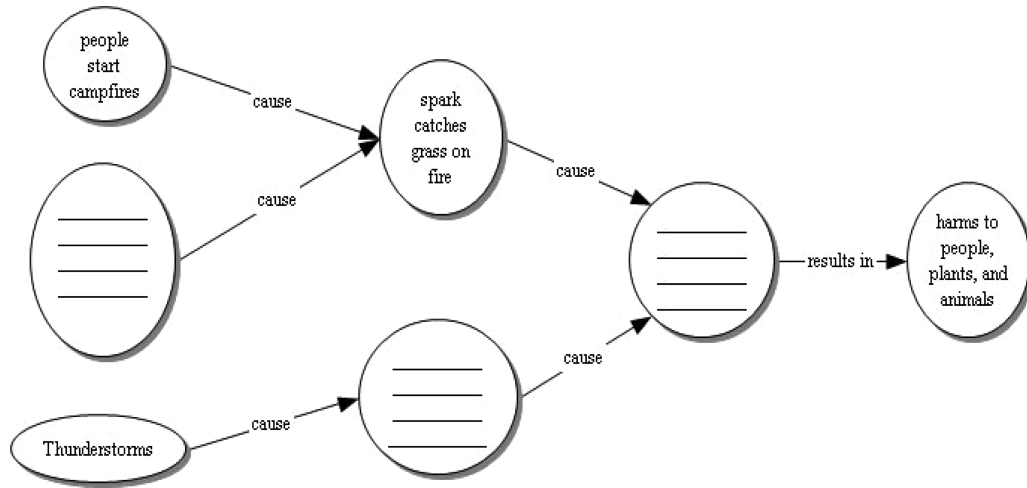


Figure 1. Graphic organizer for wildfires passage. Copyright 2010 by Carol Westby, Barbara Culatta, Barbara Lawrence, and Kendra Hall-Kenyon. Shared by permission of the authors.

different in their scores on the Gates MacGinitie Reading Test (MacGinitie et al., 2000).

Procedures

Teachers received two professional development training days. In addition, literacy specialists conducted monthly planning and evaluation meetings with the teachers. In these sessions, teachers identified ways to address students’ literacy needs and increase their opportunities to practice using skills and strategies. Particular attention was placed on providing teachers with ways to support students’ comprehension of expository texts (e.g., by orchestrating discussions around relevant topics, highlighting text structure, representing the organization of texts, and identifying relevant connections among ideas). Using classroom curricular materials, teachers had students identify text structures (e.g., descriptive, compare-contrast, cause-effect, problem-solution), note signal words for the structures, complete graphic organizers, and draw graphic organizers. No one strategy for teaching text structures was employed. The emphasis was on teaching text structure as a way to promote comprehension. Teachers did not explicitly teach writing summariza-

tion strategies or syntactic patterns of complex sentences.

Assessments

Summarization assessments were created that replicated authentic curricular task demands and were tied to curricular content. Students were asked to read and then summarize three short expository passages (see passages available as Supplemental Digital Content 1 at <http://links.lww.com/TLD/A2>). All three passages were written at the fourth-grade level (according to the Dale-Chall readability scale) and were based on the content of fourth-grade curriculum books. Two passages were cause-effect and one was compare-contrast. For two of the passages, students identified the compare-contrast or cause-effect text structure of expository texts, filled in a cloze graphic representation, marked signal words on lines representing cohesive links, and wrote a summary of the paragraph from their representation. Figure 1 shows the graphic organizer for the “Wildfires” passage and Figure 2 shows the organizer for the “Bear” passage. For the “Decline of the Tigers” passage, students were asked to generate their own graphic organizer and then write a summary.

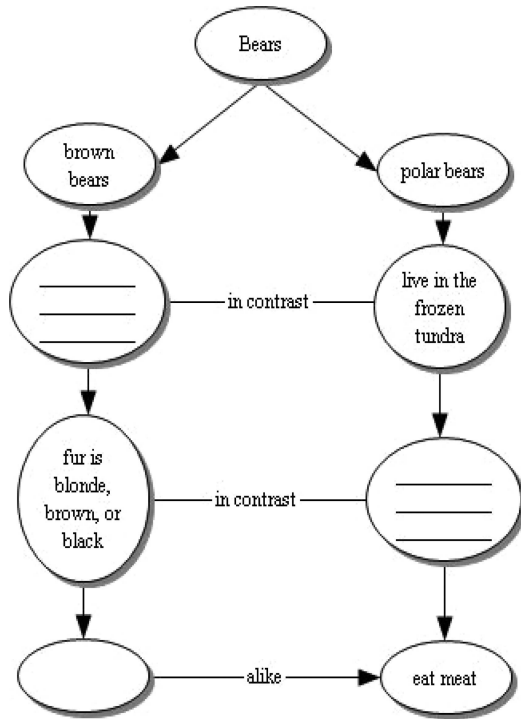


Figure 2. Graphic organizer for bear passage. Copyright 2010 by Carol Westby, Barbara Culatta, Barbara Lawrence, and Kendra Hall-Kenyon. Shared by permission of the authors.

The ARC summary tasks were simpler than the tasks used by other researchers who have investigated summarization because the students in the ARC study were younger. Therefore we used shorter passages and provided more macro and microstructure supports. The graphic organizers displayed the overall macrostructure of the texts with the most important points. The partial details and the presence of some explicit connectors in the organizers provided microstructure support.

Evaluation of student written summaries included both microstructure and macrostructure analyses. Persons doing the analysis and coding of the written samples did not know the grade level of the sample or if the sample was from a student in the treatment or control condition. Three types of analyses were conducted on the written summaries: microstruc-

ture analysis, holistic macrostructure analysis and a six-trait rubric.

Microstructure analysis

A microstructure analysis was conducted using Computerized Language Analysis (MacWhinney, 2000), which included mean length of T-unit (independent clause plus any dependent clauses attached to it), number of independent clauses, number and type of connectives (a variety of temporal and causal connectives), and number and type of dependent clauses (adjective, adverb, noun). The first author of this article marked all T-units on the students' writing sample. Graduate students entered the written sample using the CHAT format onto computers. The first author rechecked all T-units before coding each unit.

Holistic macrostructure analysis related to working memory

A holistic macrostructure scoring of the summaries was designed using Scardamalia's (1981) concept of working memory. This involved creating a holistic 0 to 4 point macrostructure rubric based on number of elements of working memory that appeared to have been used in the production of the summary (see Supplemental Digital Content 2 at <http://links.lww.com/TLD/A2>). Scardamalia used a classification system following Pascual-Leone's (1970) concept of mental power (M-power) or mental space (M-space), which involves defining different levels of task difficulty according to the number of mental units coordinated simultaneously. Other researchers have termed this *executive processing space* (Case, 1985).

Baddeley and Hitch (2000) discussed the value of Pascual-Leone's approach to working memory in accounting for developmental changes. As children develop, the number of concepts they can manipulate in their working memory increases. Expository texts require coordination of at least four content units that must simultaneously be integrated: (1) Statements must link to a central topic/theme; (2) Statements must be linked

to one another; (3) The nature of the link between statements can be explicit (because, as a result, if...then) rather than general (and, then, so); and (4) statements are simultaneously linked to the central topic and to each other according to the discourse genre. In the ARC holistic rubric, the primary defining characteristics of each level in terms of working memory were as follows:

- Level 0: Child produces random statements; not related to the passage/topic.
- Level 1: Child appears to be operating on short-term memory, not using working memory; reporting isolated, unrelated details.
- Level 2: Child appears to be able to hold and manipulate two concepts in working memory—chaining or centering—but not both simultaneously. In chaining, statements (ideas) are related in a temporal or causal relationship to one another. In centering, statements are related to a central topic, but not necessarily to one another.
- Level 3: Child appears to be able to hold and manipulate three concepts in working memory—so that chaining and centering are integrated simultaneously.
- Level 4: Child shows ability to use simultaneous chaining and centering with explicit connectives in clauses that make the relationships between ideas explicit (e.g., *before*, *because*, *consequently*, *when*, *if...then*, *but*, *in contrast*, *similarly*).

One hundred of the written samples were coded independently by both the first and third authors. These two coders then discussed each of the samples. The two coders were in agreement for nearly all the samples. The primary source of disagreement occurred on samples that were scored as either a high 2 or a low 3. The coders discussed the guidelines for the samples until they arrived at agreement for the samples on which they had differed. Guidelines were modified to improve reliability of coding summaries at macrostructure levels 2 and 3.

Six-trait rubric

Members of the research team who were educators expressed concern about the macrostructure scoring because they felt it would be difficult for teachers to understand and use. They recommended the development of a scoring rubric, noting that teachers are familiar with trait rubrics used in teaching writing or scoring students' portfolios. The researchers believed that the trait rubric would enable teachers better to understand what specific skills or content they needed to address for each student.

A second reason for developing the six-trait rubric was to provide more differentiation among the students' scores. The holistic macrostructure score provides a range of only 0 to 4 points, and the majority of students in the study obtained a score of 2. The six-trait rubric permitted a range of 0 to 24 points because students received a score of 0 to 4 in six categories: three microstructure categories (inclusion of accurate, relevant content ideas; use of signal words to connect ideas; and sentence structure); and 3 macrostructure categories (stating the main idea or gist of the passage; text structure/organization marked by logically sequencing ideas; and using the graphic organizer to guide text summary). Table 1 shows this rubric. Analysis in this article was based on the students' total rubric score (the sum of points on all six traits). Five members of the research team independently scored the three samples from 75 students and then compared and discussed their scoring and made some modifications in the rubric. Two team members independently scored three of the traits in the six-trait rubric (gist, text structure, and content ideas) for all of the students in this part of the project. Pearson correlations for the three traits were .67, .77, and .70, respectively. Percent of the raters' scores that were with 0 to 1 points were 74%, 74% and 54%, respectively; percentage of scores that were within 0 to 2 points were 93%, 92%, and 73%, respectively. Team members acknowledge that, in its present form,

Table 1. Six-Trait rubric

	A. Gist, topic/key sentence, main idea	B. Text structure	C. Signal words	D. Use of Graphic Organizer (GO)	E. Content (quantity, accuracy, and relevance)	F. Sentence structure
0 (None)	Statements do not link to a central topic	Ideas are randomly presented and do not link to each other	Uses no signal words	No relationship to the GO; little or no attempt to summarize the text	Statements are not related to the passage or do not communicate information from the passage	No complete sentences are included; includes only random phrases
1 (Little/Few/Some)	Ideas link to central topic, but no topic/key sentence brings ideas together	Some ideas link to each other.	Uses only the simplest signal words such as "and."	Some information in the GO is included, but it is incomplete and relationships are unclear	Some information from the passage is included, but some important ideas are missing; some ideas may be irrelevant or inaccurate	Uses some complete sentences, and some fragments; may include some awkward phrases
2 (Many/Most)	Topic/key sentence states some aspect of the content but does not provide a signal to the organization (e.g., <i>This passage is about bears; or A lot of things can start a wildfire</i>).	Most ideas are logically presented to reflect the overall organization of the text	Uses only the signal words in the GO or simple connections (e.g., <i>and, then, but</i>)	Most information is included from the GO, but some relationships are not accurately represented	Most information from the passage is included; some ideas may be irrelevant or inaccurate; some information/ideas are missing	Sentences are complete or mostly complete, but there is little or no elaboration and few or no dependent clauses
3 (All)	Has a topic/key sentence or sentences that states the main idea from which one can infer the organization (e.g., <i>Wildfires are very dangerous. They can start in two ways.</i>)	All ideas are logically presented to reflect the overall organization of the text	Uses signal words appropriately, and has at least one that is different from those in the GO	All information from the GO is included and relationships in the summary are accurate	All relevant information in the passage is included	All sentences are complete with some elaboration and/or some dependent clauses
4 (Best)	Introductory sentence (topic/key) provides an accurate overview of how the passage is organized (e.g., <i>The lives of polar bears and brown bears will be contrasted</i>)	Text is organized using more complex language to represent relationships	Uses a variety of more advanced signal words (e.g., <i>on the other hand, in contrast, similarly, whereas</i>)	All information from the GO is presented with signal words other than those in the GO that make the relationships clear	All relevant ideas from the passage are clearly and accurately represented and appropriately elaborated	Uses complete, complex sentences with dependent clauses that appropriately express relationships

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Table 2. Two-way analysis of variance for microstructures

Source	Dependent variable	<i>F</i> (1, 490)	<i>p</i> -value	Cohen's <i>d</i>
Grade level	Mean length of terminal unit (MLTU)	5.558	.019	.22
	# clauses	10.748	.001	.36
	Causal connectives	6.293	.012	.25
	Temporal connectives	5.012	.026	.22
Treatment/control	Mean length of terminal unit	9.984	.002	.30
	# clauses	24.928	.000	.55
	Causal connectives	22.613	.000	.47
	Temporal connectives	6.217	.013	.25

the descriptions need to be more refined with specific examples to improve reliability, particularly in coding content ideas.

Results

Data were analyzed using a two-way analysis of variance with Bonferroni correction. The microstructure analysis was based on the data across all three summaries. Microstructure analysis included the mean length of T-unit, the total number of clauses, and the number of temporal and causal connectives. Although dependent clauses were counted in the analysis, there were so few that they were not included in the analysis of variance.

Table 2 displays the results of the microstructure data analysis by grade (fourth and fifth) and condition (treatment and control). Table 3 shows the results of the holistic macrostructure analysis by grade and condition for each passage. Table 4 shows the results of the analysis using the six-trait rubric

for grade and treatment groups for each passage. (Tables of means and standard deviations for the four microstructure measures, holistic macrostructure analysis, and six-trait rubric analysis can be accessed as Supplemental Digital Contents 3, 4, and 5 at <http://links.lww.com/TLD/A2>.)

On all microstructure analyses, the holistic macrostructure analysis, and the six-trait rubric score, fifth graders had significantly higher scores on their summaries than fourth graders, and treatment groups at both grade levels had significantly higher scores than control group students. Effect sizes ranged from small to large. Differences were slightly greater between treatment and control groups than between fourth- and fifth-grade groups, indicating that treatment may have promoted greater growth than age-related development. Use of connective words correlated significantly with mean length of T-unit and with

Table 3. Two-way analysis of variance for macrostructure holistic scores

Source	Passage	<i>F</i> (1, 485)	<i>p</i> -value	Cohen's <i>d</i>
Grade	Wildfires	18.789	.000	0.41
	Bears	13.207	.000	0.35
	Tigers	19.932	.001	0.31
Treatment/control	Wildfires	21.762	.000	0.44
	Bears	60.992	.000	0.75
	Tigers	9.369	.002	0.30

Table 4. Two-way analysis of variance for total scores on the six-trait rubric

Source	Passage	<i>F</i> (1, 485)	<i>p</i> -value	Cohen's <i>d</i>
Grade	Wildfires	21.004	.000	0.42
	Bears	38.079	.000	0.48
	Tigers	28.729	.000	0.51
Treatment/control	Wildfires	23.799	.000	0.45
	Bears	95.947	.000	0.92
	Tigers	24.175	.000	0.47

higher rubric scores evaluating text content and macrostructure aspects of text (*gist, text structures*) ($p < .01$). Differences between treatment and control groups also were slightly greater on the passages (Wildfires and Bears) where a cloze map (i.e., partially completed graphic organizer) was provided than on the task (Tigers passage) where the students had to create their own representation.

Discussion

The majority of both control and treatment students received scores of 2 on the holistic scoring, indicating they were either chaining sentences or linking sentences to the passage topic, but they were not doing both. To achieve a 3 or better, students needed to identify the overall theme of the passage and to write enough to show the relationships between individual ideas and the theme and among individual ideas. To achieve a 4, students had to use dependent clauses with specific connectives that demonstrated the relationship about the elements. Many students received a score of 2 because they did not write enough to show these multiple relationships. Simply stating many isolated ideas from the texts, however, also was not sufficient. The relationships among the ideas and to the overall theme needed to be made explicit. This required appropriate use of connectives and dependent clauses.

Summaries that scored a 2 varied considerably in length. It appeared that students had to be able to provide a reasonable amount of detail or specifics about the content elements of the text before they attended to relationships among content necessary to achieve a 3. Some students scored a 2 with only three coherent sentences; whereas others might have written eight sentences and still received only a score of 2 because they were not showing the relationships among the sentences and their relation to the topic.

Even without explicit instruction in text microstructures (connectives and syntax) and summarization, fifth-grade students did better than fourth-grade students. Explicit in-

struction, however, appeared to jumpstart the system, so that students could make greater gains than could be accounted for by development alone. In fact, fourth-grade students in the treatment group did as well or even better on all measures than fifth-grade students in the control group. Even though many students made obvious gains in their ability to summarize short texts, we do not know if they would be able to summarize longer, more complex texts. The short ARC passages and the support from the graphic organizers, however, appeared to be a good way to begin to introduce summarization skills. The fact that the graphic organizers provided more support to the treatment group than the control group suggested that the treatment group had learned how to make use of graphic organizers when they were provided.

Students in the treatment groups may have produced summaries with more complex syntax and higher macrostructure scores if teachers had provided explicit instruction in text microstructures and principles or rules for summarization. The teachers' focus of instruction was on identifying text structures and completing and generating graphic organizers to improve reading comprehension. They drew students' attention to words that signaled text structure (e.g., *compare, contrast, cause, effect, next, because*), but they did not teach students how to produce complex sentences that made explicit the relationships among concepts in the texts. All students made minimal use of sentences with dependent clauses. Students in the treatment groups did make greater use of words referring to temporal and causal relationships, but they seldom used these words in ways that indicated hierarchical relationships in their summaries. Despite the limited time devoted to teaching text structure and the limited range of strategies taught, students in the treatment groups exhibited summaries that were significantly better in both their microstructures and macrostructures than control group students.

CONCLUSIONS

This study represents a beginning investigation into issues related to students' developing abilities to summarize expository text. There were some limitations in the study. It lacked adequate monitoring or control over instructional fidelity, that is, the degree to which teachers actually implemented the strategies they were taught. The holistic macrostructure rubric and the six-trait rubric require further elaboration to increase their reliability. Instructing teachers in the use of these assessment rubrics might promote their abilities to teach skills more explicitly. Despite these study limitations, fourth- and fifth-grade students in the treatment groups made significantly greater improvement in micro and macrostructure summarization skills than fourth- and fifth-grade students in the control group. These students were at the ages when ability to summarize texts is just beginning to develop.

A text summary reflects a student's comprehension of a text. Students who produce good summaries exhibit their understanding of the overall organization and theme of a text. They are able to "read between the lines"—to make inferences regarding ideas and relationships that are not explicitly stated in the text, but are essential for comprehending the

text. They are able to determine what is important and unimportant. Students might be able to retell what is in a text, but not be able to summarize the text (Kisner, 2006). Unlike summarizing, retelling does not necessarily indicate comprehension. Summarizing requires higher level thinking skills than retelling. Summarization requires that students be "information archeologists." That is, "They must dig for information, make sense of it, and attach meaning to it" (Wormeli, 2004, p. 6). Summarization requires text comprehension and also facilitates text comprehension and retention of learning.

An implication of this research is that learning to evaluate students' ability to produce expository summaries could be a particularly useful and important assessment for teachers of students in middle and high school. Further research on these assessment tools is also justified. Assessment of summarization skills is authentic because it taps a skill that is needed across the curriculum, but summaries of expository discourse have not typically been evaluated. This form of assessment is likely to highlight language/literacy difficulties that are not reflected in conversation and narrative productions and it may help teachers individualize their instruction. Furthermore, written summaries are relatively easy to collect and do not take long to analyze.

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