Recent research has shown that the rhetorical organization of narrative and expository texts interacts with the formal schemata of native English-speaking readers (the readers' background knowledge of and experience with textual organization) to affect reading. Researchers have recently shown that formal, rhetorical schemata have similar effects on reading in English as a second language. Moreover, the research in native English reading has shown that explicit teaching of various aspects of text structure can facilitate first language reading.

This article reports a controlled training study designed to answer the related question for second language reading, Can we facilitate ESL reading by explicit teaching of text structure? The results indicate that training on the top-level rhetorical organization of expository texts significantly increased the amount of information that 25 intermediate-level ESL students could recall.

INTRODUCTION

A number of research studies have provided empirical evidence that the rhetorical organization of a text interacts with the reader's formal schemata—that is, the reader's background knowledge of and experience with textual organization—to affect reading comprehension. This effect of text structure on reading comprehension has been shown to be operative for both narrative and expository texts. Furthermore, the influence of text structure on reading has been demonstrated via different measures of comprehension—written recall protocols, summaries, retellings, and question-answering. Since research on expository prose has provided further evidence that knowledge and use of textual organization discriminates good readers from poor readers, it is reasonable to ask whether instruction which focuses on text structure improves comprehension for poor comprehenders.
In second language reading research, relevant research is lacking. Some recent research has begun to investigate the effects of rhetorical organization on second language reading comprehension. Based on this research, some investigators have begun to suggest a variety of pedagogical techniques for teaching various aspects of text structure to improve reading comprehension. And, of course, ESL reading teachers have for some time included varying amounts and types of instruction on text structure. However, no empirical research has ever been reported as to whether explicitly teaching text structure facilitates ESL reading comprehension.

This article reviews the relevant research on text structure and its effects on reading comprehension in both English as a native language and English as a second/foreign language. It then reviews studies which have shown that explicitly teaching text structure facilitates first language reading comprehension. Finally, based on this research, it reports recent results from a research project designed to answer the question, Can we facilitate ESL reading comprehension by teaching about text structure?

EVIDENCE THAT TEXT STRUCTURE AFFECTS READING

Within the theoretical framework of what has been labeled story grammars (if looked at from the perspective of a narrative text as a linguistic object), or story schemata (if looked at from the perspective of the mental processing of narrative text), a large number of empirical studies have demonstrated that narratives typically have a hierarchical schematic structure, that child and adult native readers are sensitive to such structure, and that when the structure is used to guide comprehension and recall, both are facilitated (Kintsch 1974, 1977, Rumelhart 1975, 1977, Kintsch, Mandel, and Kozminsky 1977, Mandler and N. Johnson 1977, Thorndyke 1977, Glenn 1978, Kintsch and Greene 1978, Mandler 1978, Adams and Collins 1979, Stein and Glenn 1979, Adams and Bruce 1980, N. Johnson and Mandler 1980).

Similarly, in the realm of expository prose, the research of Meyer (1975, 1977a, 1977b, 1977c, 1979), Meyer, Brandt, and Bluth (1980), Meyer, Haring, Brandt, and Walker (1980), Meyer and Rice (1982), and Meyer and Freedle (1984) has shown effects on reading comprehension of differences in the rhetorical structures of expository prose. In her research on what is learned from expository texts, Meyer has gathered evidence that what she calls the “content structure” (1977a:307), or the way the information in a passage is organized, is an important factor in reading comprehension. Specifically, her research has shown that information located high, or at top levels, in the hierarchical
organization of a passage is recalled better than information at lower levels, both immediately after reading or listening, and also over time. Since this research has been reviewed recently in this journal (see Carrell 1984b), it is not repeated here.

By now, several studies have shown the effects on ESL reading comprehension of differences in the rhetorical organization of text. In the realm of narrative prose, Carrell (1984a) has demonstrated the effects of a simple narrative schema on reading in ESL. In the realm of expository prose, Hinds (1983a, 1983b) has compared Japanese and English speakers in their reading, in their respective native languages, of texts with a typical Japanese rhetorical structure. His findings show that not only is the Japanese structure generally more difficult for the English readers, but that particular aspects of that rhetorical organization are extraordinarily problematic for English readers, especially in delayed recall. He concludes that the traditional ki-sho-ten-ketsu pattern of contemporary Japanese expository prose is more difficult for English readers because of its absence in English expository prose. That is, native English readers lack the appropriate formal schema against which to process the Japanese rhetorical pattern.

The research of Connor (1984) and Connor and McCagg (1983a, 1983b) is also relevant here. Connor (1984) has compared the reading comprehension of Japanese and Spanish readers of ESL to that of a group of native English readers. She used an expository text with Meyer’s problem/solution type of top-level structure. In analyzing the recall protocols produced immediately after reading, Connor found that although the native English readers generally recalled more propositions from the original text than the non-native readers, the difference was in the number of low-level ideas rather than in the number of top-level ideas. That is, the non-native readers recalled about the same number of top-level ideas as the native readers but far fewer low-level ideas. The non-natives tended to be unable to elaborate on the main ideas with supporting details. This turned out to be a significant disadvantage when their recall protocols were holistically evaluated by ESL writing teachers, as reported in Connor and McCagg (1983a). Although not reported by Connor and McCagg (1983a) as a systematic finding, the native and Spanish recall protocols receiving the highest ratings by the ESL writing teachers reflected the problem/solution organization of the original text; neither of the Japanese protocols discussed by Connor and McCagg—neither the highest-rated nor the lowest-rated—reflected this top-level content structure.

Finally, a study by Carrell (1984b) shows the effects of four different English rhetorical patterns on the reading recall of ESL readers of
various native language backgrounds. That study showed that the more tightly organized patterns of comparison, causation, and problem/solution generally facilitate the recall of specific ideas from a text more than the more loosely organized collection of descriptions pattern. In this finding, ESL readers generally appear to be similar to the native readers tested by Meyer and Freedle (1984). However, that study also found significant differences among the native language groups (Arabic, Spanish, and Oriental) as to which English discourse types facilitate greater recall. For example, the Arabic group found the collection of descriptions type far less facilitative of recall than any of the other three. The Oriental group (predominantly Korean, plus a few Chinese) found the causation and problem/solution types about equal, and both of these facilitated recall more than the comparison and collection of descriptions, which were about equal.

TRAINING STUDIES—ENGLISH AS A NATIVE LANGUAGE

In the domain of training on narrative prose, three different studies have been conducted—by Singer and Donlan (1982), Gordon (1980), and Short (1982). Singer and Donlan (1982) showed that readers can improve their comprehension of narrative prose by being taught the schema for simple stories as well as a strategy for posing schema-general and story-specific questions to guide their interaction with the text. Singer and Donlan reasoned that the reader needs to be taught not only about the story schema (for the reader may very well already possess that knowledge), but also a strategy for applying this knowledge to the story. They taught a group of American eleventh graders a general problem-solving schema for short narratives (e.g., that a story involves a leading character who wants to accomplish a goal; the character adopts a plan for achieving the goal; on the way to the goal the character encounters obstacles which he or she overcomes, circumvents, is defeated by, and so on). Singer and Donlan then taught these students how to formulate general questions related to this schema (e.g., Who is the leading character? What is the character trying to accomplish?). Then they had the students practice deriving their own story-specific questions from these schema-general questions (e.g., Is this story going to be more about the officer or the barber? Will the barber kill the officer with the razor?). The readers’ ability to use these tools to comprehend short stories typically read at the high-school level was then tested. Using criterion-referenced tests, the comprehension of this experimental group was compared with that of a control group taught to comprehend short stories through the traditional method of teacher-posed questions. The results showed
Gordon (1980) compared the effects of three different instructional strategies on the comprehension of narrative selections in natural classroom settings. Fifth grade children of average and above average reading ability, who were using the same basal reader in one school, were randomly assigned to one of three treatment groups: Content and Structure, Inference-Awareness, and Control. Each group received, on a daily basis, 10 minutes of differential treatment related to each basal reader selection and 20 minutes of the regular basal reading program. During each 10-minute period, the Content and Structure group received instruction to improve pre-existing content schemata and knowledge of the macrostructure (Kintsch and van Dijk 1978) of text. The Inference-Awareness group was given training in the use of a metacognitive strategy designed to improve their ability to make text-based inferences and to relate prior knowledge (content schemata) to textual elements. Given the focus of this group on content schemata, this group might also be referred to as a “content” group. The Control group received differential instruction in language-related literature appreciation or creative activities pertinent to the basal reader story. Among a number of specific findings in this study, Gordon reports that the Content and Structure group significantly exceeded (p <.01) both other groups on the overall written recall on the final test. Thus, a group taught both text structure and content strategies for comprehending narrative text not only outperformed a control group, it also outperformed a group taught content strategies only.

Short (1982) designed a self-instructional program for fourth graders to remediate less skilled readers’ limited use of story schema. After only three training sessions, she found that story grammar strategy training significantly enhanced less skilled readers’ free and prompted recall performance; those receiving the strategy training were indistinguishable from skilled readers. Short observed that “the marked changes in story recall brought about by three training sessions indicated strategy training appeared to change passive poor readers into active, strategic learners” (1982: abstract).

Thus, all three studies involving explicit training in the structure of narrative texts (story grammar) yielded positive results, showing the beneficial effects of explicitly teaching the schema for simple narratives and strategies for applying the schema.

Let us now turn to training experiments with expository texts. In two studies, Geva (1983) trained students in a text-mapping strategy
Both studies were designed to train less skilled readers to pay closer attention to hierarchical aspects of text. Community college students were taught to represent prior knowledge and text structure in nodes-relation flowcharts, which represent the ideas as nodes and the relations among the ideas as labeled connectors. In Geva’s first study, students in the experimental group received 20 hours of instruction focused on the identification of causation and process descriptions in factual expository texts. Students in the control group received individualized teaching related to speed reading, text skimming, looking for key words, and identifying conjunctions in text. At the end of a five-week training period, the experimental group showed significant improvement not only on the flowcharting task but also on the Nelson Denny Reading Test (Nelson and Denny 1973). Yet, there were no differences between the experimental and control groups on the Nelson Denny Reading Test—both groups showed similar gain scores.

In her second study, however, with similar subjects, materials, and procedures as in her first study, Geva showed that less skilled readers had benefited from the instruction more than moderately skilled readers: The gain scores of the less skilled experimental students on the Nelson Denny Reading Test significantly exceeded the gain scores of the moderately skilled experimental students and of the less skilled control students. Geva speculates that “students with higher initial reading abilities had at least an implicit knowledge of text components before the experimental intervention” (1983:395); for them, the training program may have been redundant as a means of improving reading comprehension. Geva concludes: “The results seem to support the conjecture that learning to recognize text structure through flowcharting transferred to more careful reading of expository texts by less skilled readers” (1983:384).

Taylor and Beach (1984) recently studied the effects of text-structure instruction on 114 seventh graders’ comprehension and production of expository text. Each student was assigned to one of three groups: 1) an experimental group, which received instruction and practice in a hierarchical summary procedure used after reading social studies material; 2) a conventional group, which received instruction and practice in answering and discussing questions after reading; and 3) a control group, which received no special instruction. They found that the instruction and practice in the hierarchical summary procedure enhanced students’ recall for relatively unfamiliar, but not relatively

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1 Text-mapping (Armbruster 1979, Pearson and Gallagher 1983) involves selecting key content from an expository passage and representing it in some sort of visual display (boxes, circles, connecting lines, and so on) in which the relationships among the key ideas are made explicit.
familiar, social studies material and had a positive effect on the quality of students’ expository writing.

Through direct comprehension instruction, Mosenthal (1984) trained sixth and eighth grade social studies and physical science students in a purposive reading strategy. This strategy involved identifying the writer’s general goal for a text, as well as subtopics, main ideas, and the relationship of main ideas across subtopics and to the writer’s general goal. The training relied on formal aspects of expository text (e.g., using the title to identify a main topic and using that topic to infer a writer’s general goal, using headings to identify subtopics) and utilized a text-mapping strategy Mosenthal calls a “planbox”—a simple diagram of a text labeling topic, subtopics, subtopic function, and main ideas. Data from question-answering tasks and summarizing tasks, collected once a week over a six-week training period, revealed that trained students wrote more structured summaries as a result of training and in other ways performed better than control students on all comprehension measures.

In a study spanning narrative and expository texts, Reutzel (1985) has shown that explicit training in the use of what he calls “story maps” (visual text maps) improved fifth graders’ comprehension of both types of texts. In this study, one group of students was trained in the use of story maps for both simple narrative and various types of expository texts (e.g., compare-contrast, cause-effect texts). The group trained on story maps recalled significantly more of both narrative and expository texts than a control group which used the directed reading activity approach.

Bartlett (1978) spent a week—five one-hour sessions—teaching a group of ninth graders to identify and use Meyer’s (1975) comparison, causation, problem/solution, and collection of descriptions text types. This group read and was tested for the recall of texts on three occasions: before training, a day after training, and three weeks after instruction. A control group participated in all the testing sessions, was exposed during training to the same instructor and the same texts for the same amount of time, but, instead of training on the text types, engaged in a punctuation activity as part of a grammar program. At the beginning and end of each training session, students in the experimental condition were informed of the objectives of instruction—that is, to identify top-level structure in prose passages during the reading of the passage and to use that top-level structure in organizing written recall of the passage. Bartlett’s results show that the trained group remembered nearly twice as much content on the post-tests as on the pretests—both one day after instruction and three weeks later. Furthermore, on the tests after instruction, the trained group did
twice as well as the control group. (According to the regular classroom teacher of the students in the experimental group, the students reacted favorably to the skills they learned, considered what they learned to be a valuable tool, gained confidence in themselves as learners, and also gained specific skills that carried over to subsequent units of study through the rest of the term.)

Thus, the five studies involving training on expository text structure—Geva (1983), Taylor and Beach (1984), Mosenthal (1984), Reutzel (1985), and Bartlett (1978)—all show that reading comprehension can be significantly facilitated by explicitly teaching readers about expository text structure and by teaching various strategies for identifying and utilizing that structure during the reading process.

THIS TRAINING STUDY—ENGLISH AS A SECOND LANGUAGE

Some researchers have suggested that teaching various aspects of text structure ought to facilitate ESL reading comprehension (including Carrell 1984a), and some have even suggested a variety of pedagogical techniques to do this teaching most effectively—including text-mapping strategies like Geva's flowcharts (see, for example, T. Johnson and Sheetz-Brunetti 1983). And, of course, many ESL classroom reading teachers already incorporate into their lesson plans varying amounts and types of explicit instruction about text structure and teach different strategies for relating text structure to comprehension. In the spirit of relating theory and research to ESL practice and pedagogy, on the one hand, and to demonstrate under controlled conditions that a particular pedagogical practice can yield a positive outcome, on the other hand, a training study was designed to answer the question, Can we facilitate ESL reading comprehension by teaching text structure?

Subjects

This study was conducted with a heterogeneous group of 25 high-intermediate proficiency ESL students, Level 4, enrolled in the intensive English program for foreign students at the Center for English as a Second Language (CESL) at Southern Illinois University at Carbondale. The native languages represented included Chinese (5 students), Arabic (5), Bahasa Malaysian (4), Japanese (3), Indonesian (3), Korean (2), Spanish (2), and Turkish (1). The experimental group consisted of the 14 students in one section, and the control group of the 11 students in another section.
Training Procedures

Training was based loosely on Bartlett's (1978) training procedures and was conducted during a one-week period in the Fall of 1984, in five successive one-hour sessions during the students' regular CESL reading classes. The training covered four of Meyer's (1975) major expository discourse types—the same four used by Bartlett (1978) and discussed in detail in Carrell (1984b). The sessions began simply, presuming no prior background and using several short and easy, illustrative text passages (sample training text passages are given in Appendix A). The sessions built during the week to longer and more subtle passages. All text passages were naturally occurring texts, selected from a variety of sources. Each session began and ended with reviews of the training program's objectives, and each session reviewed the previous session's main points.

The teaching style was intended to be highly motivating and engaging for the students and involved student interaction with the materials and individual corrective feedback. The teacher began by doing most of the talking, demonstrating, and so on, but quickly shifted the responsibility for learning to the students and allowed them to work at their own pace.

The basic objectives of the teaching program were explicitly communicated to the students. Specifically, we explained to them that sometimes it did not matter how they read—for example, when they were reading for pleasure—but that at other times, it did. They were told that sometimes, especially as students studying English for academic purposes and headed for the university, they would be called on to read a lot of information and to remember it—for example, in preparing for exams and class assignments. We explained that the efficiency with which students could read under such circumstances was important, that if they could get the necessary information quickly and effectively, it was likely they would perform well and feel better about the task. We told them that over the training period, we would be teaching them a strategy for reading that should improve their understanding of what they read and their ability to recall it. We emphasized that by teaching them a little about the ways in which expository texts are typically organized at the top level, we hoped to teach them how to use this knowledge to improve their

—Pilot testing of the training and testing materials with a similar heterogeneous group of 37 advanced proficiency students whose classes met only three times per week showed that significant positive training effects may be obtained with only three training sessions. However, I would not want to argue that this amount of time was ideal; only that with advanced students, it appears to be sufficient to detect an effect.
comprehension of what they read, as well as to teach them a strategy for using this knowledge to improve their recall of what they read.

During every training session, each student worked with a study packet, which was the focus of that session’s activities (excerpts from the study packet for Session 5 are given in Appendix B). Every day as they left the session, the students were asked to apply what they were learning to all of the reading they did until the next session. This was intended to get the students to use the strategy outside their ESL reading classroom, in other nonteacher-supported reading situations.

The study packets included detailed explanations of the benefits of learning the strategy, along with checklists so students could monitor and regulate their own learning.

Control Sessions

While the experimental group was going through the training sessions, the control group also received special training with the same texts. However, they performed various linguistic operations with the texts, for example, grammar exercises, sentence combining, sentence analysis, work with discourse connectors, cohesion, and vocabulary work. They also focused on the content of the passages (e.g., using the texts as a basis for question-answering and discussion) and used the texts as the basis for various reading and writing assignments. The members of the control group were told that the special texts they were being given, over and above their regular CESL Level 4 reading curriculum, were part of an instructional program designed to get them to think about 1) the linguistic aspects of various texts, 2) the linguistic operations they could perform on texts to become more aware of the sentences which constitute a text, and 3) the content of a text and the connection between reading about a topic and writing about the same topic. The teaching style with the control group also attempted to motivate and encourage these students as they worked with the texts.3

The only thing the control group did not receive was the training on top-level rhetorical organization and the strategy for using that information as a basis for reading and recalling expository text. The control group did not receive training in any specific alternate strategy for use in the reading and recall of text. However, because Level 4 students at CESL are university-bound, considerable emphasis is given at that level to reading and writing for academic purposes, that

3Since one individual taught the control group and another the experimental group (both were the students’ regular CESL reading instructors), we were unable to control for any effects due to instructor differences. However, both were highly regarded, tenured teachers with equivalent experience.
is, reading to learn from text, using a variety of approaches. While the experiment might have been more tightly controlled if we had included a specific alternate training strategy for the control group, we were more interested in comparing the top-level strategy to what is commonly taught in an ESL reading curriculum.

Testing Procedures

Both the experimental and control groups were administered a pretest during the class period prior to training (Friday) and a post-test during the class period following the week's training (Monday). A second post-test was administered to only the training group, three weeks after the first post-test, to determine the persistence of the training effect. Due to time constraints, the pre- and post-tests covered only two of the four discourse types taught: comparison and collection of descriptions. Thus, the pre- and post-tests each included two texts, one of each of those two types. The length of the texts ranged from 230 words to 281 words. To control for any effects of content schemata, all of the texts used in testing were about energy and environmental issues. The tests consisted of reading each text, writing an immediate free recall, and identifying the text's overall organization by answering an open-ended question (Appendix C is an example of one of the test packets, Post-Test 1).

Scoring

Quantity of idea units recalled. Each of the six texts used in the pre- and post-tests was first analyzed into idea units (see Appendix D for an analysis of one of the test texts into idea units). Basically, each idea unit consisted of a single clause (main or subordinate, including adverbial and relative clauses). Each infinitival construction, gerundive, nominalized verb phrase, and conjunct was also identified as a separate idea unit. In addition, optional and/or heavy prepositional phrases were also designated as separate idea units. Three separate raters were used to arrive at the idea unit analysis of each text, and all agreed on the final analyses.

Recall protocols were scored for the presence of each idea unit from the original text. In this scoring, each protocol was judged by two independent judges, with any discrepancies settled by a third

4Standard reading texts for CESL Level 4 are Reader's Choice: A Reading Skills Textbook for Students of English as a Second Language (Baudoin, Bober, Clarke, Dobson, and Silberstein 1977) and Reading for College-Bound ESL Students (Cowan, Moffett, Moore, Pharis, Mahon, and Wenner 1982).
judge. The pairs of judges achieved a reliability coefficient of $r = .96$. Because the number of idea units varied slightly from text to text (from 37 to 47), the number of idea units recalled was transformed into a percentage of the total number of idea units in the original text.

Quality of idea units recalled. Each of the idea unit analyses of the six original test texts was organized into hierarchical levels (Meyer 1975, Meyer and Freedle 1984). Each idea unit was determined to be an Introduction, Top-, High-, Mid-, or Low-Level idea unit, according to the following criteria (see Appendix D for a categorization of idea units):

1. Introduction: represents the thesis statement of the text and reveals its top-level organization.
2. Top-Level: represents the main ideas being compared/contrasted (comparison text) or the main ideas being collectively described (collection of descriptions text).
3. High-Level: represents major ideas or main topics in the text.
4. Mid-Level: represents minor ideas or subtopics in the text.
5. Low-Level: represents minor detail in the text.

Organizing the idea units of each original text into a hierarchy enabled us to analyze the recall protocols in terms of the levels of idea units recalled and to determine whether the training was effective at all hierarchical levels or only for certain kinds of idea units—main topics, subtopics, or minor details. (Since most subjects had no difficulty recalling the central theses of Introduction and Top-Level, these idea units were not included in the qualitative analysis.)

Organization used. Each recall protocol was also analyzed to determine whether or not it utilized the text type of the original (i.e., collection of descriptions or comparison). To be classified as a collection of descriptions, the protocol had to have an overtly expressed topic plus associated comments on the topic; to be classified as a comparison, the overall structure had to contrast opposing points of views, either those of the original text or the subject's own point of view. The pairs of judges agreed 75 percent of the time in their scoring of the rhetorical organization used.5

Organization recognized. The open-ended questions were also scored on whether or not the reader had correctly identified the discourse

5Since the primary emphases of the study were the amount and type (quantity and quality) of information recalled from text, and not the rhetorical organization used to structure that recall, it was decided that the relatively low reliability of 75 percent could be tolerated on this secondary measure. Furthermore, a one-sample, chi-square test of the number of times the two judges agreed versus the number of times they disagreed yielded $x^2 = 30.04$, df = 1, $p < .001$. Thus, a 75 percent agreement rate is highly significant when calculated over 128 data points (128 recall protocols scored by each judge).
type. The pairs of judges agreed 86 percent of the time in their scoring of rhetorical organization recognized.

RESULTS

Although there appear to be some differences between the groups' performances on the collection of descriptions texts and the comparison texts which warrant further analysis (see Carrell 1984b), the results reported herein are averaged across both text types. Descriptive statistics are shown in Table 1.

<table>
<thead>
<tr>
<th>Groups (N = 25)</th>
<th>Pretest</th>
<th>Post-Test 1</th>
<th>Post-Test 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental (n = 14)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean Percentage of Idea Units</td>
<td>18</td>
<td>46</td>
<td>46</td>
</tr>
<tr>
<td>Percentage of Subjects Using Organization</td>
<td>86</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Percentage of Subjects Recognizing Organization</td>
<td>46</td>
<td>96</td>
<td>92</td>
</tr>
<tr>
<td>Control (n = 11)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean Percentage of Idea Units</td>
<td>17</td>
<td>28</td>
<td>--</td>
</tr>
<tr>
<td>Percentage of Subjects Using Organization</td>
<td>77</td>
<td>86</td>
<td>--</td>
</tr>
<tr>
<td>Percentage of Subjects Recognizing Organization</td>
<td>41</td>
<td>50</td>
<td>--</td>
</tr>
</tbody>
</table>

Note: Each test consisted of two discourse types: comparison and collection of descriptions.

First, the training enabled the experimental subjects to recognize the trained discourse types and to use them in their recall protocols. After training, the experimental group significantly increased in the proportions of those who recognized and used the text's top-level organization, whereas the control group did not. Chi-square tests of proportions for paired observations (Glass and Hopkins 1984:291) yielded the following results: Recognition: Experimental $\chi^2 = 12.25$, p < .001; Control $\chi^2 = .40$, n.s. Use: Experimental $\chi^2 = 4.00$, p < .05; Control $\chi^2 = .67$, n.s. Furthermore, the data from Post-Test 2 show the persistence of the training effect, even three weeks after training. However, the basic point of the study was to see if we could train subjects to recognize and use the text type to increase their reading
comprehension, as measured by the amount of the original text they were able to recall.

A one-way analysis of variance procedure showed no significant difference between the experimental group ($\bar{X} = 18$) and the control group ($\bar{X} = 17$) on the pretest ($F = .001, \text{n.s.}$). Although we were testing in already existing classrooms and were not able to randomly assign subjects to experimental and control classes, there were no differences between these groups prior to training.

In a research design such as this, involving comparable pre- and post-tests, one might suspect performance on the post-tests to be somewhat predictable from performance on the pretest. To the extent that this is the case, performance on the post-test could not be attributed to the experimental activities and would dictate use of an analysis of covariance procedure. Thus, the correlation coefficient between the pretest and the first post-test was checked, and an overall $r^2 = .06, \text{n.s.}$, was obtained. Since the pretest was not significantly correlated with Post-Test 1, an analysis of covariance was not appropriate.

A simple one-way analysis of variance was performed, and the results, reported in Table 2, show that the mean on Post-Test 1 for the experimental group is statistically significantly larger than that of the control group. In other words, the training sessions for the experimental group were statistically significant in increasing the total amount of information that students in that group could recall from the two types of texts they read. Moreover, this training effect for the experimental group was persistent.

### TABLE 2
Analysis of Variance—Idea Units

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>1</td>
<td>2063.362</td>
<td>2063.362</td>
</tr>
<tr>
<td>Within Groups</td>
<td>23</td>
<td>3242.998</td>
<td>140.999</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>5306.360</td>
<td>--</td>
</tr>
</tbody>
</table>

$F = \frac{2063.362}{140.99} = 14.63, \text{df (1,23), } p = .0009$

To determine whether the significant facilitating effect of the training applied equally to major topics (main ideas) as well as to subtopics and low-level details, the results were analyzed according to the hierarchical levels of the idea units within the original text. Table 3 presents these results. In a comparison of results on the pretest and the first post-test for both experimental and control
groups, an analysis of covariance procedure for the High-Level idea units yielded an F-value of 11.99, \( p = .0022 \). Thus, the Post-Test 1 mean for the experimental group is significantly larger than that of the control group for High-Level idea units. Results of the analysis of variance procedure for Mid- and Low-Level idea units yielded F-values as follows: Mid-Level: \( F = 12.32, p = .0019 \); Low-Level: \( F = 7.04, p = .0142 \). Thus, the Post-Test 1 means for the experimental group are significantly larger than those of the control group for Mid-and Low-Level idea units.

<table>
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<td></td>
<td></td>
</tr>
<tr>
<td>Mean Percentage of High-Level Idea Units Recalled</td>
<td>15</td>
<td>43</td>
<td>41</td>
</tr>
<tr>
<td>Mean Percentage of Mid-Level Idea Units Recalled</td>
<td>8</td>
<td>31</td>
<td>38</td>
</tr>
<tr>
<td>Mean Percentage of Low-Level Idea Units Recalled</td>
<td>16</td>
<td>41</td>
<td>43</td>
</tr>
<tr>
<td>Control (( n = 11 ))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean Percentage of High-Level Idea Units Recalled</td>
<td>13</td>
<td>23</td>
<td>--</td>
</tr>
<tr>
<td>Mean Percentage of Mid-Level Idea Units Recalled</td>
<td>8</td>
<td>13</td>
<td>--</td>
</tr>
<tr>
<td>Mean Percentage of Low-Level Idea Units Recalled</td>
<td>10</td>
<td>17</td>
<td>--</td>
</tr>
</tbody>
</table>

Note: Each test consisted of two discourse types: comparison and collection of descriptions.

DISCUSSION

The training experiment yielded promising results, demonstrating that explicit, overt teaching about the top-level rhetorical organization of texts can facilitate ESL students' reading comprehension, as measured by quantity of information recalled. The results of the qualitative analysis show that the training facilitates recall of supporting detail as well as of major topics and subtopics. In addition, the persistence of the training was evident for as long as three weeks after training.

\(^{6}\) An analysis of covariance procedure was called for in this instance because of a significant correlation, \( r = .55, p < .001 \), between the pretest and the first post-test and a common within-groups regression coefficient, \( F = .94, \text{n.s.} \).
It should also be mentioned that student reaction to the training was extremely positive. Students expressed the view that they had learned a helpful technique which benefited them. One very quiet student said that most of his life he had hated reading because he never knew what he was looking for and that now it made sense to him. All the training students expressed more confidence in themselves as ESL readers.

The findings of this study are noteworthy, since, as was mentioned earlier, no previously published research has shown that such explicit training does indeed enhance ESL reading comprehension. Although researchers have previously called for such teaching and although many ESL classroom reading teachers may already incorporate such training into their lesson plans, for the first time we have tangible evidence that such training studies can yield a positive outcome.

Obviously, many more such training studies need to be conducted 1) to refine the training techniques, 2) to determine the optimal length of training, 3) to discover whether there are differential effects at different proficiency levels of ESL, 4) to ascertain whether there are any differential effects of training due to differences in native language background, and 5) to determine the longer-range persistence of the training effect.

Such training on discourse types is obviously only one part of a comprehensive instructional program in ESL reading comprehension. As Tierney (1983:9) has said, "It is easy to forget that the mastery of the strategy should not displace reading for meaning." Clearly a comprehensive instructional program in ESL reading comprehension should also include work in schema availability and schema activation (Carrell and Eisterhold 1983), metacognitive training (e.g., inference-awareness, analogy), comprehension monitoring skills, decoding skills, and so on (see Collins and Smith 1982 and Pearson and Gallagher 1983 for more on the latter). Teaching the prototypical patterns of different texts would be inappropriate unless such instruction occurs in conjunction with helping students, in a number of ways, to acquire meaning from text.

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REFERENCES


APPENDIX A
Sample Training Texts

Advanced Adulthood

There are many physical changes that come with advanced adulthood. As in the earlier stages of human development, the physical changes in advanced adulthood vary greatly from person to person. And the ability to pinpoint these changes is made more difficult because of the effects of illness that are present in many people of this age group.

As a result of these physical changes, the muscles of people in advanced adulthood are not as flexible as they used to be. Seeing and hearing are often not as good as they were earlier. The body’s ability to resist infection and to recover from illness also decreases in advanced adulthood.

(Type: Causation, Training Session 2)

The Relation Between Man and Ape

Some people think that man came from apes. They believe this is so because man and apes share many characteristics. Both are mammals. Both are primates. Physically, early man and apes looked alike. Some think that modern man and apes look alike. But, the argument that men came from apes is not true. Most scientists believe that man did not suddenly arise from apes. Fossils have revealed many important differences in bone structure between early man and apes. Also, the social behavior of early man differed from that of apes. It seems that man and apes may have had common ancestors. But, the ape is not the ancestor of man. Altogether, facts show that
man is related to the ape, but only because he developed at the same time as the ape was developing. The difference is that man developed more.

(Type: Comparison, Training Session 3)

Forest Conservation and Forest Fires

One of the tremendous tasks facing the U.S. today is the preservation of existing forests, both young and old, against fire. Fire destroys, in addition to the trees and underbrush, the wildlife that inhabits the forest. Lightning is the cause of some forest fires, but most are caused by people's carelessness. Most forest fires are caused by smokers carelessly throwing cigarettes and matches in the woods, and by unattended camp fires and trash fires.

The United States is now making efforts to preserve the forests. Forest-conservation programs include the planting of new trees, forest-fire prevention, and the regulation of lumbering. The lumber industry itself is doing much today to conserve forests. The United States Forest Service now safeguards the forests. Trained rangers and foresters are on the lookout for fires, and trained fire fighters stand ready to fight a fire once it starts.

(Type: Problem-Solution, Training Session 4)

APPENDIX B

Excerpts from Study Packet (Training Session 5)

During the past few days, you have found that:
1. Picking out the organization in what you read is a key to understanding.
2. A strategy to improve memory is called using top-level organization.
3. The strategy has two (2) parts—picking the organization and using the organization.
4. Picking the top-level organization needs your attention before, during, and after reading.
5. To pick the organization, you ASK two questions before reading: What is this passage all about? (This gives the main idea.) How is this main idea discussed? You ANSWER these questions while you read, and CHECK your answers after reading.
6. There are many different top-level organizations, but four (4) are common: description, before-as a result, problem-solution, and favored view and the opposite view.
7. Different words in the passage help you to pick the top-level organization.
8. Each of the common types of organization has a special way to pattern the sentences in a passage.

9. Description means most of the sentences are intended to describe persons, places, things, events, or qualities in the main idea.

10. Before-as a result means that there is a cause-and-effect relationship. Two main parts are involved. One tells about the cause or what happened before, and the other tells about the effect or result.

11. Problem-solution means that part of the passage tells about a problem (question, puzzle, concern), and the other tells about its solution (answer, reply).

12. Favored view and the opposite view means that different points of view are shown in different parts of the passage. It may be that one view tells what did happen, and the other tells what did not happen; or, one might tell what exists, and the other, what does not exist; or, each part might tell opposite arguments. But, the writer may clearly favor one view more than the other(s).

13. Once you have picked the top-level organization, you must use it to organize what you write.

14. Using the top-level organization needs your attention before, during, and after you write.

15. Before you write about the passage, write the name of the organization type and think about how it works.

16. While you write, keep your sentences relevant to the organization.

17. After you write, check that you used the proper organization correctly.

18. To use it, you should a) write its name on the top of the page you’ll be writing on (to help you get organized); b) write the main-idea sentence (to set up the top-level organization); c) arrange sentences to match the top-level organization (keep thinking about how the top-level organization works); d) check that you’ve used it (ask “Have I discussed the main idea that same way as in the passage?”); and e) write down anything you’ve only just remembered (often you think of more information as you are checking).

Your skill in using this information has shown that you can
a) still learn more about using the strategy.

b) find the main idea in the passage.

c) pick top-level organization in a passage.

d) use the same top-level organization to arrange your writing.

e) use the strategy effectively.

When should you use the strategy?

a) Only for reading Geography and English notes.

b) For reading that we don’t have to remember.

c) Only for what we read in this class.

d) For any reading we might want to remember.
To use the strategy, you must do these things:
1. **Before** you read ________________________________.
2. **While** you read ________________________________.
3. **After** you read ________________________________.
4. **Before** you write ________________________________.
5. **While** you write ________________________________.
6. **After** you write ________________________________.

**Choose the best answer for the following questions:**
1. In a *favored view and the opposite view* organization, sentences which follow the main idea sentence will be arranged:
   a) all mixed up.
   b) first one argument, then another.
   c) to show up different arguments, so, it could be either (a) or (b).

2. In writing down what I remember from a passage using a favored view and the opposite view organization, *I should first*
   a) write the name “favored view and opposite view” at the top of the passage.
   b) start writing straight away.
   c) use sentences that tell the problem, then sentences that tell the solution.

   **Second,** *I should*
   a) write down the main idea sentence.
   b) use sentences that tell what happened *before*, then sentences that tell what happened *as a result*.
   c) write the name “favored view and the opposite view” at the top of the page.
   d) use sentences that tell one argument, then sentences that tell another.

   **Then,** *I should*
   a) finish.
   b) check to see I’ve used the “favored view and the opposite view” top-level organization.
   c) use sentences that tell one argument, then sentences that tell another.

   **Fourth,** *I should*
   a) finish.
   b) check to see that I’ve used the “favored view and the opposite view” top-level organization.
   c) add anything else that I’ve just remembered.

   **Finally,** *I should*
   a) check to see that I’ve used the “favored view and the opposite view” top-level organization.
   b) add anything else I’ve just remembered.
   c) say or write the name “favored view and the opposite view.”
This package contains two passages. Please read each passage. Read at your usual reading speed. Write down the time you start and finish. Then, write all that you can remember from the passage. Repeat these steps for the second passage.

Don’t worry about what others may be doing, as different packages and passages have been used. Therefore, some people may finish before you do. It is very important that you work through the package one page at a time. Do not look back at the passage once you start writing.

Nuclear Energy Versus Solar Energy

Two of the most promising sources of energy for the future are nuclear power and solar power. Both sources of energy have numerous advantages and disadvantages which must be considered in the development of energy programs.

For several decades, many governments have attached great hopes to nuclear energy as a less expensive alternative to oil and other fossil fuels. However, opposition to nuclear energy has increased in recent years. One of the main concerns of the critics of nuclear energy is the damage that the release of radioactive materials could inflict upon communities surrounding nuclear power stations. Harmful materials could cause serious health problems for individuals and could have disastrous effects on the environment. Another issue concerning nuclear energy involves using nuclear plants for the manufacture of nuclear weapons. This is especially a point of concern about countries with unstable governments, where nuclear materials could easily be used for nonpeaceful ends by terrorist groups.

Solar power is the other energy source over which there are differing opinions. One of the main advantages of solar energy is that the primary required resource—the sun—is abundantly available over most parts of the earth. Also, if a country’s main source of energy were to come from solar power, it would not have to depend upon other countries in order to maintain its energy supply. The main negative feature of solar power is that the technology is still being developed in this field and is not yet sufficiently reliable or cheap enough to compete with other sources of energy.

Write down as much as you can remember from the passage you have just read. Use complete sentences. You can use the words in the passage or your own words. Do not turn back to the passage after you start writing.
Serious nuclear accidents in the past have led to the implementation of strict safety rules regarding the construction and operation of nuclear power stations. There are at least three goals of such safety rules.

First, the most obvious goal of any nuclear safety program is to reduce the probability of accidents. One effective way of reducing such probability involves using reliable, tested design practices in the planning of nuclear power plants. The construction of the power stations should be carefully supervised and inspected and the training of plant workers should be a high priority to ensure plant safety.

The second aim of nuclear safety is to minimize the release of radioactive materials if accidents should occur at a nuclear power station. The best way to protect against the release of dangerous materials into the atmosphere is to construct plants which are equipped with multiple barriers directed toward containing radioactive materials.

Finally, the third goal of nuclear safety rules is to minimize population exposure if radioactive materials are released. The most effective way of ensuring that as few people as possible are affected by radiation is to locate nuclear power plants in areas where the population density is low. Also, emergency response planning and preparedness are means by which the communities surrounding nuclear facilities can attempt to protect themselves from the dangers of radioactive materials released into the atmosphere.

Write down as much as you can remember from the passage you have just read. Use complete sentences. You can use the words in the passage or your own words. Do not turn back to the passage after you start writing.

What plan did the writer use to organize the passage you just read? Answer in about two sentences.
APPENDIX D

"Nuclear Safety": Idea Unit Analysis

1. Serious nuclear accidents...have led
2. in the past
3. to the implementation of strict safety rules
4. regarding the construction
5. and operation of nuclear power stations.
6. There are at least three goals of such safety rules.
7. First, the most obvious goal of any nuclear safety program is
8. to reduce the probability of accidents.
9. One way of reducing such probability involves
10. using reliable, tested design practices
11. in the planning of nuclear power plants.
12. The construction of the power stations should be carefully supervised
13. and inspected
14. and the training of plant workers should be a high priority
15. to ensure plant safety.
16. The second aim of nuclear safety is
17. to minimize the release of radioactive materials
18. if accidents should occur
19. at a nuclear power station.
20. The best way to protect...is
21. against the release of dangerous materials
22. into the atmosphere
23. to construct plants
24. which are equipped with multiple barriers
25. directed toward containing radioactive materials.
26. Finally, the third goal of nuclear safety rules is
27. to minimize population exposure
28. if radioactive materials are released.
29. The most effective way of ensuring...is
30. that as few people as possible are affected by radiation
31. to locate nuclear power plants in areas
32. where population density is low.
33. Also, emergency response planning
34. and preparedness are means
35. by which the communities surrounding nuclear facilities can attempt
36. to protect themselves from the dangers of radioactive materials
37. released into the atmosphere.

*I = Introduction, T = Top-Level, H = High-Level, M = Mid-Level, L = Low-Level.