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ABSTRACT

Based on the hypothesis that teachers possessing extensive and coherent knowledge structures are the most effective teachers, this paper explores the use of a modified ordered tree (OT) technique for measuring teachers' knowledge structures. Two questions are posed: (1) Can a modified OT technique be used to measure teachers' knowledge structures? and (2) Is there a relationship between teachers' knowledge structure scores and their ability to be adaptive during instruction? Using 8 experts, 16 novices, and 4 uninstructed learners, 3 studies were conducted. Results indicate that the modified OT technique describes longitudinal changes in novice teachers' knowledge structures during reading methods course instruction, and that novices' knowledge structures are associated with adaptive instructional actions. Implications for teaching and teacher education are suggested. (Author)

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Laura R. Roehler, Gerald G. Duffy, Mark Conley, Beth Ann Herrmann, Janet Johnson, and Sandra Michelsen

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Abstract

Based on the hypothesis that teachers possessing extensive and coherent knowledge structures are the most effective teachers, this paper explores the use of a modified ordered tree technique for measuring teachers' knowledge structures. Two questions are posed: (a) Can a modified ordered tree technique be used to measure teachers' knowledge structures and (b) Is there a relationship between teachers' knowledge structure scores and their ability to be adaptive during instruction? Using 8 experts, 16 novices, and 4 uninstructed learners, three studies were conducted. Results indicate that the modified ordered tree technique describes longitudinal changes in novice teachers' knowledge structures during reading methods course instruction, and that novices' knowledge structures are associated with adaptive instructional actions. Implications for teaching and teacher education are suggested.

TEACHERS' KNOWLEDGE STRUCTURES: DOCUMENTING THEIR DEVELOPMENT AND THEIR RELATIONSHIP TO INSTRUCTION

Laura R. Roehler, Gerald G. Duffy, Mark Conley, Beth Ann Herrmann, Janet Johnson, and Sandra Michelsen[1]

Today, research on teaching is focusing primarily on teacher cognition, particularly interrelationships between teacher thought and teacher action. As such, there is a need for effective ways to measure and study teacher thought. This paper describes a technique for measuring teachers' knowledge structures and for using such data to explore interrelationships between teachers' organized thought and their instructional interactions with students. The hypothesis is that extensive and well organized knowledge structures are associated with effective instruction.

Rationale for Studying Teachers' Knowledge Structures

Because researchers study teachers' knowledge structures within the context of reading instruction, in this paper a knowledge structure is defined as a network of interrelated concepts about reading and reading instruction. It is assumed that the professional thought of a reading teacher is grounded in knowledge, particularly propositional (or declarative) knowledge about both the content of reading (e.g., syntax, inference, background knowledge), and the pedagogy of reading (e.g., Directed Reading Lessons, modeling, language experience stories).

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The rationale for studying teachers' knowledge structures is based on earlier studies of teacher explanation which confirmed the hypothesis that teachers who provide explicit instructional information produce readers who are both high achievers and aware of and in control of cognitive reasoning processes associated with strategic reading (Duffy, Roehler, Sivan, et al., 1987). Subsequent post hoc descriptive analyses (Duffy, Roehler, & Rackliffe, 1986; Roehler & Duffy, 1986), as well as findings from an instructional study in mathematics (Herrmann, 1986), further revealed that effective teachers do not limit explanations to planned presentations; they also respond to student misunderstanding with spontaneous explicit elaborations. For instance, an effective lesson on compound words includes not only explicit introductory and modeling statements but also spontaneously generated teacher responses to unanticipated instructional situations, such as when a student says that "carpet" is a compound word. Wilson, Shulman, and Richert (1987) label this teacher action "alternative representation," while Duffy and Roehler (1987) call it "responsive elaboration."

Ability to engage in such responsive elaboration seemed to be associated with teachers' cognitive control of their professional knowledge (Duffy, Roehler, & Putnam, 1987). To understand how teachers gain control of their professional knowledge, researchers explored research on cognitive psychology (Baker & Brown, 1984; Fredrickson, 1984; Schuell, 1986) and on experts and novices (Chi, Glaser, & Rees, 1982) which indicated that experts organize knowledge into meaningful clusters or chunks, and tie these clusters together into a patterned network of coherent relationships. These organizations, alternatively referred to as knowledge structures, schemata, or cognitive structures (Hoz, 1987), influence subsequent perception, comprehension, and processing of experiential information (Andre, 1987). Because experts' knowledge is well organized, they regulate their efforts to access and process knowledge. In short, experts are aware of and in control of their knowledge.

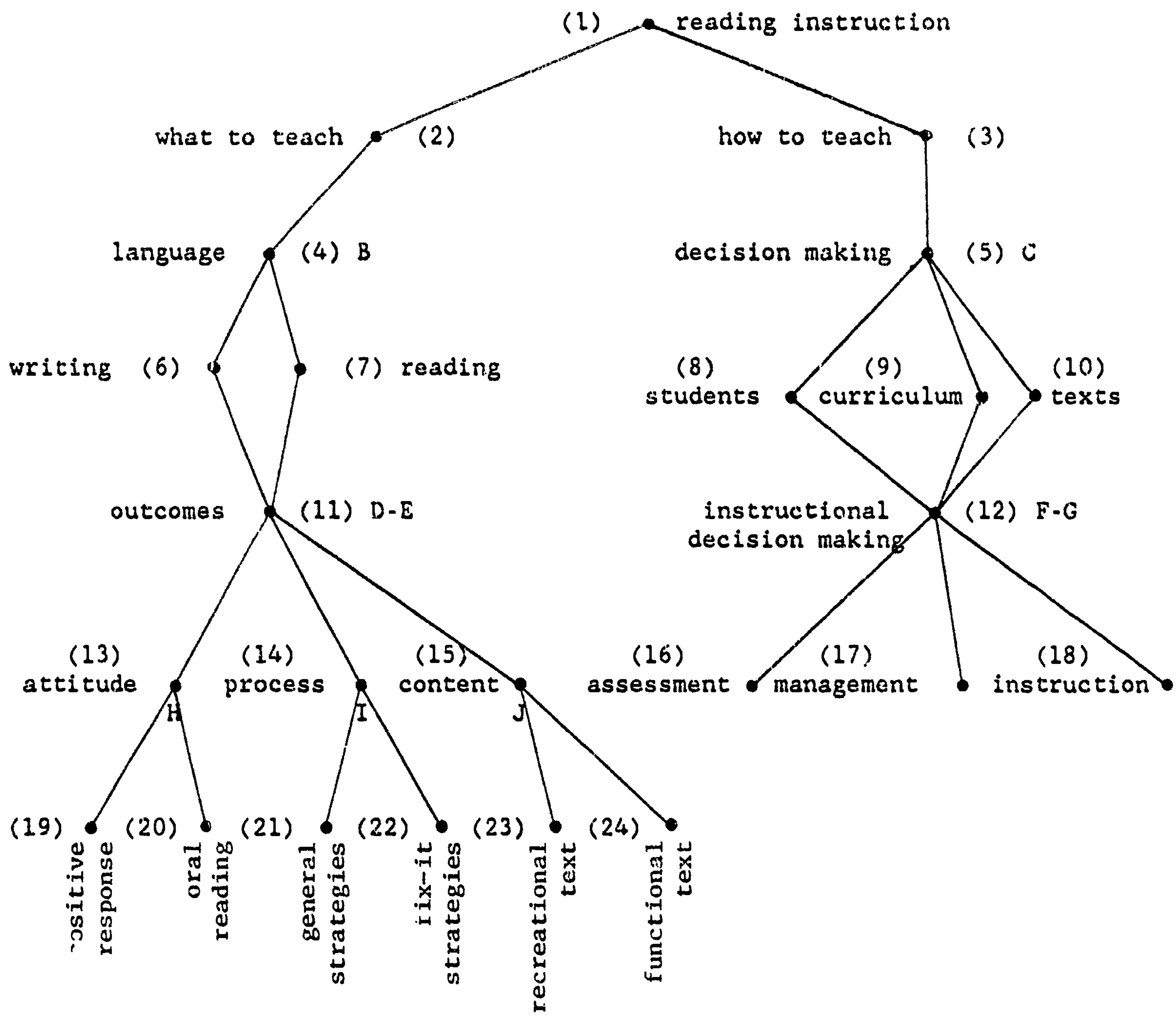
While the complexities and uncertainties of teaching make teachers' lives unique (Floden & Clark, 1988), parallels can be drawn between expert teachers and experts in other fields. For instance, when faced with the need to be in regulatory control--as when spontaneously providing an appropriate instructional elaboration in the midst of an ongoing group lesson--the most effective teachers may be like experts in other fields in that their professional knowledge is organized into meaningful clusters and patterns. Consequently, it was hypothesized that some teachers are able to provide responsive elaboration because their propositional knowledge about reading instruction is organized differently than the propositional knowledge of teachers who seldom provide such elaboration. If this is so, studying teachers' knowledge structures may help explain why some teachers are more effective than others and how teacher educators can help teachers develop extensive and well organized knowledge structures.

Measuring Teachers' Knowledge Structures

To measure teachers' knowledge structures, researchers modified an ordered tree (OT) technique that Naveh-Benjamin, McKeachie, and Tucker (1986) used to study the development of university students' cognitive structures. The modified OT technique enables teachers to display (a) concepts included in their knowledge structures and (b) how these concepts are tied together into a network of relationships. A sample OT about reading instruction is shown in Figure 1.

Constructing an Ordered Tree

A five-step procedure is followed when constructing an ordered tree. First, the teacher is asked to "brainstorm" words or phrases about reading and



	Conversion
Extensiveness measure	
Concepts - 24	2.0
Chunks - 10	3.85
Average number of concepts per chunk - 2.4	9.56
Hierarchical structure (depth & width) - 10	4.00
extensiveness average =	4.85
Coherence measure	
Cluster 9/10 - 90%	9.0
Extended sequence 20/21 - 100%	10.0
coherence average =	9.5

Figure 1. An Ordered Tree for reading instruction.

effective reading instruction. Second, from a list of 100 words developed by the authors, the teacher selects additional words and adds them to the brainstormed list. Third, the teacher groups the words and phrases into categories and labels each category. Fourth, the teacher organizes the groups under the general label of effective reading instruction to show how the groups are interrelated. Finally, the teacher provides an audiotaped or written description of the relationships among categories.

Analyzing an Ordered Tree

An extensiveness score, a coherence score, and an overall score are used as measures of ordered trees. These measures, developed in earlier studies (Duffy & Roehler, 1986), are described briefly here; a more detailed description is provided in Roehler (1986) and Roehler, Herrmann, and Reinken (in preparation).

The extensiveness measure. The extensiveness measure examines the breadth and depth of an ordered tree in terms of (a) concepts (words and phrases), (b) chunks (groups composed of subordinate concepts linked to one superordinate concept), (c) average number of concepts per chunk, and (d) hierarchical structure (the number of horizontal levels in the tree combined with the number of chunks at the widest point).

For the studies reported here, the extensiveness measure was scored by raters recruited from undergraduates enrolled at Michigan State University. These raters, working in teams of two, were trained to count the number of concepts and chunks, compute the average number of concepts per chunk, and determine the combined score for horizontal levels and the number of chunks at the widest point. Training continued until an interrater reliability of .80 was reached. The raters, who were blind in that each ordered tree was identified by only a code number, then scored the extensiveness measures for all the ordered trees collected in the following studies. The final interrater reliability for the extensiveness measure was .90. Once the OT's were scored, the researchers converted the raw scores to ratings using a standard 10-point rating scale based on the range of extensiveness scores (see Figure 2 for the conversion scale). Ratings from these four extensiveness subcategories were then averaged to obtain an overall extensiveness score for each ordered tree.

To illustrate how the extensiveness measure was used, consider the sample ordered tree in Figure 1, which contains (a) 24 concepts, (b) 10 chunks, (c) an average of 2.4 concepts per chunk, and (d) a hierarchical structure of 10. Ratings assigned to each of these categories and the final extensiveness score for the sample OT also are shown in Figure 1. The overall extensiveness rating for Figure 1, obtained by averaging the ratings obtained from the conversion table, is 4.85.

The coherence measure. The coherence measure examines the extent to which concepts are logically linked together in chunks and in vertically extended sequences. For the studies reported here, the first two authors of this paper (Roehler and Duffy) teamed to examine relationships among concepts for logical consistency in the ordered trees collected in the following studies, all of which were identified by code number only. Rating occurred in two steps. First, raters individually examined each chunk and then mutually decided whether superordinate and subordinate concepts in the chunk were logically connected. If the raters agreed that the concepts were logically connected, credit was given; credit was not given if the raters could not agree or if they agreed that one or more concepts were not logically connected. The percentage of coherent chunks was then computed.

Scale

Measures	10	9.0	8.0	7.0	6.0	5.0	4.0	3.0	2.0	1.0	0
Concepts	120	109	98	87	76	65	54	43	32	21	10
Chunks	26	23.5	21.4	19.1	16.8	14.5	12.2	9.9	7.6	5.3	3
averaged concepts per chunk	2.3	4.07	5.84	7.61	9.38	11.15	12.92	14.69	16.46	18.23	20
hierarchical structure	25	23.1	21.2	19.3	17.4	15.5	13.6	11.7	9.8	7.9	6

Figure 2. Conversion scale for extensiveness scores.

Second, raters individually examined relationships within each extended sequence of concept (i.e., a vertical path from a beginning concept to an ending concept). Then both raters mutually decided whether all concepts in a path were logically tied together. If they agreed they were, credit was given; credit was not given if raters could not agree or if they agreed that one or more of the relationships was not logical. The percentage of coherent vertical sequences was then computed. The chunk coherence percentage and the extended sequence cohesion percentage were converted to a standard 10 point scale (90% becomes 9.0) and averaged to determine an overall coherence rating.

To illustrate how the coherence measure is used, consider again the sample OT in Figure 1. The figure shows that 90% (9 out of 10) of the individual chunks are coherent. For instance, Chunk B is considered to be coherent because the subordinate concepts of writing and reading are logical components of the supraordinate concept of language. However, chunk H was judged not to be coherent because the subordinate concepts of positive response and oral reading are not logical components of attitude (i.e., it would be logical to couple "appreciation" with "positive feelings" since both are attitude outcomes but oral reading is not logical because it is an instructional activity, not an outcome).

When the extended sequences were examined in Figure 1, it was judged that all of them (21 of 21) were coherent. For instance, the extended sequence that includes reading, instruction, what-to-teach, language, writing, outcomes, attitudes, and positive response is coherent because each concept in the sequence is a logical subcomponent of the concept above it. Because all relationships within the sequence are logical, the sequence received a score of one, as did all the other extended sequences.

Using the standard 10-point conversion scale, the raw scores of Figure 1 were converted and averaged. The overall coherence rating for Figure 1 was 9.5.

Overall OT score. An overall OT score is determined for each ordered tree by averaging the overall extensiveness and coherence ratings. In Figure 1, the overall OT score is 7.18.

Summary

The modified ordered tree technique enables teachers to show how they categorize words and phrases associated with particular domains (in this case, reading instruction) and how these categories are related. The result is a visual representation of a teacher's professional knowledge, which is analyzed in terms of extensiveness and logical relationships.

Three Knowledge Structure Studies

Three knowledge structure studies were conducted to explore (a) the potential use of the modified ordered tree technique for measuring teachers' knowledge structures and (b) the relationship between teachers' knowledge structures and ability to provide responsive elaboration during reading instruction. Experts, novices, and uninstructed learners (Champagne, Gunstone, & Klopfer, 1985) were included in the studies. Experts were 8 university reading faculty from 4 different United States universities, including 2 professors, 4 assistant professors, and 2 advanced graduate students. The novice learners were 16 preservice teachers beginning their first of two undergraduate reading methods courses at Michigan State University. The uninstructed learners were 4 undergraduate education majors at Michigan State University who had not yet enrolled in methods courses of any kind. The experts, novices, and uninstructed learners constructed three ordered trees about teaching reading, one in September (fall), one in January (winter), and one in May (spring). These were constructed and rated following the procedures described above.

Study 1

Study 1 examined whether the modified ordered tree technique discriminates experts' knowledge structures from uninstructed learners and novices who, because they are just beginnin reading methods instruction, are as yet uninstructed. Data for this study consisted of the ordered trees collected in the fall. The hypotheses were that (a) there would be no differences between extensiveness, coherence, and overall scores of uninstructed learners' and novices' ordered trees since neither group had yet received instruction in reading methods and (b) experts' ordered trees would receive higher extensiveness, coherence, and overall scores than ordered trees completed by either uninstructed learners or novices.

Method

Subjects. Subjects were the 8 experts, the 16 novices, and the 4 uninstructed learners.

Procedures. Each subject constructed a single ordered tree in the fall. For the experts, this was just prior to teaching the novice reading methods course; for the novices, it was during the first session of the reading methods course; and for the uninstructed learners it was during the first session of an education course taken prior to the methods sequence.

Data analysis. First, all ordered trees were rated and scored using the procedures described above. Then analyses of variance (ANOVAs) were performed to compare the overall, extensiveness, and coherence scores of experts with uninstructed learners and novices. Tukey HSD tests were used to examine pair-wise comparisons among the experts', novices', and uninstructed learners' overall scores.

Results

Means and standard deviations of extensiveness, coherence, and overall scores for each of the groups are displayed in Table 1. Analysis of variance indicated a significant difference in the fall between experts on the one hand and the beginning novices and uninstructed learners on the other hand on the extensiveness measure, $F(2, 21) = 37.51$, $p < .0001$; on the coherence measure, $F(2, 21) = 29.3$, $p < .0001$; and on the overall score, $F(2, 21) = 58.13$, $p < .0001$.

Tukey HSD tests were used to make specific pair-wise comparisons between the groups. Results indicated that the experts' scores were significantly (.05) higher than both the uninstructed learners' and the novices' scores on all three measures. There were no significant differences between the novices and the uninstructed learners.

These results support the hypothesis that the ordered tree technique differentiates experts from both novices at the beginning of their reading methods course and uninstructed learners.

Study 2

Study 2 examined whether the modified ordered tree technique could be used to document longitudinal changes in novices' knowledge structures. The hypothesis was that as novices progressed through two reading methods courses their ordered trees would begin to look more like experts' ordered trees, while the ordered trees of uninstructed learners who were not participating in a reading methods course would remain unchanged over the same time period.

Table 1

Means and Standard Deviations for Novices, Uninstructed Learners, and Experts in the Fall

Group		
Novices	*M*	*SD*
Extensiveness	4.0	1.1
Coherence	4.6	1.3
Overall	4.3	1.0
Uninstructed learners	*M*	*SD*
Extensiveness	3.8	1.2
Coherence	4.7	1.3
Overall	4.3	1.2
Experts	*M*	*SD*
Extensiveness	8.2	0.9
Coherence	9.3	0.9
Overall	8.8	0.8

Method

Subjects. The subjects were the 16 novices and 4 uninstructed learners used in Study 1.

Procedures. Subjects constructed three ordered trees, one at the beginning of the academic year (fall), another at the midpoint (winter), and a third at the end of the school year (spring).

Data analysis. First, all the ordered trees were rated and scored using the procedures described above. Then comparisons between the novices and uninstructed learners were made using repeated measures, analysis of variance (ANOVA) procedures, and Tukey HSD post hoc tests. Expert scores from Study 1 were used as the benchmark to determine whether novices moved toward expert status. Three separate analyses of variance were conducted, one each for extensiveness, coherence, and overall scores. Independent variables were group (experts, novices, and uninstructed learners), and time of year (fall, winter, and spring).

Results

Table 2 shows the means and standard deviations for extensiveness, coherence, and overall scores for each group at each time of year. Significant interactions were found between group and time for the extensiveness measure, $F(2, 28) = 7.1$, $p < .01$; for the coherence measure, $F(2, 28) = 29.0$, $p < .01$; and for overall score, $F(2, 28) = 29.0$, $p < .01$. Because, as reported in Study 1, experts were significantly different from both novices and uninstructed learners in the fall on each of the extensiveness, coherence, and overall measures, three separate analyses of variance (one for each subscore and one for the overall score) were used to compare novice scores with expert scores at the winter and spring points. In contrast to the fall findings, at the winter or

Table 2

Means and Standard Deviations for Novices and Uninstructed Learners at Each Time P. .t

Time of Year

Group	Fall		Winter		Spring	
Novices	M	SD	M	SD	M	SD
Extensiveness	4.0	1.1	7.4	1.1	7.7	1.1
Coherence	4.6	1.3	7.8	1.2	8.2	1.2
Overall	4.3	1.0	7.1	1.1	7.9	0.9
Uninstructed Learners	M	SD	M	SD	M	SD
Extensiveness	3.8	1.2	3.5	1.2	3.4	1.2
Coherence	4.7	1.3	3.6	1.5	2.7	1.3
Overall	4.3	1.2	3.4	1.2	3.1	0.7

spring time points there were no significant differences between experts and novices.

However, differences between the experts' and uninstructed learners' extensiveness, coherence, and overall scores were significant in winter and spring. For the winter, a significant difference between expert and uninstructed learner was found for the extensiveness measure, $F(1, 10) = 49.87$, $p < .001$, for the coherence measure, $F(1, 10) = 48.37$, $p < .001$, and for the overall scores, $F(1, 10) = 75.90$, $p < .001$; for the spring, significant differences were found for the extensiveness measure, $F(1, 10) = 49.95$, $p < .001$, the coherence measure, $F(1, 10) = 93.60$, $p < .001$, and the overall measure, $F(1, 10) = 227.3$, $p < .001$. Hence, while novices' scores eventually approximated experts' scores, uninstructed learners' scores did not.

Tukey HSD tests, conducted to examine trends in the data further, revealed that changes in the difference between uninstructed learners' scores and novices' scores were significant (.05) from fall to winter and from fall to spring for each of the extensiveness, coherence, and overall measures. There were no significant effects due to changes in the scores from winter to spring. Figures 3, 4, and 5 depict the range of scores for the extensiveness, coherence, and overall measures for experts, novices, and uninstructed learners at each of the three times. As the novices participated in their reading methods courses, their scores approached the expert level, though the range of their scores remained wider than that of the experts. In contrast, scores for uninstructed learners changed very little.

In sum, Study 2 indicates that the modified ordered tree technique describes longitudinal changes in novices' knowledge structures in response to instruction provided in their reading methods course.

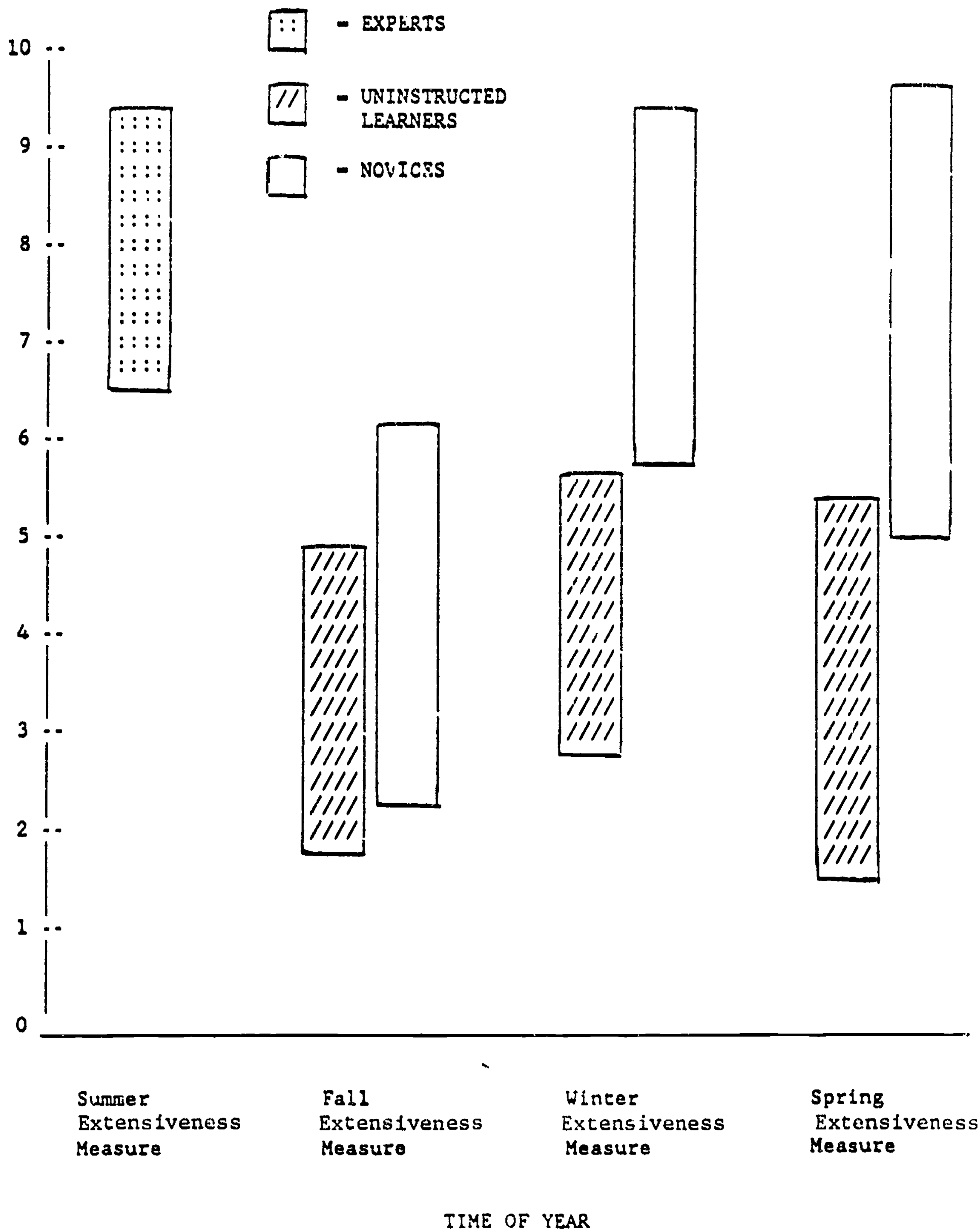


Figure 3. Range of extensiveness measure scores for each group.

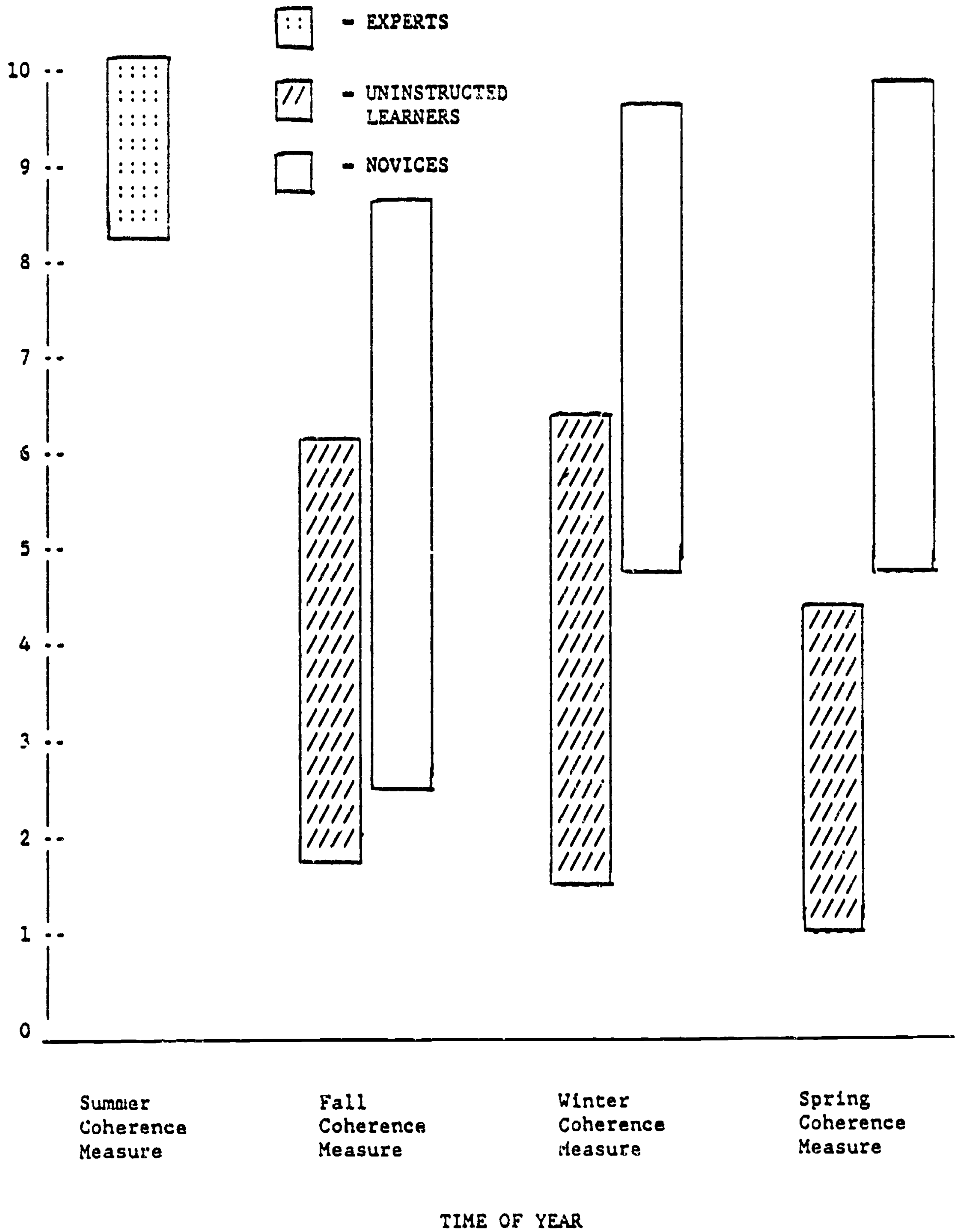


Figure 4. Range of coherence measure scores for each group.

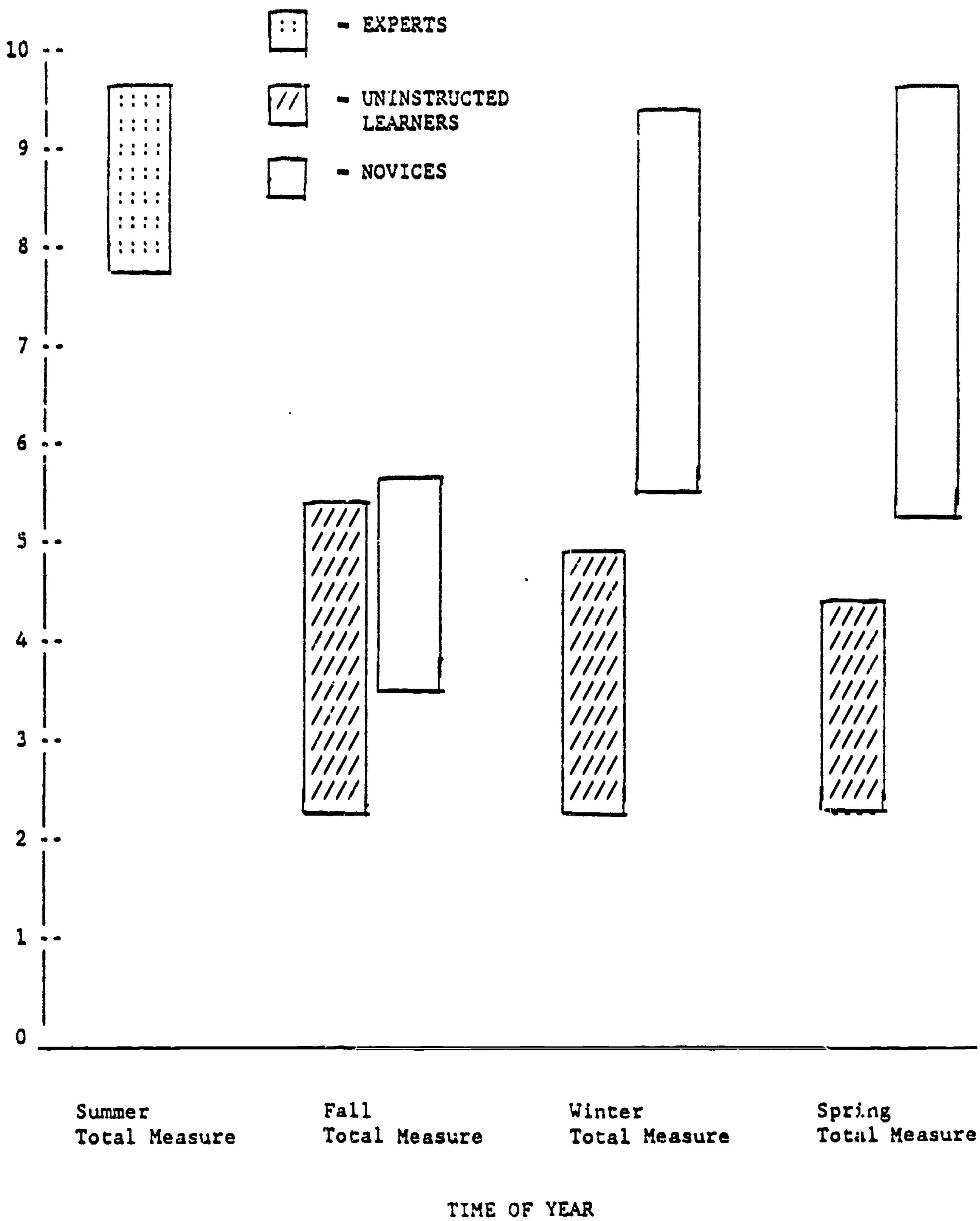


Figure 5. Range of total scores for each group.

Study 3

The third study explored whether relationships exist between novices' knowledge structures and the quality of their adaptive responses to student misunderstandings (i.e., their responsive elaborations) during (a) actual teaching situations and (b) interviews about simulated teaching situations. The hypothesis was that novices having high ordered tree scores would provide responsive elaboration whereas novices having low ordered tree scores would not.

Method

Subjects. Subjects were 4 novices selected at random from among the 16 novices described in Study 1.

Procedure. Twice weekly during the reading methods course taught prior to the completion of the final ordered tree (spring), novices tutored one elementary student and taught a reading group. Two sets of data were collected to measure novices' responsive elaboration while teaching. The first data set came from lesson observations. Three of the novices were observed four times and one was observed three times. Each lesson was audiotaped, transcribed, and analyzed for instances of responsive elaboration. Researchers looked for responsive elaborations at points when (a) students asked for clarification, (b) student responses to questions were different from what was expected, and (c) students were performing tasks incorrectly.

The second data set came from novices' responses to nine hypothetical instructional situations presented individually to each novice during a single interview. For example:

> You and your students are reading a story orally. A student says bell for tell in the sentence "I will tell the teacher what you did," and does not correct himself. What would you do and/or say and why?

Like the lessons, interviews were audiotaped, transcribed, and analyzed for instances of responsive elaboration. The novices' spring ordered trees were used as the knowledge structure measure.

Data analysis. Transcripts of lesson observations and of interviews were analyzed using a modified signal detection technique (Baird & Noma, 1978) in which transcripts were read to note whether the novices capitalized on or failed to capitalize on opportunities for elaboration. A rating team of two authors of this paper scored the transcripts of lessons and of simulation interviews, each of which was identified by a code number only. First, each rater independently read all transcripts to identify all opportunities. Second, each rater read each transcript to note whether the novice capitalized on or failed to capitalize on opportunities. Finally, each rater scored each occasion when a novice capitalized on an opportunity using a rating scale (see Appendix A) modeled after one used to rate instructional explanations (Duffy, Roehler, Sivan, et al., 1987). This scale provided a 0-4 point rating criteria for scoring (a) responses to student-initiated interactions and (b) teacher-initiated opportunities for elaboration. The elaboration scores were significant ($p < .05$), suggesting that novices' knowledge structures are associated with the amount and quality of their responsive elaboration.

As shown in Table 3, Novice A capitalized on a number of opportunities for responsive elaboration and her efforts received relatively high scores, which was consistent with her high score on the spring ordered tree. In contrast, Novice D often failed to capitalize on opportunities for responsive elaboration; when she did, her efforts received low scores, which was consistent with her low score on the spring ordered tree. Similar but less extreme patterns existed in comparisons between Novices B and C.

Table 3

Novices' Responsive Elaboration Across Four Lessons

Lesson	#1	#2	#3	#4
Novice A (Spring OT overall score: 9.4)				
Total Opportunities	11	13	19	10
# of Responsive Elaboration	9	6	17	7
Average Ratings of Quality	1.8	2.3	3.75	3.8
Novice B (Spring OT overall score: 7.8)				
Total Opportunities	3	5	0	5
# of Responsive Elaboration	3	4	0	4
Average Ratings	1.6	3.5	0	2.75
Novice C (Spring OT overall score: 6.7)				
Total Opportunities	11	11	7	7
# of Responsive Elaboration	5	5	3	0
Average Ratings	1.6	1.6	2.0	0
Novice D (Spring OT overall score: 4.4)				
Total Opportunities	17	10	7	4
# of Responsive Elaboration	0	3	5	0
Average Ratings	0	1.0	1.0	0

To illustrate, note typical responsive elaborations provided by Novices A and D during lessons on compound words. Novice A provided the following elaboration after a student had read a passage and couldn't make sense of the word snowman.

T: OK. You are having trouble figuring out this word.

S: Yeh.

T: When I look at this word, I think that the compound word strategy might help. Why don't you try that. First, you look to see if . . .

S: . . . there are two words in there that make sense.

T: Yes. What are the two words?

S: Snow and man.

T: Now, do these two words make sense alone and then together in the sentence?

S: Yes.

T: So the sentence now makes sense, right? Tell me how they make sense.

S: Well, snow is a word, man is a word, and the word snowman makes sense in the sentence. It makes sense.

In contrast, note that during a lesson on compound words Novice D failed to capitalize on an opportunity to provide responsive elaboration when a student was unable to answer a question. Instead, she simply continued to ask the same question.

T: So, is that a compound word?

S: Yes. No, it's not.

T: Why isn't it a compound word?

S: Because . . . it is a compound word?

T: Why?

S: Because . . . un . . . un . . . did.

T: OK. Write undid for me.

Similar qualitative differences were noted in simulated situations. For example, Novice A responded to simulations by describing her mental processing and by requesting more information about lesson goals and student understandings. In contrast, Novice D did not know what to do in response to most of the simulated instructional situations.

Discussion and Conclusion

The first two studies reported here explored the potential of the modified ordered tree technique for measuring teachers' knowledge structures. The third study explored relationships between knowledge structures and adaptive teacher actions during reading instruction. Results suggest that the modified ordered tree technique discriminates among various teachers' knowledge structures and reflects knowledge acquisition during methods courses, and that novices who possess extensive and coherent knowledge structures tend to respond more effectively during instruction.

Small sample sizes and the descriptive nature of these studies preclude firm conclusions and generalization. Nevertheless, these findings are provocative. They suggest that it is possible to measure reliably how teachers organize their professional knowledge and to determine the extent to which instructional effectiveness is associated with certain types of knowledge structures. Consequently, three hypotheses for future study are suggested: (a) accessing and using professional knowledge during instruction requires organization of such knowledge rather than mere possession of it; (b) teacher thought is linked to teacher action through spontaneous activation and use of appropriate categories of professional knowledge in response to unanticipated instructional situations; and (c) effective teaching involves much more than simply carrying out a well-constructed lesson plan; it also requires spontaneously adapting specific categories of professional knowledge to an evolving instructional situation. Together, these three hypotheses about knowledge structures and spontaneous teacher actions signal the need to examine teachers' use of knowledge in unfolding interaction patterns or routines where the unanticipated instructional situations shape the use of propositional and pedagogical knowledge.

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APPENDIX

Responsive Elaboration Rating Criteria

I. Student Initiated Elaborations

Rate how well the teacher responds to student misunderstanding when students initiate the interaction, such as when a student asks a clarifying question.

0 -- Missed opportunity--students ask clarifying questions but the teacher either does not respond to the question or responds in such a way as to ignore the question. For example: "If you would listen you would know how."

1 -- Teacher responds to student questions by providing one word answers or short phrases that simply answer the question and do not provide additional information.

2 -- Teacher elaborates based on student questions but reiterates what has already been taught rather than providing new information.

3 -- Teacher elaborates based on student questions by providing additional information on the mental processing needed to do the strategy, in the form of new examples, or a new explanation that serves to clarify student misunderstanding.

4 -- Teacher elaborates based on student questions but responds in such a way as to allow for ongoing assessment of the students restructured understanding; and based on all the student's responses (not just the initial one) provides new information

which is cohesive,* and focuses on mental processing and meaning getting in real text.

II. Teacher Created/Initiated Opportunities for Responsive Elaboration

Rate how well the teacher initiates opportunities for responsive elaboration--How well the teacher creates opportunities to check student understanding of what the lesson is about, how they are to do the mental processing being taught, when they would use the strategy, etc.

0 -- Missed opportunity--teacher does not create opportunities to check for student understanding of the lesson (therefore provides no opportunity for responsive elaboration).

1 -- Teacher provides opportunities to check student understanding of the lesson by asking questions that require a one-word or a short-phrase response. For example: "Do you know what I mean by this?"

2 -- Teacher creates opportunities to check student understanding of the lesson by asking students to explain what they learned, when they might use it and how to perform the strategy, but does not check for students' understanding of the mental processing, focusing instead on procedural recall to the questions posed.

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* Define cohesive as information or elaboration that is consistent with the teacher's knowledge structure of reading as indicated in preinstruction interview, or fits into previously taught or future lessons.

3 -- Teacher creates opportunities to check student understanding of how, when, and where to use the strategy being taught by asking questions that require the student to explain his/her mental processing.

4 -- Teacher creates opportunities to check student understanding by providing opportunities for students to think about what they are doing, to practice what they are doing, and that allows the teacher to assess student's restructured understanding.

III. The Event of Responsive Elaboration

Rate the quality of the event/instance of the responsive elaboration (the dialogue)

0 -- Missed opportunity--teacher does not elaborate on the lesson.

1 -- Teacher uses opportunity and responds to student's understanding but provides one word answers or phrases that simply answer the question and does not provide elaboration.

2 -- Teacher uses opportunity for elaboration and provides information but reiterates what has already been stated rather than providing new examples or additional information.

3 -- Teacher uses opportunity for elaboration and provides new examples or information that is a cohesive explanation that serves to clarify student misunderstanding.

4 -- Teacher uses opportunity for elaboration and provides new information which is cohesive, focuses on student mental processing and meaning getting in real text, and in addition provides an additional way for assessing student restructured understanding.