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ABSTRACT
        One hundred twenty-three fifth grade students
participated in a study that investigated the role of prosodic cues
in children's comprehension of discourse. The subjects, both good and
poor readers, read, listened to, or read and listened to a story in
one of four modes of visual and auditory presentation: (1) no audio,
(2) normally intoned, (3) highly intoned, and (4) no print. In the
first, second, and third conditions, the subjects completed both a
comprehension message measure and a parsing activity in which they
indicated points in the story where pauses were acceptable. Children
in the fourth condition participated only in the comprehension
activity. Results showed that the subjects were able to understand
the parsing task and could identify intrasentence units in written
passages. This was true even for those who did not have any auditory
support during the task. The results of the parsing task showed that
both good and poor readers readily perceived suprasegmental features
in speech and used these cues effectively in identifying sentence
structure. The findings support the theory that the poor
representation of prosodic features in written text adds to the
difficulty some children experience in learning to read. (Copies of
the stimulus materials are appended.) (FL)

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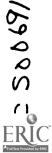# TECHNICAL NOTE

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SPEECH PROSODY AND CHILDREN'S PERCEPTION OF SENTENCE ORGANIZATION

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ABSTRACT

Good and poor readers in the fifth grade read and/or listened to a
story in various modes of visual and auditory presentation. The major
mode of interest involved simultaneous listening and reading, with
normal and slightly exaggerated modelling of prosodic cues such as
intonation and junctural features. No facilitative effects were observed
on a multiple-choice comprehension measure; but the results of a parsing
task showed that both good and poor readers readily perceived supra-
segmental features in speech and used these cues effectively in
identifying sentence structure. The results are consistent with the
hypothesis that the poor representation of prosodic features in written
text adds to the difficulty some children experience in learning to
read. Implications for reading instruction are discussed, with special
attention to classroom techniques that incorporate listening activities
in reading comprehension instruction.

SPEECH PROSODY AND CHILDREN'S PERCEPTION OF SENTENCE ORGANIZATION

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Reading comprehension requires at least two skills beyond those needed for speech reception. One of these is decoding graphic symbols. In addition, the reader must learn to organize groups of words into meaningful syntactic-semantic units. The first of these skills entails an analysis of segmental and lexical information; the other, an analysis of organization structure tying words together. However, reading instruction typically emphasizes decoding skills. This emphasis seems to reflect the belief that decoding is the only new skill that children need to acquire to transfer oral language skills to reading. However, other differences between reading and listening may affect children's development of reading comprehension skill. One of these differences is the absence of prosodic information in written text. This difference has implications for reading because prosody provides cues about the meaning and structure of sentences, such as the location of major clause and phrase boundaries, and therefore contributes to speech comprehensibility (Snow & Coots, 1981).

Poor readers may have difficulty compensating for the lack of organizing (suprasegmental) cues in text. If prosodic cues are key elements in children's language comprehension, poor readers should benefit from an auditory presentation of written material. Moreover, if the specific contribution of the auditory stimulus is that it provides prosodic cues for the perception of sentence structure, then poor readers ought to perceive intrasentence junctures and should

therefore parse sentences more accurately when the material is spoken rather than written. This hypothesis was examined by Kleiman, Winograd and Humphrey (1979).

They used a parsing task as a measure of children's recognition of intrasentence units. Fourth-grade children were asked to mark the boundaries of meaningful groups of words. The task was presented in two conditions; one in which the children simultaneously read and listened to a spoken version of the text (with prosody condition). In the other condition, the participants only read the text (no prosody condition). Both good and poor readers performed better on the parsing task in the "with prosody" condition, but the improvement was greatest for poor readers. Kleiman et al. interpreted their findings as evidence that poor readers have difficulty with text organization and comprehension because of the lack of prosodic information in written discourse. When this information is present, the children are able to detect and articulate the organizational structure of sentences.

Although these findings support the hypothesis that poor readers are sensitive to the lack of prosody in texts, two problems in the study make the results difficult to interpret. One problem is that the study measured comprehension only indirectly, using a parsing measure that was presumed to reflect an important subskill underlying comprehension. There is, however, no direct evidence that parsing tasks reflect the actual psychological processes in reading or that they provide a reasonable index of comprehension. In fact, sometimes parsing tasks indicate that even good readers are not able to detect and articulate sentence structure, a result clearly contradicted by the comprehension skills that these readers demonstrate (e.g., Mason & Kendall, 1978).

In addition to the question of measures, the Kleiman et al. study failed to isolate prosody as a specific variable. Since the auditory information may have helped children with word regonition as much as with the perception of meaningful units, it is not clear whether the effects on parsing scores were due to the prosodic information or to the segmental information provided by the auditory input. It is possible that children in the auditory condition benefitted from the extra segmental and lexical cues rather than suprasegmental cues. Such an interpretation would have quite different instructional implications.

The present study addressed these issues. We extended the range of presentation conditions to include two auditory conditions that differed only in the relative magnitude of prosodic cues. Since the auditory conditions differed only in suprasegmental cues, not in word recognition cues, these conditions could assess the effect of prosody independently from the effects of other auditory cues. In addition, we assessed the effects of different presentation conditions by a parsing task as well as a comprehensive measure. Consistent results for both of these measures would give evidence that parsing skills are related to comprehension.

METHOD

Participants. One hundred twenty-three children from four fifth-grade classes (2 classrooms in each of 2 schools) participated in the study. Classrooms were chosen by district personnel as representative of fifth graders at each school. The participating schools were located in Southern California, in neighborhoods of middle socioeconomic-status.

Materials. The children's reading skills were assessed by the SWRL Reading Skills Survey (Level 5). This is a 32-item untimed test of decoding and comprehension skills, described in Coots and Snow (1982, Appendix A).

The experimental text was a short fairy-tale entitled "The Muffin Muncher." The story was approximately 1100 words in length, and contained only nine words above level for grade 4 (EDL reading core vocabulary word lists). The story was adapted from Economy's reading program, Level 12, for grade 4. The text was typed in a standard paragraph format, with pages stapled to form a booklet for the children to read.

The story was parsed into phrasal segments on the basis of a consensus of judgments by the experimenters. The parsed version served as a guide for producing the audio recordings of the story (to be described) and as a scoring key for the parsing task.

The principal criterion used by the experimenters in creating the phrasal segmentation was pause acceptability. That is, boundaries were identified where it would be permissible to pause when reading the story out loud without obscuring or changing the meaning of the text. The phrasal segmentation is shown by slashes in the following example: "Many, many years ago/in the far corner/of a very poor country/stood the poorest of poor castles." The complete segmentation of the text is shown in Appendix A.

Two audio recordings of the story were prepared. A male narrator, who was familiar with the design and intent of the study, recorded both of the audio versions. In one version, the text was read with normal prosody (normally intoned). In the other version, prosody was slightly exaggerated, giving greater magnitudes to pauses and intonation contours within sentences (highly intoned). These pauses focused on phrasal boundaries that were identified in the experimenters' parsing of the text. Subjectively, this highly-intoned version gives an expressive reading of the text, with slower reading time due to longer pauses between phrasal constituents. The highly intoned version was approximately 50 seconds longer in reading time than the normally intoned version.

A set of 16 multiple-choice questions was prepared to assess the children's comprehension of the story (Appendix B). In accordance with studies of comprehension tasks (Snow, 1980), the questions were designed to assess various levels of comprehension (e.g., literal and inferential) and various subskills such as recognition of temporal sequence, cause-effect relationships, and main idea.

Materials for the parsing task were prepared in the format described by Cioffi (1980); reviewed in Snow (1982). The first 55 sentences of the experimental passage were typed one sentence to a line in list format. The sentences were displayed lengthwise on 8½ x 11 paper, with triple spacing between sentences. All punctuation

that had been used in the paragraph format was included. To the left of each sentence, a number in parentheses (from 1 to 5) indicated how many parsing junctures were to be located. Very short sentences that were not to be parsed in the task (number of junctures = 0) were marked by an asterisk. The materials for the parsing task are given in Appendix C.

PROCEDURES

Participants in all four conditions were given the SWRL Reading Skills Survey. The Survey was group-administered in each classroom by the teacher. It was given on a day when the experimental tasks were not scheduled.

Each classroom was randomly assigned to one of the four experimental conditions: (1) no audio, (2) normally intoned, (3) highly intoned, and (4) no print. In conditions 1, 2 and 3, the children participated in both the comprehension and parsing activities. These tasks were conducted as group activities in each classroom. The comprehension activity was completed first and was followed by the parsing task, after an interval of 2 to 3 days. Children in the no print condition participated only in the comprehension activity.

A summary of the four conditions is shown in Table 1. The table shows the activities that each classroom participated in, and the type of visual and auditory stimulus used.

Comprehension Task

The children were told they would read and/or listen to a story about a dragon. They were given a copy of the story in standard

Table 1

Summary of Activities and Materials

Conditions	Activities		Modalities of Input	
	Comprehension	Parsing	Visual (text)	Audio (recording)
1 No Audio	X	X	X	
2 Normally Intoned	X	X	X	standard prosody
3 Highly Intoned	X	X	X	highly intoned
4 No Print	X			highly intoned

paragraph format (except in the no print condition). They were told

that after they had finished reading and/or listening to the story,

they would answer some questions about it and that they would not be

able to look back at the story. In the no audio condition (condition

1), children read at their own pace. When they finished reading the

story carefully one time, they were to raise their hand. The experi-

menter then took the passage from the child and gave the child the set of

comprehension questions. The comprehension activity was untimed. Enough

time was allowed for all children to answer all of the questions.

In the audio conditions (2 through 4), the reading or listening

time was paced by the recording. When the recording was finished, the

experimenter passed out the comprehension questions to the entire class

and collected the reading passages. All children began responding to

the questions at the same time. Again, enough time was allowed for

all children to complete the task.

Parsing Task

The parsing activity was conducted about two days later in each of
the three classrooms where a printed version of the story had previously
been read (conditions 1, 2, 3). Each parsing session lasted about 50
minutes. The activity began with a training session conducted by the
experimenter. The training session used five practice sentences adapted
from the opening lines of "The Story of the Three Bears." The practice
sentences were printed on the cover page of the children's test booklet
and also written on the chalkboard, so that the experimenter could
explicitly show the children examples of how to segment sentences. The
training procedures, like the materials, were modelled after those used
by Cioffi (1980). As in Cioffi's procedures, the focus of the task was
on pause acceptability judgments. The children were told that in good
oral reading, the reader pauses slightly at certain places. They were
given examples of oral reading with and without appropriate pauses and
other prosodic features. They were told that they would try to find the
locations in sentences where it was okay to pause and have the sentence
still make sense. The training differed from procedures described by
Cioffi in that the pre-experimental instruction in the present study was
designed to explicitly teach the concept involved. The procedures used
explicit answers to the practice tasks, oral modelling, unison reading, and
feedback. The experimenter provided answers to the practice items on the
chalkboard and showed, by reading them aloud, why they were better answers
than alternative choices. This was done for each practice sentence after
students were first allowed to locate appropriate pause acceptability
locations by themselves.

Students were instructed to make a slash mark in locations within
sentences where it was okay to pause. They were told to pay attention

to the numbers in the left-side margin that indicated how many locations, if any, to mark in each sentence. In the no audio condition, the children worked at their own pace. No time limits were imposed. All children were allowed to complete the task. In the two audio conditions, the children completed the task one sentence at a time. Each sentence was played individually on a tape recorder as the children read along. The recorder was stopped after each sentence, allowing enough time for all participants to mark their answers before going on to the next sentence.

RESULTS

Scores were selected for analysis from participants who 1) were not identified by the school as non-English or limited English speakers, and 2) had participated in the reading assessment activity and at least one of the experimental tasks. Using these selection criteria, the scores of 96 children were analyzed. The reading assessment score (SWRL Reading Skills Survey) was used to assign participants to good reader and poor reader groups within each input condition. The median score on the reading assessment, using scores from all 96 participants, was 27.06 (85%). Good readers were defined as those scoring above 27; poor readers below 27.

The parsing score for each child was determined by using the experimenters' consensual parsing of the text as a scoring key (see Appendix A). Ninety pause locations were judged. Scores were determined by counting the number of phrasal junctures marked by the children that matched those chosen by the experimenters. In a few instances, the children marked more pause locations than were specified in the instructions. To handle this problem of "extra guesses," proportional

scores were calculated using the formula $P = X/90+Y$, where X = number of target junctures identified, and Y = number of extra guesses.* All other scores (reading skills assessment and comprehension of the experimental passage) were converted to proportions in a straightforward manner, in order to facilitate the comparison of results across tasks. The mean scores and sample size of each reader group and condition are summarized in Table 2.

Table 2

Mean Scores on Assessment and Experimental Tasks,
by Reader Group and Condition

Group	Comprehension Task			Parsing Task		
	N	Reading Skills	Comprehension	N	Reading Skills	Parsing
1 No Audio						
Good Readers	11	.93	.71	14	.92	.73
Poor Readers	10	.72	.60	10	.74	.64
Total Group	24	.83	.66	27	.84	.70
2 Normally Intoned						
Good Readers	9	.93	.81	10	.93	.87
Poor Readers	9	.66	.67	8	.64	.70
Total Group	19	.79	.74	19	.81	.79
3 Highly Intoned						
Good Readers	16	.93	.79	16	.93	.96
Poor Readers	12	.62	.58	11	.61	.86
Total Group	30	.80	.71	29	.80	.92
4 No Print						
Good Readers	4	.92	.89			
Poor Readers	9	.59	.62			
Total Group	16	.72	.74			

*One child had more than 100% extra guesses on the parsing task. This child's score was eliminated from the analysis for this task.

Preliminary analysis of a sample of the comprehension scores (analysis of covariance, using reading skills as a covariate) did not show a significant effect of condition on comprehension. Also using preliminary data, correlations were obtained for the relationship between comprehension and parsing scores. The correlations ranged from .23 (No Audio condition) to .38 (Normally Intoned condition), suggesting a positive but weak relationship between these measures.

The major analysis focused on the parsing scores. The statistical model used was a 2 x 3 between-groups analysis of variance with unequal cells (Nie et al., 1975). The analysis showed main effects for reading skills level ($F = 11.002$, df = 1/63, $p < .002$) and input condition ($F = 17.537$, df = 2/63, $p < .001$). The two-way interaction between reading skills and input conditions was not significant ($F = .571$, df = 2/63).

The subset of the data in this analysis is shown in Table 3.

Table 3

Mean Parsing Scores
by Reader Group and Input Condition

Reading Skills Group	Input Condition*			
	(1) No Audio	(2) Normally Intoned	(3) Highly Intoned	Total
Good Readers	.73 (14)	.87 (10)	.96 (16)	.85 (40)
Poor Readers	.64 (10)	.70 (8)	.86 (11)	.74 (29)
Total	.69 (24)	.79 (18)	.92 (27)	.81 (69)

*Number of participants is shown in parentheses.

The differences between conditions were further analyzed using a
Newman-Keuls procedure with harmonic means (Winer, 1962). Data were
aggregated across reading skills groups for this analysis. The
Newman-Keuls procedure showed that the difference in means
between conditions 1 and 2 was significant (p <.05). Conditions 2
and 3 also differed significantly, showing a slightly more robust
effect (p <.01).

A post hoc analysis was also carried out in an effort to determine
some of the characteristics of intrasentence units that were perceived
by good and poor readers. The question addressed in this analysis was:
Are there differences in the types of phrasal boundaries that good and
poor readers are able to locate? Two characteristics of parsing units
were investigated: 1) clause versus phrase structures, and 2) major
versus minor constituents in the surface structure hierarchy. Both
of these parameters are important in sentence perception processes, as
suggested by psycholinguistic investigations of comprehension (Fodor,
Bever, & Garrett, 1974) or performance studies of speech prosody
(Cooper & Sorensen, 1977).

Clauses were defined as dependent sentences containing a verb
(usually finite). In this analysis, they were confined to subordinate
(adverbial) clauses and restrictive relative clauses attached to the
subject noun phrase. Phrases were defined as constituents whose
boundaries did not coincide with those of main sentences, clauses, or
sentential complements. Major constituents were defined as subject
noun phrases, verb phrases, and sentence adverbs. Minor constituents
were those at lower levels of the sentence structure, such as syntactic
boundaries within the verb phrase.

Some examples of target boundaries defined by these parameters are shown below.

	Type	Level	Examples
(1)	Clause	Major	From then on every wagon that crossed the bridge/left ten muffins. . . . the head baker. . . could not fire up the great ovens/because there was no wood.
(2)	Phrase	Major	The villagers of the castle/did not have riches and valuables. The next morning/the people looked out their castle windows.
(3)	Phrase	Minor	Taking one look, the people ran over the bridge/and into the castle. With crumbs still on his face/from the last muffins he'd eaten he came down the hill . . .

The analysis focused on target pause locations that a) corresponded to the structural boundaries defined in (1), (2), or (3) above, and b) were not already marked by a comma in the text. The children's protocols were scored for the number of pause locations correctly identified in each of the three structural categories. Each score was converted to a proportion based on the number of possible target boundaries (for categories 1, 2, and 3, this maximum number was 7, 15, and 22 locations, respectively). The mean proportions of correctly identified pause locations in each structural category are shown in Table 4.

The results show that pause junctures are generally identified more easily at the boundaries between 1) clauses versus phrases, and 2) major constituents versus minor constituents. Differences between these categories are most notable in good readers, however. For poor readers, there is less variance in scores across the different categories

Table 4

Proportion of Correct Pause Locations Identified
at the Boundaries of Clauses, Major Phrases, and Minor Phrases

Group	Condition	Clause (Major)	Phrase (Major)	Phrase (Minor)
		Type (and Level) of Intrasentence Unit		
Good Readers	No Audio	.80	.69	.59
	Normally Intoned	.91	.86	.79
	Highly Intoned	.98	.95	.96
Poor Readers	No Audio	.56	.54	.47
	Normally Intoned	.63	.63	.63
	Highly Intoned	.91	.85	.86

of target units within sentences. It should be noted, however, that
these differences between reader groups and categories are greatly
diminished in the highly intoned audio condition, where good and poor
readers alike were able to identify most units regardless of their
structure.

DISCUSSION

Success of the Parsing Task Procedures

This study showed that fifth grade children 1) were able to
understand the parsing task, and 2) could identify intrasentence units
in written passages. This was true even for children who did not have
any audio support during the task (No Audio condition). This group of
children identified 70% of the pause locations that had been selected
by a consensus of the experimenters' judgments. The impressive performance
of fifth graders on this difficult task suggests that intrasentence units
have psychological reality for children. The results also show that

children can indeed understand the task, if they are given sufficient instruction to make the task objective clear. Modelling and practice with examples seem to be key features of the instruction.

The Facilitative Effect of Prosody on Children's Perception of Phrasal Units

When children listened to tape recordings of the text, they performed significantly better on the parsing task than when they had no auditory support. For example, when the text was read with normal prosody, children were able to identify nearly 80% of the target pause locations, as compared to 70% when auditory cues were not available (No Audio condition). This result replicates previous findings (Kleiman et al., 1979) which demonstrated that auditory modelling of written sentences led to improvements in children's ability to detect important intrasentence units.*

The present study extends previous findings by showing that the suprasegmental features of auditory modelling (rather than lexical or segmental cues) are the critical sources of information that help children articulate meaningful units more accurately. The specific role of prosodic features was investigated by having two auditory conditions that differed only in the relative salience of prosodic cues. The highly intoned version emphasized the acoustic features that mark the boundaries of functional units within sentences: lengthening of temporal intervals between stressed syllables, fall-rise in intonation, and phrase-final stress. This highly-intoned condition led to even more improvement in the children's parsing scores than did

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*However, the present study differed from Kleiman et al. in the type of parsing task used. Our task focused on pause acceptability judgments whereas Kleiman et al. asked children to locate meaningful groups of words.

auditory modelling per se. These results support the hypothesis that
acoustic features relating to timing, intonation, and stress are important
cues for organizing (and thus comprehending) verbal information.

Good and Poor Reader Differences

The children's success with the parsing task also depended on
reading proficiency. Good readers performed the task better than poor
readers in all conditions. This implies that the parsing task explicitly
requires organizational skills that are also needed for good reading
comprehension. However, the availability of prosodic features helped
both good and poor readers to perform the task better. Significant
improvement in parsing skills was observed for both groups of readers
in the audio conditions, and especially in the highly intoned condition.
This shows that both good and poor readers were able to articulate
intrasentence units more effectively when they had the support of
acoustic cues for important constituent boundaries.

The availability of prosodic information permitted poor readers
in the highly intoned condition to identify intrasentence units better
than good readers did in the no audio (reading only) condition. Since
the no audio task represents the conditions of normal reading, we
assume that the good readers' performance in this task condition gives
an index of the text organization skills required for good reading.
Poor readers exceeded this level of performance when they had the
support of salient prosodic cues. This implies that these children may
depend on the prosodic cues missing from text for the task of segmenting
sentences into meaningful, efficient processing units.

In addition to differences in overall performance, good and poor readers had a different distribution of scores across the categories of units to be indentified in the task. Good readers located some pause locations much better than others, especially in the no audio condition. They seemed to be especially sensitive to clause boundaries. Poor readers, on the other hand, identified units in various categories with about the same degree of accuracy. Their scores did not differ substantially according to the type and structure of the target units. For example, clause boundaries were correctly located about as often as phrasal boundaries. This suggests that poor readers did not make as much use of syntactic and semantic cues in selecting appropriate pause locations.

Prosody and Comprehension

The purpose of the study was to investigate the role of prosodic cues in children's comprehension of discourse. One of our hypotheses was that prosody facilitates comprehension by helping the reader to segment utterances into information units of an appropriate size and content for efficient processing. To test this hypothesis, we attempted to find a positive three-way relationship between prosodic cues, parsing abilities, and comprehension. The results did not show a clear effect of prosody on comprehension, however, nor a convincing relationship between parsing skills and comprehension. It is possible that our comprehension measure (multiple-choice questions) was not sufficiently sensistive to the level of comprehension which the audio conditions may have enhanced. Another possibility is that the text

(a narrative fairy tale) and its readability level (grade 4) may
have been relatively easy for the children to understand in all input
conditions.

By way of additional limitations of the study, it should be emphasized
that the pause acceptability task in our study did not necessarily
reflect parsing skills, which involve the utilization of many types of
cues: syntactic, semantic, and phonological. The task instructions
in this instance directed the children's attention to some semantic
cues such as finding 1) groups of words that "go together," or 2) places
to pause where the text still "made sense." But the instructions
emphasized phonological criteria for locating intrasentence junctures.
The children were asked to locate places where it would be okay to pause.
Given this task, one possible strategy in the audio conditions would be
simply to listen for perceptible pauses in the auditory input. If
children used this limited strategy, the task would not reflect the
larger range of psychological processes required to determine
"meaningful groups of words" in sentences.

Since it is not clear what strategy the children used, the clearest
implication of our findings is that children were able to perceive
prosodic cues such as pauses and intonation contours within sentences,
and that they can use this information effectively in a task that
requires them to do so, such as locating acceptable pause junctures in
sentences.

By showing that pauses are perceptually real for children, the
study has not clearly demonstrated that children use this information
in cognitive processes such as the segmentation of written sentences.

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But this finding is a first encouraging step in the study of children's
speech processing skills as precursors to reading. Moreover, these
results contribute to related research whose findings suggest important
links between listening and reading skills.

Research has shown that auditory modelling has a powerful effect on
children's acquisition of reading skills. For example, Chomsky (1976)
demonstrated the effectiveness of a technique using simultaneous reading
and listening. Poor readers in the third grade, who had not been able to
read a book on their own, listened repeatedly to audio recordings of a
story while they read along. This practice not only helped the children
to eventually read the training book fluently by themselves, but it also
helped them to read other books to criterion levels of fluency, with
increasingly less training time. That is, there was a good deal of
transfer to new reading material. Perhaps the benefits of this technique
generalized to new reading situations because the children received
repeated practice in matching the prosodic organization of the audio
recording with phrases, clauses, and other meaningful units in the text
(Schreiber, 1980).

In support of this interpretation of Chomsky's findings, our
research has shown that children are indeed sensitive to speech prosody.
Moreover, we know that listeners can use prosodic signals to organize
verbal material that is otherwise difficult to interpret. For example,
O'Connell, Turner, and Onuska (1968) studied factors that helped adult
subjects to recall nonsense material containing few or no explicit
grammatical morphemes. In auditory presentations, a highly intoned
presentation of the material permitted subjects to make use of the
sparse grammatical cues available and therefore to organize the material
for effective recall.

Taken together, these findings support the hypothesis that child
and adult listeners readily perceive the prosodic organization of speech
and that they actively use this information in order to organize, under-
stand, and remember spoken discourse. Most importantly, auditory modelling
facilitates the acquisition of reading fluency skills because it provides
a rich model of the phrasal organization of written text which otherwise
contains few reliable cues guiding its segmentation into meaningful units.
Future research needs to investigate the effectiveness of oral modelling,
in conjunction with the use of segmented text, in longer-term training
studies with poor readers. The present study and related research efforts
suggest that these techniques can help children to extend their abundant
language skills from the context of listening and speaking to reading.

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APPENDIX A

PHRASALLY SEGMENTED VERSION OF THE EXPERIMENTAL TEXT

THE MUFFIN MUNCHER

Many, many years ago
in the far corner
of a very poor country
stood the poorest of poor castles.

The villagers of the castle
did not have riches and valuables.
They were also poor in spirit.
They had done nothing
to be proud of.

The only way they had stayed alive at all
was by baking and selling
the best muffins in the land.

Every morning
the king,
who was also the head baker,
would bake a fresh batch.
When he had finished,
the people would load their carts
and set off
for the other villages
in the kingdom.

There was never any trouble
selling the muffins.
They were the finest ever baked.
But because the people were so poor,
they had to use all the money they had earned
to buy wood for the fire
and flour to make more muffins.

So,
day in and day out
the head baker,
who was also the king,
would build up the giant fires in the ovens
and bake muffins.

He would slowly mix all the ingredients
in a big cracked bowl.
Then he would pour the mix into the tins
and put them in the ovens to bake.

The people were just barely getting along.
As if things were not bad enough,
there appeared at the castle one day
a great dragon.
Now this was not
your everyday
run-of-the-mill dragon.
He was rather large.
He was a little heavy.
He was a muffin-munching dragon.

With crumbs still on his face
from the last muffins he'd eaten
he came down the hill
right up to the bridge.

Taking one look,
the people ran over the bridge
and into the castle.

The dragon took a great long smell.
He said,   "I smell muffins!"
This castle,
he decided,
smelled like a nice place to stay.
So he moved in
right under the bridge.

He was very tired from his long journey.
He took his pillow
and the picture of his pony from his bag,
curled up,
and fell fast asleep.

The next morning
the people looked out their castle windows
and thought that the dragon was gone.
Breathing a sigh,
they began preparing for another day.

After loading their wagons
with fresh warm muffins
they set off across the bridge
over the soundly sleeping dragon.
With all the noise from the wagons
he woke up right away.

He peeked up over the edge of the bridge
to see what was going on.
"So, that's it.
The people from the castle make muffins!
Those muffins look so good
and I am very hungry.
How can I get the people
to bring me fresh muffins?"

He thought and thought
and finally came up with a plan.
He jumped up on the bridge
right in front of the people,
tried to look very mean,
and roared.

"Stop,
or I shall burn up your bridge!"
Then he blew a little flame
and puffed three smoke rings.

"From now on,"   he rumbled,
"you shall each give me
ten of your best muffins
as your price to cross my bridge."

"But this is our bridge!" they cried.

"Well if I burn it up
it won't be anybody's bridge,"   said the dragon.

The people thought
and talked awhile
and finally agreed
to give the dragon what he wanted.
They barely had enough money to buy wood,
let alone enough wood
to build a new bridge.

From then on
every wagon that crossed the bridge
left ten muffins.

With crumbs all around him
the dragon would sit there
stuffing those scrumptious muffins away.

This might have gone on to this day
except for one little thing.
The dragon was eating so many muffins
that the people did not have enough to sell.
Because of that,
they didn't have enough money
to buy wood for the ovens
or even flour to bake more muffins.

They would return every day
with fewer and fewer goods.
One day
they all came home with nothing.

The next morning
the head baker,
who was also the king,
could not fire up the great ovens
because there was no wood.
He could not use his big cracked bowl
because he had no flour or goods
to put in it.

With a heavy heart
and a tear in his eye
the baker sat sadly
on a pile of empty flour sacks
and cried.
"We have no more goods to make muffins.
We have no more wood to light the fires.
We cannot bake any more muffins.

Our bridge will be burned down.
What are we ever to do?"

That same day
the dragon woke up,
brushed his teeth,
combed his hair,
and prepared for another day of muffin munching.

He waited
and waited
and waited.
No wagons came.
His stomach began to rumble and roar.
He tried eating a few of the crumbs
that had dropped on the ground
the day before.
They were stale.
"No muffins!"   he roared.

Finally
he decided to enter the castle
and find out what had happened
to all his muffins.

The dragon walked through the castle
until he reached the bakery.
Then he peeked inside
"Where are my muffins?"   he roared.
"I've been waiting
and waiting
and waiting!
Where are they?"

The head baker,
who was also the king,
walked up to the dragon
as bravely as he could.
"Mr. Dragon," he said,
"we are poor people.
We live in a poor castle
which has very little.
Before you came,
the muffins we sold
barely paid for our firewood
and the goods we need
to mix muffins.
Now that we have to give you so many muffins,
we can't buy enough wood.
Our ovens have no heat."

That poor dragon
was so very confused.
He wanted some muffins
because he was so hungry.
But at the same time
he felt sorry for the baker
and the other people
who lived in the castle.

He thought
and thought.
Finally,
a great big smile crossed his face.
"I have it!" he shouted.
He asked the head baker,
who was also the king,
to call all the people
to a castle meeting
so that he could tell them
of his wonderful plan.

The people
happily began to cheer and shout
as he finished telling his plan.
Surely
the dragon had solved the castle's problems
and his own.

Then and for always
the dragon heated the ovens of the bakery
with his mighty flame.
With the extra money they saved
by not having to buy wood
the people were able
to leave a stack of muffins
in reach of the muffin-munching dragon
every single day.

APPENDIX B

COMPREHENSION QUESTIONS FOR "THE MUFFIN MUNCHER"

Name _____

School _____

Teacher _____

Question Booklet

THE MUFFIN MUNCHER

Instructions: Circle the letter next to the best answer.

1. Who was the head baker?

   A. the king
   B. the dragon
   C. the Muffin Muncher
   D. the dragon's pony

2. Who bought the muffins?

   A. people at the town market
   B. people in the baker's village
   C. the dragon
   D. people in other villages

3. Why was it easy for the king to sell his muffins?

   A. No one else in the kingdom made muffins.
   B. The muffins were very good.
   C. The market place was near by.
   D. He could not make very many muffins.

4. What happened first?

   A. The dragon spoke to the king.
   B. The head baker said, "What will we ever do?"
   C. The dragon said, "Stop!"
   D. The dragon fell asleep.

5. What happened next?

   A. The king was upset.
   B. The dragon stopped the wagons.
   C. The dragon fell asleep.
   D. The dragon entered the castle.

6. Why did the dragon peek over the bridge?

   A. He heard noises.
   B. He had a plan.
   C. He smelled muffins.
   D. He was waiting for the wagons.

7. Why did the people give muffins to the Muffin Muncher?

   A. They knew the plan wouldn't work.
   B. They thought he might destroy the bridge.
   C. They hoped he would help them.
   D. They thought he might destroy the castle.

8. How many muffins did the people leave at the bridge?

   A. ten every day
   B. ten from every batch
   C. ten from every wagon
   D. as many as the dragon wanted

9. Why did the people in the castle stop making muffins?

   A. They couldn't get over the bridge.
   B. They had a plan.
   C. They didn't have any more wood or flour.
   D. They were afraid.

10. Which one of these events happened first?

   A. The people cheered.
   B. The king called a meeting.
   C. The dragon entered the castle.
   D. The dragon had a new plan.

11. What happened last?

   A. The king called a meeting.
   B. The dragon talked to the king.
   C. The king became upset.
   D. The dragon was confused.

12. What was the "wonderful plan?"

   A. The dragon would help bake the muffins.
   B. The people would build another bridge.
   C. The dragon would bring firewood to the people.
   D. The people would bring the dragon more muffins.

13. What did the dragon think after the king had talked to him?

   A. He didn't believe the king.
   B. He thought he should destroy the bridge.
   C. He felt that the baker was to blame.
   D. He felt sorry about what had happened.

14. What kind of dragon was the Muffin Muncher?

   A. mean, but cowardly
   B. greedy, but gentle
   C. fierce, and full of hate
   D. clever, and terrible

15. What is the main idea of this story?

   A. Persistence is best in the long run.
   B. A castle can be a terrible place to live.
   C. Cooperation is the best way to do things.
   D. Dragons can be useful.

16. What kind of a person is the head baker?

   A. mean, and full of hate
   B. lazy, but clever
   C. hard-working, and mean
   D. hard-working, and gentle

Name_____

School_____

Teacher_____

Practice Sentences

THE STORY OF THE THREE BEARS

(1) Once upon a time there were three bears.

(2) They lived in a little house in the woods.

*   Each bear had a porridge bowl.

(2) One day they made some hot porridge for their breakfast.

(3) "This porridge is too hot," said the Mama Bear, after she had poured it into their bowls.

     And so they decided to go for a walk while the porridge was cooling.

     While they were away, a little girl called Goldilocks passed by their house.

(3) Many, many years ago in the far corner of a very poor country stood the poorest of poor castles.

(1) The villagers of the castle did not have riches and valuables.

* They were also poor in spirit.

(1) They had done nothing to be proud of.

(2) The only way they had stayed alive at all was by baking and selling the best muffins in the land.

(3) Every morning the king, who was also the head baker, would bake a fresh batch.

(4) When he had finished, the people would load their carts and set off for the other villages in the kingdom.

(1) There was never any trouble selling the muffins.

* They were the finest ever baked.

(3) But because the people were so poor, they had to use all the money they had earned to buy wood for the fire and flour to make more muffins.

(5) So, day in and day out the head baker, who was also the king, would build up the giant fires in the ovens and bake muffins.

(1) He would slowly mix all the ingredients in a big cracked bowl.

(1) Then he would pour the mix into the tins and put them in the ovens to bake.

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* The people were just barely getting along.

(2) As if things were not bad enough, there appeared at the castle one day a great dragon.

(2) Now this was not your everyday run-of-the-mill dragon.

* He was rather large.

* He was a little heavy.

* He was a muffin-munching dragon.

(3) With crumbs still on his face from the last muffins he'd eaten he came down the hill right up to the bridge.

(2) Taking one look, the people ran over the bridge and into the castle.

* The dragon took a great long smell.

(1) He said, "I smell muffins!"

(2) This castle, he decided, smelled like a nice place to stay.

(1) So he moved in right under the bridge.

* He was very tired from his long journey.

(3) He took his pillow and the picture of his pony from his bag, curled up, and fell fast asleep.

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(2) The next morning the people looked out their castle windows and thought that the dragon was gone.

(1) Breathing a sigh, they began preparing for another day.

(3) After loading their wagons with fresh warm muffins they set off across the bridge over the soundly sleeping dragon.

(1) With all the noise from the wagons he woke up right away.

(1) He peeked up over the edge of the bridge to see what was going on.

*   "So, that's it.

*   The people from the castle make muffins!

(1) Those muffins look so good and I am very hungry.

(1) How can I get the people to bring me fresh muffins?"

(1) He thought and thought and finally came up with a plan.

(3) He jumped up on the bridge right in front of the people, tried to look very mean, and roared.

(1) "Stop, or I shall burn up your bridge!"

(1) Then he blew a little flame and puffed three smoke rings.

(4) "From now on," he rumbled, "you shall each give me ten of your best muffins as your price to cross my bridge."

(1) "But this is our bridge!" they cried.

(2) "Well if I burn it up it won't be anybody's bridge," said the dragon.

(3) The people thought and talked awhile and finally agreed to give the dragon what he wanted.

(2) They barely had enough money to buy wood, let alone enough wood to build a new bridge.

(2) From then on every wagon that crossed the bridge left ten muffins.

(2) With crumbs all around him the dragon would sit there stuffing those scrumptious muffins away.

(1) This might have gone on to this day except for one little thing.

(1) The dragon was eating so many muffins that the people did not have enough to sell.

(3) Because of that, they didn't have enough money to buy wood for the ovens or even flour to bake more muffins.

(1) They would return every day with fewer and fewer goods.

(1) One day they all came home with nothing.

(4) The next morning the head baker, who was also the king, could not fire up the great ovens because there was no wood.

(2) He could not use his big cracked bowl because he had no flour or goods to put in it.

(4) With a heavy heart and a tear in his eye the baker sat sadly on a pile of empty flour sacks and cried.