RTI Strategies: Unpacking and Co-teaching the Language Complexities of Reading

Part I: Complex Syntax of School-age
Part II: Changes in Oral Reading
Part III: Changes in Oral Language

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Syntax at School Age

- Complexity of all aspects of language, including syntax, increases each year in school.
- Literate language uses longer, more embedded and conjoined utterances as well as abstract vocabulary and complex discourse structures.
- Syntactic complexity is one of the two primary measures of readability.
- Increases each grade level and by 4th grade exceeds the grammatical complexity of typical conversational language (Chall, 1983).
What is Readability?

<table>
<thead>
<tr>
<th>Example Sentences</th>
<th>Words</th>
<th>Syllables</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Tony lived in a zoo.</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>2. He was a lion.</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. He was a friendly lion.</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>4. A bird came to his cage.</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>5-20. Similar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total:</td>
<td>100</td>
<td>112</td>
</tr>
</tbody>
</table>

The sentence structure is simple.

The vocabulary is simple.

**Fry (1968) readability formula**
Example Sentences

1. Julie had trained months for this race, and she hoped she and her dogs would win.  
   Words: 16  Syllables: 20

2. They certainly had tried.  
   Words: 4  Syllables: 6

3. Hour after hour, day after day, Julie’s dogs pulled the sled to get in shape for the race.  
   Words: 18  Syllables: 20

Total Sentences = 7.6  Total for 100 words = 100 117.8 syllables

The sentences have conjunctions, relative clauses, infinitives, idioms.

The vocabulary requires background knowledge, words like “shape” “day after day” have specific meaning.

Fry (1968) readability formula
• Similar words can be read differently and have different meanings based on syntactic structures.
He wanted to go with her before school.
He wanted to go with her big sister.
• The reader must be able to quickly parse the sentences into correct syntactic chunks.
• Intonation, stress, and pauses would differ.
• Only by reading with an understanding of the syntactic structures can the meaning be abstracted and reading become fluent.
A growing number of studies have established a relationship between reading and higher level language abilities.

In both reading and spelling, the child must be aware that morphemes such as –ed, -tion, -s are different from the phonemes/graphemes in words.

(Carlisle, 2004; Demont & Gombert, 1996; Gottardo, Stanovich, & Siegel, 1996; Leikin, 2002; Lyster, 2002; Mahony, Singson, & Mann, 2000; Nation & Snowling, 2004; Nation, Clarke, Marshall, & Durand, 2004; Stothard & Hulme, 1992; Yuill & Oakhill, 1991)
• Poor readers have difficulty detecting and correcting syntactic errors (Bentin, Deutsch, & Liberman, 1990; Demont & Gombert, 1996; Gottardo, Stanovich, & Siegel, 1996; Leikin, 2002)

• Preschoolers with syntactic delays are at high risk for later reading problems (Nation & Snowling, 2000, 2004)

• Syntactic awareness at 1st grade predicts word recognition at 2nd grade after accounting for PA and general ability (Tunmer, 1989)

• Dyslexic readers have difficulty with syntactic processing (Leikin, 2002)
The Problem is Not Addressed

- Rich get richer, poor get poorer: Those who start out with less syntactic awareness are poorer readers; poor reading limits learning of new syntactic structures (Loban, 1976; Moats, 2009)
- Teachers are not trained to recognize or teach language processing (not even aware they need to)
- Few teachers understand language at a level where they can teach its complexities using classroom materials
Definition of Syntactic Awareness:

- awareness of the syntactic structure of sentences and the ability to reflect on and manipulate that structure
- Measured by Mokhtari and Thompson using the TOLD-II:3 sentence combining (manipulating the structure of sentences), Word Ordering, and Grammatical Competence
Mokhtari and Thompson (2006) examined 5th grade students' levels of syntactic awareness in relation to their reading fluency and comprehension.

Level of syntactic awareness significantly related to reading fluency ($r = 0.625$).

And significantly related to reading comprehension ($r = 0.816$).
Need for Curriculum Addressing Syntax

- Need to develop language-based curricula
- Need effective instruction aimed at syntactic awareness
- Need to determine how the improvement of syntactic awareness impacts reading fluency and reading comprehension
- Need to measure effects of syntactic awareness training on students with varying reading ability levels and experiences.

- Mokhtari and Thompson (2006)
Implications

• lower levels of syntactic awareness correspond to poor reading fluency and poor comprehension

• Increasing syntactic awareness should increase reading ability
Phase 1: Create an Interactive PowerPoint

- Norris (2008) created an Interactive PowerPoint (Four Leaf Luck)
- Paralleled the syntactic structure of a 6th grade DIBELS narrative
- Followed Stein and Glenn (1979) story grammar with 4 episodes
- Sentences are each complex, with different sentences containing conjunctions, relative subject and object clauses, wh-adverbial constructions and other complexities.
- Each complex sentence is “unpacked” into constituent sentences and then animation is used to systematically show how the sentences are combined
Four Leaf Luck

by Jan Norris

Four Leaf Luck, Animated PowerPoint Program. ElementOry.com
For example, the complex sentence is presented in the cloud. Two of the constituent questions are unpacked (“Danny was playing with his friends one spring day” and “His friends lived down the street.”) Each phrase within the sentence (“with his friends” “one spring day” “down the street”) scrolls in separately to show how phrase structures may expand on the kernel sentence.

Animation is used to show how the adverbial clause “one spring day” can be moved to the beginning of the sentence, and how this move is marked with a comma. The supporting pictures switch places to show how the emphasis in meaning changes accordingly.
The next slide continues to show the transformations using step-by-step animation. The noun phrase “his friends” is common to all three constituent sentences. Two different grammatical strategies are shown for combining sentences with the same noun phrase. The first shows how a special pronoun, i.e., a relative pronoun, can replace the redundant noun phrase and at the same time combine the two sentences (in this case the relative pronoun “who” embeds the second sentence in a relative clause-object construction). The second shows the use of an appositive clause structure.
Clovers fly in to indicate how sentences are elaborated, combined, or embedded. Lessons can be accompanied by the use of Visual Grammar cards (Norris; elementory.com) to help students understand the meaning of parts of speech. For example, students can use them to try out different conjunctions or clauses as they attempt to combine the constituent sentences, or to predict what strategy the author will use before the animation begins.
Other slides show how there are two speakers when quotations are used, i.e., the character who speaks and the narrator who names the speaker and provides information about how, when, or where the utterance was produced. The animation shows how the punctuation performs the same function as the speech bubble.

“When we find the four-leaf clover, I’m going to wish for an i-pod,” Mark said excitedly as he charged ahead of the group.

“*When* we find the four-leaf clover, 
I’m going to wish for an i-pod”

Mark said excitedly
Following each episode, the phrases and sentences that correspond with Stein and Glenn (1979) story grammar elements are profiled. This teaches children that reading is more than understanding the structure of and abstracting meaning from individual sentences. It is equally important to understand the larger discourse structures, such as narrative structure, and how meaning is communicated across sentences as well.

Students are then given the opportunity to read the episode independently. This enables the teacher to listen analytically to the reading. If the students have learned to process the language, the reading should be fluent with correct intonation that is appropriate to the meaning of the passage. If not, go back and re-teach the sentence because something is still not understood. (In 30 minutes you may only go through 3 or 4 slides if the reading is challenging to your students – the program is designed to be a 6-8 week intervention tool).

Now you read it yourself

After turning off the game, Mark, who was looking out the window at the yard, suddenly noticed a patch of clover. He asked Danny whether the stories about finding a clover with four leaves were true, to which Danny replied that he didn’t know for sure. After much discussion among the boys, Danny agreed to go outside in the yard to search for the lucky clover. “When we find the four-leaf clover, I’m going to wish for an i-pod,” Mark said excitedly as he charged ahead of the group.
A little rusty on your knowledge of grammar?

No Problem!

Four Leaf Luck comes complete with a detailed suggested script that can be used to guide the discussion of each slide. This allows you to refresh your knowledge of grammar while you are helping your students understand how to process the complexities of literate language.
Watch a demonstration by following the link at elementory.com

Four Leaf Luck, Animated PowerPoint Program. ElementOry.com
Student PowerPoints

• Working with younger students or students at a very low readability level?
• 70 members of undergrad class of 2008 each made an animated PowerPoint
• Wrote an original story parallel in syntactic structure to a DIBELS passage
• Stories written from Grade 1 through Grade 6
• Students all agreed to allow their PowerPoints to be used by others
• You receive these PowerPoints when you order Four Leaf Luck.
I saw a kitten inside.
There is a lake in the Dominican Republic named Lake Enriquillo.

Prepositional Phrase
There is a lake in the Dominican Republic

(The lake is named Lake Enriquillo.)
Phase 2: Intervene Using the Animated PowerPoints

- 62 members of undergrad class of 2009 each worked with elementary students using the animated PowerPoint programs
- Used PowerPoints to increase awareness of syntactic strategies for combining 2 or more sentences to form complex sentences
RTI Strategies: Unpacking and Co-teaching the Language Complexities of Reading

Part II: Changes in Oral Reading

Ashley Meaux, MA
LSU
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Students who showed deficits in syntactic awareness performed poorly on reading fluency and comprehension.

Poor readers have language processing difficulties that include awareness of the syntactic and grammatical structure of language.

Syntactic awareness skills are closely related to reading skills.

Refutes the position that poor syntactic awareness is a by-product of poor phonemic awareness skills.

Supports the position that poor phonemic awareness is not a sufficient explanation for poor reading skills.

Mokhtari and Thompson (2006)
Question of this Study

- Syntactic awareness correlates with reading fluency and comprehension
- If syntactic awareness is directly related to reading, as syntactic awareness improves there should be a concomitant increase in reading ability
- Question: Is there an increase in the ability to read with accuracy and fluency as a result of the PowerPoint intervention designed to increase syntactic awareness?
Procedures

• 62 members of undergrad class of 2009 each worked with elementary students using the animated PowerPoint programs
• Worked with 1-2 students per group for 30 minutes
• Students seen 2-4 times per week based on teacher recommendation
• Used PowerPoints to increase awareness of syntactic strategies for combining sentences
Data Collection

- Elementary students administered an informal reading inventory at pretest (Form A) and posttest (Form B)
- Part I: graded word lists (20 words per grade level)
- Part II: graded reading passages marked for miscues, time (measures of fluency and accuracy)
- Comprehension questions administered following reading passage
Isolated Word Lists

List B 5414 (Grade 4)

1. bike
2. castle
3. jungle
4. bullet
5. factory
6. stripe
7. problem
8. target
9. capture
10. sleeve
11. pump
12. sausage
13. electric
14. business
15. instant
16. balance
17. surround
18. invention
19. accident
20. rifle

Number Correct

Total Score

Passage Reading

The Plant World

The world of plants is an exciting one. There are over three hundred thousand different kinds. Some plants grow bigger and live longer than animals. Plants grow in many sizes and shapes almost everywhere in the world. Some are smaller than the period at the end of this sentence. **These plants can only be seen with a microscope.** Other plants, like the giant pine, tower high in the sky. Most plants have stems and leaves.

Plants can live in a variety of places. Some seem to grow out of rocks. Others live in water, old bread, and even old shoes!

**Oral Rereading:** Find and read out loud the sentence that tells how to see very small plants.

WPM 6000

Comprehension

M 1. ___ What is this passage about? (plants)
F 2. ___ How many plants are there? (over 300,000)
F 3. ___ How small can plants be? (smaller than a period at the end of a sentence)
F 4. ___ What do most plants have? (stems and leaves)
F 5. ___ According to the passage, where can plants live? (water, bread, and shoes [any two] or a variety of places)
F 6. ___ What is used to see small plants? (a microscope)
I 7. ___ Name some plants that would probably live longer than most animals. (any logical response; trees)
I 8. ___ Why would a person want to study plants? (any logical response; they're exciting; there are so many different kinds, etc.)
E 9. ___ What do you think would happen if all the plants died? (any logical response; there would be no life on earth)
V 10. ___ What is a “microscope”? (a thing that makes small things seem larger)

Percent of Comprehension ___
Basal and Ceiling Levels

• **Basal Level** represents Independent Reading Level of word lists and passages

• Basal = 99-100% accuracy in word recognition

• **Ceiling Level** represents the grade level at which reading is considered to be too difficult to learn (termed “Frustration” level)

• Ceiling = 13 or fewer of 20 words on graded list
  90% or fewer of passage words
  60% or fewer comprehension questions

In between basal and ceiling = **Instructional Levels**
Gains represent statistically significant increases in word recognition for both graded word lists and for words accurately read within graded passages.
Lowest Readers

- Lowest readers averaged 1.0 grade level increase in reading passage level between pre-posttest.

<table>
<thead>
<tr>
<th>Pretest</th>
<th>Posttest</th>
<th>Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
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</tr>
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<td>2</td>
<td>2</td>
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<td>2</td>
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<tr>
<td>3</td>
<td>6</td>
<td>3</td>
</tr>
</tbody>
</table>

*Increased word list recognition by 1 grade level but not passage level*
I-LEAP and LEAP Scores

• 3rd and 4th grade scores for the school increased 10% over the previous year
• Teachers credited our program as the #1 factor that led to this change
• In 3rd grade only 7 children scored in the lowest “approaching basic” category (compared to 19 the previous year)
• 16 scored “advanced” compared to only 8 the previous year
Change in Participating Subjects (lowest readers in 4th grade)

Changes in State Reading Scores (LEAP) for Children Participating in the Study (identified as low readers)

<table>
<thead>
<tr>
<th>Mastery</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic</td>
<td>2</td>
</tr>
<tr>
<td>Approaching Basic</td>
<td>1</td>
</tr>
<tr>
<td>Unsatisfactory</td>
<td>0</td>
</tr>
</tbody>
</table>

I-LEAP = end of year scores prior to intervention
LEAP = end of year scores following intervention

Change in LEAP scores significant
p = .001
Conclusions

• This project represented a preliminary study exploring the efficacy of using animated PowerPoint programs to increase syntactic awareness and the resulting effects on reading fluency and comprehension (no control group)

• Reading levels showed statistically significant increases for word recognition in isolated word lists and graded reading passages

• Participating children showed statistically significant gains in state test scores compared to the previous year
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Part III: Changes in Oral Language

Christina Tausch, MA
LSU
ASHA 2009  Session 1689
Developing Syntactic Maturity

• At each grade level, children acquire the ability to process increasingly more complex sentences
• Acquire grammatical structures, forms, and strategies for the more sophisticated and precise ways of using language
• Must use these “literate” forms of language for reading, writing, and listening to academic forms of discourse, including lectures

Fillmore and Snow, 2000
• Measures of phonological awareness are not the best predictors of later reading
• Vocabulary and sentence recall are more important predictors
• Children with language disorders (non-phonological) are at-risk for reading failure
• Some problems develop after 3rd grade when syntactic complexity of sentences increase
Syntactic Awareness

• Awareness of the syntactic structure of sentences and the ability to reflect on and manipulate that structure
• Includes combining sentences and detecting errors
• Children’s ability to detect and correct syntactic errors is directly related to reading comprehension
• Poor comprehenders have greater difficulty with explicit syntactic knowledge, such as word order

Mokhtari and Thompson (2006)
Comprehension

• The process of simultaneously extracting and constructing meaning through interaction with written language

• In addition to word recognition, some aspects of syntactic parsing are prerequisites for comprehension

• To improve reading, instruction must go beyond phonemic awareness and phonics

(Rand Reading Group report, 2001)
Poor Comprehension

• children with comprehension problems have weak syntactic awareness skills,

• suggests that “poor comprehenders’ difficulties extend beyond problems with reading comprehension to more general weaknesses with language processing

• Nation & Snowling (2000, 2004) ; Stothard & Hulme (1992)
Question of this Study

- Syntactic awareness correlates with reading fluency and comprehension.
- If syntactic awareness is directly related to reading, as reading improves there should be a concomitant increase in syntactic awareness.
- Question: Is there an increase in the ability to manipulate and recognize errors (syntactic awareness) as a result of the syntactic PowerPoint intervention?
Test of Language Development – Intermediate (3rd Edition)

• Administered pre- and posttest to subjects
• Selected two of the subtests requiring the ability to manipulate and evaluate syntax
  - Sentence Combining = syntactic structures
  - Grammatic Comprehension = morpho-syntactic structures
• Reliable measure of oral language
The child is to form one compound or complex sentence from two or more simpler sentences spoken by the examiner.

We found a nickel. We found a dime.

We found a nickel and (a) dime.

(Do not use “and” for the following sentence)

Maria saw the accident. She didn’t tell the police.

Although she saw the accident, Maria didn’t tell the police

Maria saw the accident but she didn’t tell the police.

Maria didn’t tell the police (that) she saw (had seen) the accident.
The child must distinguish between grammatically correct and incorrect sentences.

Antonio always forget where he lives. (N-V agreement)

They are the baddest men in town. (irregular superlative)

The robber had went before the police came. (verb tense)

It was me who won the race. (subject pronoun)

She ran quick. (adverb)
**Results**

**Sentence Combining:**
Mean correct responses increased from 10.3 to 15.3 points from pretest to posttest. Gains significant at $p=.001$.

**Grammatic Comprehension:**
Mean correct responses increased from 9.6 to 17.1 points from pretest to posttest. Gains significant at $p=.009$.
Discussion

• Both measures of syntactic awareness increased following the intervention
• The increases in syntactic awareness corresponded with increases in reading scores
• Since both oral and written language were addressed in intervention, a causal relationship cannot be established
• Likely that the relationship is reciprocal
• Because there is no control group, cannot say that a third factor didn’t actually cause or contribute to the results and so this study is considered preliminary
Important Contribution to RTI

• Recent research on syntactic awareness combined with these two studies suggest that higher level language is a critical component of reading that must be addressed

• Intervening for syntactic and morphological awareness are critical contributions the SLP can make in the classroom for both identified children and their peers

• It is also important to address discourse needs, such as narrative and expository text structures
References


Materials

References


Materials