Language Complexity in Reading Input for Primary School Children: An Exploratory Study

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Introduction

Research indicates that young children show emergence of language and literacy through book reading and printed texts (Williamson, Fitzergerald, & Stenner, 2013). Since printed texts play an important role in children's language development, it is pertinent that educators, as well as speech-language pathologists (SLP) pair children with appropriate books in school.

The Common Core State Standards (CCSS; 2012), which have been adopted by 41 states nationwide, suggest that pairing children to books should include three considerations: qualitative, quantitative, and reader/task. Additionally, a series of commercially available books are provided as exemplar texts by grade for self-reading (i.e., storybooks), read-aloud books, across narrative and informational genres.

Leveling of books is a common approach by publishers of academic material and is utilized widely by teachers for literacy instruction. The most widely used measures are Guided Reading Level (Fountas & Pinnell, 2001) and Lexile Level (Smith et al. 1989). These approaches are based on frequency of vocabulary or content (Benjamin, 2012); however, they may not account for the language needs of young children at multiple levels of language (e.g., phonological, word, sentence, discourse).

Children are exposed to books in school in two key ways, first by the books which they are directed to read by educators, and second during read-aloud activities conducted by educators and SLPs. This study is the first step in a programmatic line of research that aims to pair children to books that support and promote language development by evaluating quantitative language and literature features of CCSS (2012) exemplar texts.

Purpose

The goal of this study was to validate whether the use of language sampling measures used to quantify the spoken language skills of children can be used to quantify the written language demands of commercially available narrative and informational exemplar texts for students in grades K and 1.

The specific **research questions** were:

(1) What are the language and literature characteristics of exemplar kindergarten and first grade books using quantitative measures?

(2) Are there differences in the language and literature characteristics of books by genre (narrative, expository) and text type (read-aloud, stories)?

(3) What are the relationships among language and literature characteristics and grade leveling metrics including Guided Reading and Lexile Levels?

Method

Thirty-three ($n = 33$) exemplar texts were included for analysis. Inclusion criteria for books were:

(1) cited within the CCSS (2012) list of recommended books for kindergarten and 1st grade students;

(2) Guided Reading and/or Lexile levels were available through reference materials (Fountas & Pinnell, 2001; Smith et al. 1989).

Books were orthographically transcribed into the Systematic Analysis of Language Transcripts (SALT; Miller & Iglesias, 2004) following the transcription conventions outlined in the program. Additional rules were included for the transcription of books in order to retain as much of the literature features of the text.

Language Transcription Measures obtained from SALT included:
- Total Sentences and Words
- Mean Length of Utterance (in morphemes)
- Subordination Index (a measure of syntactic complexity)
- Type-Token Ratio
- Number of Different Words

Literature Measures calculated for analysis included:
- Total Number of Pages
- Sentences and Words per Page

Results

Table 1. Means and standard deviations for language and literature characteristics of exemplar texts by genre and type

	Total Number of Sentences	Total Number of Words	MLU-Morphemes	Subordination Index	Type-Token Ratio	Number of Different Words	Total Number of Pages	Words per Page	Sentences per Page	Guided Reading Level	Lexile Level
Narrative, Storybook	135.50 (70.34)	936.38 (609.86)	7.31 (1.94) ⭐	1.27 (0.37) ⭐	0.22 (0.13)	179.25 (120.59)	54.50 (13.98)	16.20 (8.47)	2.37 (0.92)	9.63 (0.92)	272.50 (157.09)
Narrative, Read-Aloud	296.63 (458.05)	3960.63 (6169.47)	13.06 (3.41) ⭐	1.82 (0.45)	0.29 (0.11)	644.00 (711.11)	45.50 (38.00)	64.55 (68.47)	4.87 (4.03)	14.88 (4.58) ⭐	701.25 (234.85) ⭐
Information, Storybook	80.75 (32.12)	701.00 (451.09)	9.24 (2.47)	1.45 (0.28)	0.29 (0.04)	205.00 (151.36)	31.00 (0.82) ⭐	22.89 (15.32)	2.63 (1.10)	10.25 (2.63)	422.50 (228.53)
Information, Read-Aloud	103.13 (53.91)	963.63 (477.72)	10.99 (0.80)	1.41 (0.25)	0.33 (0.04)	307.63 (125.78)	30.25 (3.69)	32.09 (16.49)	3.42 (1.85)	12.00 (1.20)	592.50 (84.13)

Multivariate Test, Omnibus Results → Genre by Booktype Interaction: Wilks' Λ = 0.31, $F(11,14) = 2.84$, $p = 0.04$, Partial $\eta^2 = 0.69$

Main Effect Genre = ⭐ (red)
Main Effect BookType = ⭐ (green)
Genre x Book Interaction = ⭐ (purple)

Table 2. Correlations among measures

	1. TNS	2. SI	3. MLU	4. TTR	5. SPP	6. TNP	7. GRL	8. LL
1. Total Number of Sentences	--							
2. Subordination Index	0.30	--						
3. Mean Length of Utterance	0.33	0.86**	--					
4. Type Token Ratio	-0.41*	-0.52**	-0.39*	--				
5. Sentences per Page	0.75**	0.44*	0.52**	-0.46**	--			
6. Total Number of Pages	0.85**	0.12	0.04	-0.51**	0.41*	--		
7. Guided Reading Level	0.47**	0.65**	0.83**	-0.32	0.72**	0.13	--	
8. Lexile Level	0.35	0.74**	0.92**	0.28	0.50**	-0.05	0.73**	--

$* p < 0.05; ** p < 0.01$

Coding

Coding was conducted by trained research assistants who were undergraduate or graduate students in speech-language pathology. The following coding guidelines include transcription conventions prescribed by the SALT program (Miller & Iglesias, 2004) and additional rules developed for the study (in order to retain literate features of text).

- Grammatical morphemes were coded for:
  - Plural –s → the toy/s were on the floor
  - Possessive –s → the boy/s toy was on the floor
  - Present progressive → the boy was throw/ing his toy on the floor
  - Past tense → the boy play/ed with his toy on the floor
  - Third person singular → the boy play/s with his toy on the floor
- Punctuation, except for periods and commas, were placed in braces { } to be ignored by SALT software
- Repeated words were not coded for root identification count purposes to keep transcriptions true to the book
- Comparative morphemes were not slashed
- Onomatopoeia were marked with the following code [%]

Discussion

This exploratory study examined the use of traditional language sampling measures applied to books as quantitative indicators of text complexity.

- There were clear differences in the complexity of texts with read-aloud books being more complex than storybooks, and narrative books being longer than informational books.

- Measures of syntactic complexity and morpho-syntax (MLU) were strongly related to Guided Reading and Lexile Levels and appeared to be more sensitive measures in the multivariate model.

- Guided Reading and Lexile Levels were strongly related; however, the patterns of language and literature measures related to each differed in significance or magnitude.

For the SLP, an important consideration is how to pair children with books that can support language development, while not being too advanced that the content of the story is missed by the child. This is a challenging task given the array of books and interests available to children. One must considered quantitative approaches used in the current study along with qualitative and reader characteristics. These include: topic, background knowledge, motivation, and child's interests.

Future Directions

The ultimate goal of this work is to match children with language impairments to books that will support and promote language and literacy development. To this end, the future direction of this work include the following:

- To continue to build a library of language and literature transcription measures for CCSS (2012) exemplar texts indicated for grade levels 2 through high school.

- Identify additional literature reference manuals (e.g., Lexile) from which books can be selected and included within the language transcription library.

- Identify additional literature measures that can be applied to exemplar texts that account for quantitative, qualitative, and reader traits.

- Conduct experimental studies that match schoolchildren to texts, based on language transcription measures obtained from both the student and the text as the independent variables, and examine the effects across a variety of language and literature dependent variables including self-reading vs. read-aloud.
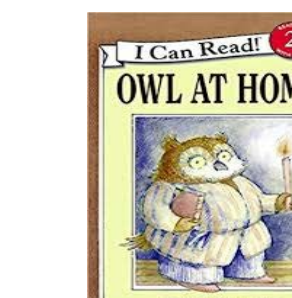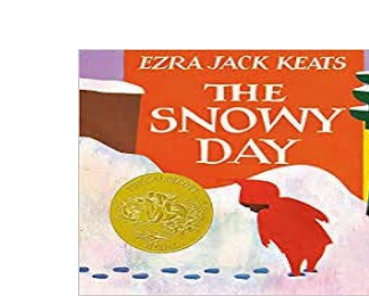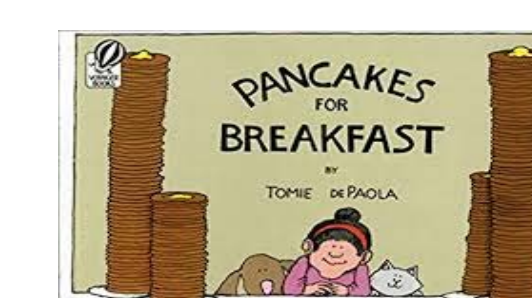
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* A bibliography of the exemplar texts used for in the study is available at: http://blogs.shu.edu/row-lab/

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