Early Spelling Development: Letter Knowledge, Phonological Awareness and Sublexical Representations.

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Outline of the Seminar

- Overview of the Stages of Reading Development
- Predictors of reading development
- Stages of spelling development
- Year-long Kindergarten Study
- Implications for teaching
Stages of Reading Development

- Specific knowledge about print: connection between visual form and its sound and meaning
- Partial alphabetic stage:
  - some letter/sound knowledge,
  - some PA – partial connection to the first and last letter of the words;
- Full alphabetic stage:
  - connection between all letters and sounds
  - all representations a stored in memory
Five Core Skills Identified in Early Reading Stages

- Alphabet knowledge
- Sensitivity to initial phonemes
- Sensitivity to final phonemes
- Full alphabetic decoding
- Automatic word recognition.
Sequence of Early Decoding

- Letter recognition
- Initial sound recognition/production
- Final sound recognition/production
- Full word recognition/production
Research in Early Reading Development

- Phonological Awareness (PA) – best predictor for early reading achievements
- Controversy: explicit PA may not be essential for linking print and speech sounds (Castles & Coltheart, 2004)
- Cognitive indicators for reading:
  - understanding of letter names and sounds and PA
- PA contributes to developing of decoding and eventually word recognition and spelling
Letter Knowledge and Learning to Read

- May be the most powerful predictor for reading achievements on par with PA (de Jong, 2007; Hulme, Snowling, Caravolas, & Carroll, 2005).

- Why letter knowledge?
  - It is assumed that letter knowledge provides initial connections between print and speech, i.e., combining visual and phonological properties.
“Inside Out” vs. “Outside In” Skills

• Kindergarten – “inside out” skills:
  • letter knowledge
  • letter sound correspondence
  • Phonological Awareness

• Beyond 1\textsuperscript{st} grade - “outside – in” skills:
  • vocabulary knowledge
  • other oral language measures
Stages of Spelling Development

- Stage 1 – Emergent Spelling (3-5 years of age)
- Stage 2 – Letter Name-Alphabetic Spelling (5-7 years of age)
- Stage 3 - Within word pattern spelling (7-9 years of age)
- Stage 4 – Syllables and affixes spelling (9-11 years of age)
- Stage 5 – Derivational Relations spelling (11-14 years of age)
Stage 2: Kindergarten Year

- Emergent alphabetic principle
- What is alphabetic principle?
- The alphabetic principle assumes that for each speech sound or phoneme in an alphabetic writing system, there is a specific graphic representation in the form of alphabet letters. This principle states that the print letter will evoke a certain sound and vice versa.
Trieman (1994) Account of Early Spelling Development

- Most important principles:
  - Number of letters may not match the number of syllables
  - “fine-grained” level of relating print and speech
  - “Analyze” words into individual sounds using letter names (‘plad’ for ‘plaid’)
  - Omit second consonant within initial consonant clusters and first consonant within the cluster in final position (spelling groups of phonemes with single letter)
  - Use of consonant letter names for representation of all phonemes in the word.
What are the Foundations for Spelling Abilities? (Caravolas, Hulme & Snowling, 2001)

- Phonological acceptability of spelling
- Spelling abilities were consistently and significantly predicted by
  - letter-sound knowledge
  - Phoneme isolation skill
- Only phonological abilities were fundamental to the development of spelling
- Verbal and visual memory skills did not influence the development of spelling
- Letter-sound knowledge was found to predict letter-name knowledge
**Possible Preference for Specific Letter Names**

- Children in the early stages of spelling may be more successful in using letters with initial sound of the letter name (CV pattern, e.g. ‘b’, ‘d’) rather than letters whose names begin with vowel sounds (VC pattern, e.g. ‘s’, ‘f’) (Roberts, 2003; Treiman et al., 2008).

- This suggestion was supported only in the final position at the beginning of kindergarten: children were more likely to use VC consonant pattern at the end of the word omitting the vowel.

- There was no preference for the types of consonants in the onset position (Zaretsky & Core, 2009).
What we know

- Children move to the full alphabetical stage during kindergarten – first grade
- The development is gradual:
  - From initial to final consonant representation
  - Little representation of full consonant clusters – usually missing second consonant in the initial position and first consonant in final position, i.e., “lamp”-/lap/, “step” - /sep/
  - Use letter name to represent vowel digraphs, i.e., “mail/male” - /mal/ or vowel in CVC word, i.e,
  - “pick” - /pk/
What we want to know

- How children parse the word for spelling?
- Possible ways to parse the word:
  onset-rime  ons-nucleus-coda body-coda  phonol.repres
  /dr/-/es/   /dr/-/e/-/s/   /dre/-/s/   /d/-/r/-/e/-/s/
- One view: children go from larger to smaller units in their early spelling just like in reading, i.e., onset and rime (Goswami & Bryant, 1990)
- Other views suggest that it is easier to break the word into onset-coda first (Seymour et al., 1999) or body-coda (Share & Blum, 2005) units
What can we do?

- Previous studies did not look at the sensitivity to subsyllabic structure of the word in early spelling.
- Sample spelling was coded for phonological acceptability of word representation rather than for the units of representation within the word, i.e., onset-rime, body-coda, etc.
- To investigate the most common units of word structure in early spelling:
  - Code the sample for all possible sublexical representations, rather than take possible acceptable phonological representations.
Present Study

- Follow a group of kindergartners from the beginning of the year to the end of the year
- Previous longitudinal studies followed children from kindergarten through 2nd or 3rd grade
- Often there is no intermediate testing, i.e., kindergarten and grade 2, or grade 1 and grade 3
- Important to measure growth in spelling development within the first year of “official” exposure to “formal” instructions to understand the time-frame when specific skill emerges
Research Questions

• What are the most often represented subsyllabic units in early spelling attempts?
• Is there developmental growth in subsyllabic representations?
• Do early spelling attempts suggest children’s awareness of smaller vs. larger subsyllabic units (Classification)?
• Is there a relationship between alphabet knowledge, PA, vocabulary and word representation in early spelling?
• Does the letter name play a role in children’s awareness of and the ability to represent consonant clusters at the beginning and the end of the word, i.e. as part of onset or coda?
Methodology

- Participants: 24 kindergartners
- Age range 5;1–6;1 (M = 5;5, SD = .32)
- Children were assessed at the beginning (T1) and the end (T2) of the Kindergarten year.

Assessment tools (T1):
- Phonological Awareness Test (PAT)
- Receptive Vocabulary (PPVT)
- Early Reading Screening Instrument (ERSI, Lombardino et al., 1999):
  - Alphabet Knowledge (Upper/lower case naming; alphabet production)
  - Decoding (10 words)
  - Sight (basal) Words (10 words)
  - Invented Spelling (12 words)

Assessment tools (T2):
- Invented spelling (ERSI)
Composition of Invented Spelling Words

- The invented spelling words used 14 consonant sounds total (7 with CV, e.g., ‘b’=/bi/, pattern and 7 with VC pattern, e.g., ‘m’=/em/, in their names).
- The CV and VC pattern consonants were equally used in the beginning and end of the words.
- 2 consonant clusters (CV/VC and VC/CV phonological string) were used as an onset and 2 clusters (VC/CV and CV/CV phonological string) were used at the end of the words.
- 5 vowels (a, o, i, u, e) were used in the sample words.
- The words were dictated to all children and children were asked to write them down to the best of their abilities.
Coding System

- Sample spelling coded for correct use of consonants within the words, rather than possible phonological acceptability of spelling;
- The exceptions were made for vowel representations, i.e., use of ‘a’ rather than ‘ai’ in ‘mail’, i.e., letter name, was considered acceptable
- Each unit within coding system was assigned 1=correct or 0=incorrect or missing
- The words were coded for
  - onset (12);
  - body, i.e., onset +nucleus (12);
  - rime (13) (one 2-syllable word);
  - coda (13).
- Total number of each sublexical structures for each individual participant were used in the analysis.
Results

Question 1: What are the most often represented subsyllabic units in early spelling attempts?
- At T1 – Onsets are the most often represented units

Question 2: Is there developmental growth in subsyllabic representations by the end of Kindergarten year?
- Significant developmental increases at T2 toward representation of all syllabic elements within the word

Results of repeated measure (Time x Tasks) ANOVA showed significant effect of Time (F=14.96, p=.0008) and Measures (F=25.71, p=<.0001) on subsyllabic representation.
Results

Question 3: Do early spelling attempts suggest children’s awareness of smaller vs. larger subsyllabic units (Classification)?

- T1 Onset x Rime: significant difference $p=.0001$; T1 Body x Coda – NS, better classification
- T2- NS; representation of full word structure
Results

Question 4: Is there a relationship between alphabet knowledge, PA, vocabulary and word representation in early spelling?

<table>
<thead>
<tr>
<th></th>
<th>AlphLow</th>
<th>AlphUpper</th>
<th>AlphProd</th>
</tr>
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<tbody>
<tr>
<td>T1 Onset</td>
<td>.418*</td>
<td>.518**</td>
<td>-</td>
</tr>
<tr>
<td>T1 body (o+n)</td>
<td>.562**</td>
<td>.608**</td>
<td>-</td>
</tr>
<tr>
<td>T1 Rime</td>
<td>-</td>
<td>.475**</td>
<td>-</td>
</tr>
<tr>
<td>T1 Coda</td>
<td>.559**</td>
<td>.475**</td>
<td>-</td>
</tr>
<tr>
<td>T2 Rime</td>
<td>.436*</td>
<td>-</td>
<td>.468*</td>
</tr>
</tbody>
</table>

Repeated measure ANOVA: Significant effect of letter knowledge on subsyllabic representations at T1 and T2 (F=103.76, p=.002)
Blending is the only PA skill strongly and significantly correlated with Onset representation at T1. At T2, PA plays increasingly important role in children’s representation of sublexical word structure.

Vocabulary does not influence early spelling!
Question 5: Does the letter name play a role in children’s awareness of and the ability to represent consonant clusters at the beginning and the end of the word, i.e. as part of onset or coda?

Children did not show preferences for CV/VC clusters in the onset position at T1 and T2. NS but observable preference for CV/CV cluster in the coda position at T1. T2 did not show any differences.
Is there developmental growth in cluster representations?

- At T2 – significant increase in correct cluster representation for each phonological string in both positions
- CV/VC initial-\(p=0.001\)
- VC/CV initial-\(p=0.002\)
- VC/CV final-\(p=0.03\)
Summary

• In the beginning of kindergarten – children are more likely to accurately spell either the initial and final consonant (onset-coda), or body and coda.
• Shows developmental trend (Treiman, 1994)
• Suggests that body-coda is an easier sub-syllabic representation (Share & Blum, 2005)
• Children are likely to simplify consonant cluster in the initial and final positions:
  • omit the second consonant in the initial cluster
  • omit the first consonant in the final cluster
  • more likely to use CV/CV cluster at the end at T1 – better fit after a vowel (body/coda)
• By the end of kindergarten-significant increase in correct spelling of consonant clusters in both positions.
Implications

- Data from typically developing kindergartners can inform us on developmental patterns to apply to disordered population
- ASHA Position Statement (2000) outlines the responsibilities of SLPs in preventing reading failure
- Rejects “wait and see” approach and suggests “as early as possible” approach
- Children who will have difficulties in 4th grade will show deficits in kindergarten
Implications (continues)

- Provide strong support for alphabet learning: naming letters should be randomized and presented in upper and lower cases:
  - Children may have difficult time learning letter-sound correspondence if they cannot fluently identify letter names

- Increase PA skills:
  - Provide opportunities for children to identify initial and final sounds of the words
  - Provide opportunities to identify individual sounds in consonant clusters
  - Provide opportunities to blend words – from larger units (easier) to individual sounds (harder)
Implications (continues)

- Although our results did not show specific correlation between vocabulary and early spelling, rhyming skill was influential.
- Suggests that teaching children “word families” as rhyming words may increase children’s skills in perceptual identification (easier) and production (harder) of rhymes.
- These skills will transfer to spelling as the child progresses to alphabetic stage of spelling.
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Questions?
References


