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Key research findings on reading comprehension and language in deaf children

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Reading comprehension in deaf children: relationship with word reading

- In our research, oral and signing deaf children with below average reading all had poor decoding skills (including poor word reading) *and* poor reading comprehension^{1,2}
- In the research literature, reading comprehension difficulties in deaf children are often attributed to poor word reading
- Why? Because slow, inaccurate, or inefficient word reading leaves fewer cognitive resources for processing text for meaning³
- This is unlike hearing children with poor reading comprehension, who generally have age appropriate word reading⁴

¹Herman et al 2014, ²Herman et al 2015, ³Perfetti, 1985, ⁴Cain & Oakhill 1999



Reading comprehension and vocabulary in deaf children

- Vocabulary knowledge is correlated with word recognition, speech comprehension, and reading in hearing^{11,12} and deaf children^{13,14,15,16,17}
- Deaf children's vocabulary is typically smaller than hearing children
- Rate of vocabulary acquisition is slower
 - On vocabulary tests, the expected rate of change for hearing children is 1.0 per year, i.e. a one-year increase in age-equivalent score per year
 - For deaf children with cochlear implants, the mean rate is typically 0.46 to 0.72 per year (better for children implanted younger)¹⁰



Reading comprehension and broader language skills

- As well as vocabulary, sentence level language skills (e.g. grammar) are important, and both are explicit in a text
- In addition, readers must make sense of information stated *implicitly*, i.e. make inferences
- What are inferences? Inferences involve drawing conclusions from the text
 - Making links between information provided, e.g. Tom loved his new pet. The puppy was very playful *Inference: the new pet was the puppy*, or
 - Making use of external information, e.g. The children paddled and built sandcastles *Inference: the setting is the beach*⁵
- Deaf children have problems with vocabulary and syntax and also struggle with inferencing skills ^{6,7,8,9}

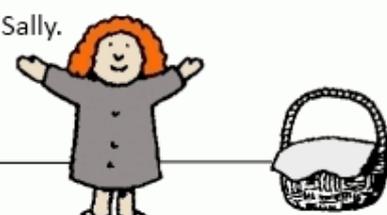
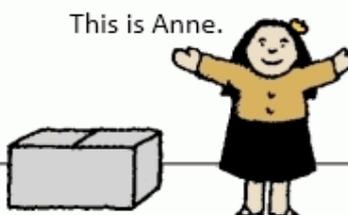
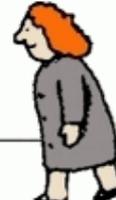
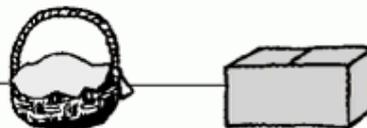


Reading comprehension and Theory of Mind

- What is Theory of Mind?
- ‘The ability to impute mental states to oneself and others’¹⁸
- Develops from early infant imitation and joint reference, pretend play and later conversations about personal experiences and the experiences/perceptions of others
- Involves the use of mental state verbs to talk about thoughts, feelings, hopes, etc.
- Linked to language development
- Deaf children have delayed TOM development - although not children in native signing families¹⁹
- Interventions developed for children with ASD



Testing Theory of Mind (Baron-Cohen, 1985)

<p>This is Sally.</p>  <p>Sally has a basket.</p> <p>This is Anne.</p>  <p>Anne has a box.</p>	 <p>Sally has a marble. She puts the marble into her basket.</p> 
 <p>Sally goes out for a walk.</p>  	 <p>Anne takes the marble out of the basket and puts it into the box.</p>
<p>Now Sally comes back. She wants to play with her marble.</p>  <p>Where will Sally look for her marble?</p>	



Research findings on spelling

- Spelling and reading are highly correlated in hearing and deaf children
- Far less research on spelling
- More reliable method for deaf children with poor intelligibility as it is not dependent on speech
- Analysis of spelling errors is informative because it provides a window into the kind of strategies children use



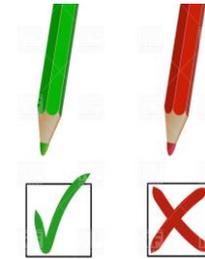
Spelling strategies

- 2 main types of strategies:
 - Visual, whole-word/whole syllable non-phonetic
 - Auditory-sequential phonetic
- Children use both types of strategies
- Poor readers and poor spellers may have problems with one or both types of strategy



Analysing spelling errors

- Visual orthographic, non-phonetic errors
 - e.g. more letters than necessary
 - Grapheme (letter) implausible
 - Non-phonetic order /anagrams
- Semi-phonetic/ phonetic errors
 - Vowels missing
 - Non-homophones
 - Homophones



the tehe
play plag
friend frenid

work wrk
home hom
boat bote



Changes in strategy use with age

- Spelling errors from typically developing children start undifferentiated, but become increasingly phonetically plausible across time
- By 11-12 years, more than 75% of misspellings in hearing children are phonetically plausible¹⁰
- This compare with less than half (44%) of 6-12 year-old-deaf children with CI¹¹



Summary and implications of research on spelling in deaf children

- Spelling is a relative strength for deaf children
- In deaf children, use of a phonetic strategy is related to better spelling & reading and associated with expressive vocabulary, speech intelligibility but not speech reading
- Visual orthographic strategies also play a part
 - Best suited to irregular words
 - Least well suited to unfamiliar, low frequency words
- Over-dependency on visual orthographic strategies may underpin plateau effect in older children
- Teaching potential of spelling and analysis of errors as an integral part of supporting literacy acquisition in deaf children