Working Memory and Comprehension of Individuals with Reading Disabilities

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Purpose

- Reading comprehension is a complex task that is critical for students' academic success.
- Many learners perform below a proficient level in reading; the **majority of students with disabilities** perform **below a basic level** (The Nation's Report Card, 2015).
- Despite myriad reading comprehension interventions, many students still struggle.

Research Question

How, or to what extent, do individuals with learning disabilities in reading comprehension (RD-comp) differ in working memory (WM) performance from their nondisabled peers?

Theoretical Background

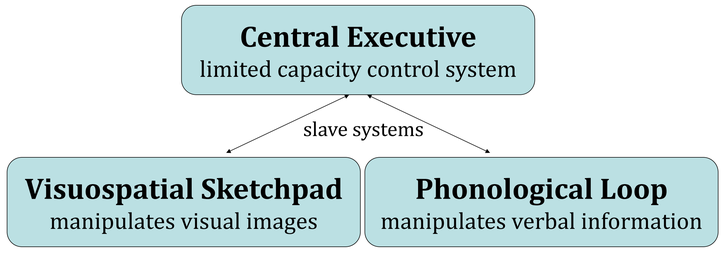
- **The Simple View of Reading** (Hoover & Gough, 1990)
  Reading Comprehension = Decoding x Linguistic Comprehension
- WM is a **core foundational skill** for linguistic comprehension with a total direct and indirect effect of .51 (Kim, 2017).
- Individuals with **RD-comp** have shown **performance deficits** on WM tasks (e.g., Peng & Fuchs, 2016).

Relations have been found between WM and:

- overall **text processing** and **comprehension**
- ability to **adjust processing** to match reading purpose
- ability to **infer** meaning from text
- prior **knowledge**
- **strategy** use

(Budd, Whitney, & Turley, 1995; Whitney, Ritchie, & Clark, 1991; Linderholm, Cong, & Zhao, 2008; Linderholm & van den Broek, 2002; Cain, Oakhill, & Lemmon, 2004; Fincher-Kiefer, Post, Greene, & Voss, 1988; Linderholm & Zhao, 2008)

Working Memory (WM) (Baddeley, 1992)



Limited WM capacity constrains comprehension (Just & Carpenter, 1992)

Method

Systematic literature search: PsychINFO, ERIC, Education Source, Academic Search Premier.

Limited to peer reviewed articles written in English.

- *Inclusion Criteria*: experimental or correlational, compare/contrast participants on WM, verbal complex span task, capacity view of WM, passage level comprehension

Preliminary results: 211 publications screened and 10 included, three with participants with RD-comp

Results

Relation between RD-comp & WM

- Verbal WM deficits were found for children with RD-comp compared to their **chronologically age-matched peers**
- Children with RD-comp displayed **superior verbal and visual-spatial WM** when compared to younger, non-disabled children matched in reading comprehension

(Swanson and Berninger, 1995)

Relation between RD-comp & WM (cont.)

- Children with **RD in comprehension only** outperformed those with **RD in comprehension and word recognition** deficits who outperformed those with **poor comprehension, word recognition, and verbal IQ**.
- Storage may be superior to processing in RD-comp. only

(Swanson, Howard, and Sáez, 2006)

Relation between WM & Strategy Instruction

- Both skilled and RD-comp readers benefitted from **cueing and rehearsal strategy instruction** but between-group variation on WM tasks remained.
- **Processing constraints** of a limited capacity system seemed to account for this important between-group variance

(Swanson, Kehler, and Jerman, 2010)

Discussion & Next Steps

- Cannot assume the relation between WM and reading comprehension in the general population extends to those with RD-comp
- There are many unanswered questions regarding this relation
- Need for analysis of results by LD subgroups
- The foundational role of WM in linguistic comprehension suggests a clearer understanding of its relation to RD-comp can be beneficial in intervention research
- What is the effect of strategy instruction and WM for those with RD-comp? What is the effect of instructional format?

Next steps.

- Since this was a preliminary literature review, I am currently re-doing this review with colleagues.

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