**Cognitive Profiles in Dyslexia: Beyond Phonological Processing Deficits**

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**INTRO**

Extant research highlights the phonological deficits inherent in dyslexia. However, given the educational impact of dyslexia, an examination of a large sample was warranted to verify the full spectrum of cognitive deficits to better inform the development of effective interventions.

**METHODS**

In a chart review of records from 85 learning centers between 2010 and 2019, we collected scores on the Woodcock Johnson III - Tests of Cognitive Abilities (WJ III) administered to children ages 5-18 previously diagnosed with dyslexia or specific learning disability in reading and tested < 38th percentile on a reading test (n = 4,150).

Using descriptive statistics, linear regression, and independent samples t tests, we generated overall cognitive profiles and examined differences by age and sex.

**RESULTS**

- Overall, long-term memory, working memory, and processing speed were the most deficient skills, followed by auditory processing (phonological awareness).

- Age was a significant predictor* of 4 of the 7 skills (p < .001) with very small effect sizes: VP, PS, AT, and AP. (Fig. 1)

- There was a significant difference* between males and females on 4 of the 7 skills (p<.001) with very small effect sizes: VP, PS, AT, and AP. Females scored higher on all constructs except VP. (Fig. 2)

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*Regression for Age as a Predictor:
VP (F = 24.4, p = .001, $R^2 = .006$, $\beta = -1.76$)  
PS (F = 22.9, p = .001, $R^2 = .006$, $\beta = -1.92$)  
AT (F = 20.7, p = .001, $R^2 = .005$, $\beta = -1.45$)  
AP (F = 19.2, p = .001, $R^2 = .005$, $\beta = -2.49$)  
FR (F = 7.4, p = .007)  
LTM (F = .94, p = .33)  
WM (F = 3.1, p = .08)

**Independent T Tests for Sex Differences:**
VP (Mean = 1.8, t = 4.9, p = .001, $d = .16$)  
PS (Mean = 1.9, t = 4.8, p = .001, $d = .15$)  
AT (Mean = 1.4, t = 4.5, p = .001, $d = .14$)  
AP (Mean = 2.5, t = 4.4, p = .001, $d = .13$)  
FR (Mean = 1.3, t = 2.7, p = .007)  
LTM (Mean = .49, t = .97, p = .33)  
WM (Mean = .86, t = 1.8, p = .08)

**CONCLUSIONS**

- Working memory, long-term memory, and processing speed deficits dominate cognitive profiles in dyslexia and specific learning disability in reading across age groups.

- Cognitive skills appear to decline across childhood in the absence of an effective intervention.

- Interventions for children with reading disabilities should also target multiple cognitive skill deficits.