

The Neuropsychology of Written Language Disorders:
Developing Evidenced Based Interventions




When writing is hard

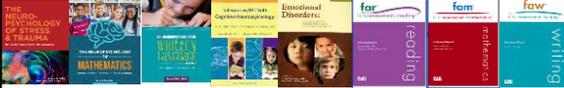
Our Mission Learn Our Community

Dysgraphia Life Webinar
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Dr. Feifer's Journey 1992 – present
www.schoolneuropsychpress.com



- School psychologist 20+ years
- Diplomate in school neuropsychology
- 2008 Maryland School Psychologist of the Year
- 2009 National School Psychologist of the Year
- Author: **8 books** on learning and emotional disorders
- Test Author: FAR & FAM & FAW
- Currently in private practice at Monocacy Neurodevelopmental Center in Maryland

Disclosures:
Financial — Dr. Feifer is a test author for PAR publishers and receives royalty payments. He also receives book author royalties from School Neuropsych Press.
Nonfinancial — none

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Five Quick Facts About Written Expression



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1. Most students rely on writing, either e-mail, text messages, word processing, or other computerized technology to communicate.
2. According to NAEP, 54% of 8th graders and 52% of 12th graders perform at a *Basic* level in written expression.
3. Males score *significantly* lower than females on standardized assessments of written language (NAEP, 2011).
4. Children spend nearly 60% of their school day actively engaged in the process of written expression or some equivalent fine motor-related endeavor (Feder & Majnemer, 2007).
5. Writing remains one of the most challenging skills to teach our students, due in part to many writing genres.

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What is Dysgraphia?

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Dysgraphia is a broad-based term that refers to a specific learning disability in written expression. The term can include problems with letter formation, legibility, letter spacing, spelling, fine motor coordination, rate of writing, grammar and overall sentence production (Chang et al., 2020).

Developmental Dysgraphia refers to difficulty acquiring writing skills despite adequate learning opportunities and cognitive skills.

- Younger children tend to have deficits with the motoric aspects of the written stroke, whereas older children struggle with more cognitive-linguistic elements of writing (Biotteau et al., 2019).

Acquired Dysgraphia refers to a learned skill (writing) being disrupted by a specific injury or degenerative condition.

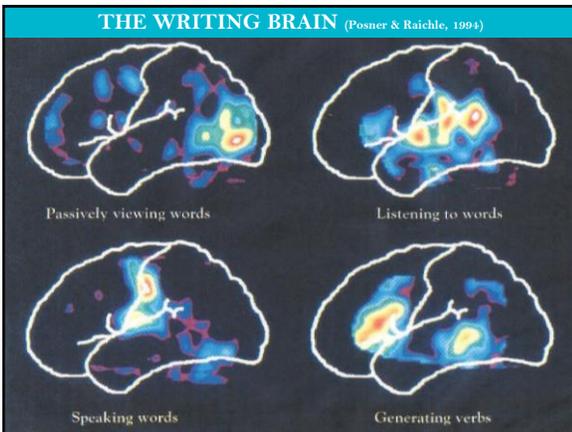
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Warning Signs of Developmental Dysgraphia

Age Group	Signs of Dysgraphia
Preschool aged children	<ul style="list-style-type: none"> • Awkward pencil grasp • Lack of hand dominance • Fatigues quickly when writing • Letters poorly formed or inverted • Difficulty writing within margins • Overflow motor movements • Does not anchor paper with opposite hand.
Elementary aged students	<ul style="list-style-type: none"> • Illegible or messy handwriting • Letter transpositions • Mirror writing • Switching between cursive and print • Slower paced writing • Poor spelling impacts legibility. • Frequent erasures
Secondary school students	<ul style="list-style-type: none"> • Poor planning and organizational skills. • Discrepancy between verbal output and written output. • Difficulty keeping pace when note-taking. • Does not separate ideas by paragraph. • Paragraphs do not flow from general to specific. • Grammar impacts legibility.

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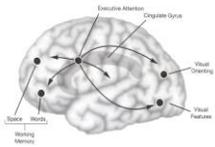
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Cognitive Constructs and Written Language

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Attention: (Selective & Sustained)

- Poor planning
- Uneven tempo
- Erratic legibility
- Inconsistent spelling
- Poor self monitoring
- Impersistence



BRAIN REGION - Anterior Cingulate Gyrus
** Effort control and top-down attention*

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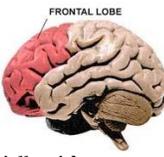
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Cognitive Constructs and Written Language

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Sequential Production

- Poor connected writing
- Letter reversals
- Organizational deficits
- Lack of cohesive ties
- Deficits in working memory, especially with ADHD kids, leads to sequential dysfunction.



BRAIN REGION - Left Prefrontal Cortex

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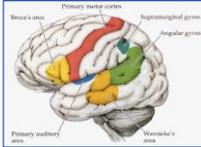
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Cognitive Constructs and Written Language

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Language

- Poor vocabulary
- Lack of cohesive ties
- Poor grammar
- Simplistic sentence structure
- Left hemisphere stores language by **converging** words into semantic baskets; right hemisphere excels in more **divergent** linguistic skills (simile and metaphor).
- Writing genre impacts retrieval!



BRAIN REGION - Temporal Lobes

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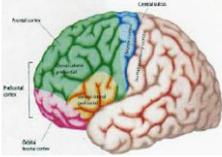
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Cognitive Constructs and Written Language

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Executive Functioning

- Organize and plan ideas
- Self monitor
- Task initiation
- Sustain attention to task
- Difficulty making cognitive shifts from one topical area to another.



BRAIN REGION – Dorsolateral Prefrontal Cortex

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Executive Functioning and Written Language

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<u>Classification</u>	<u>Writing Dysfunction</u>
(1) Initiating	* Poor idea generation * Poor independence
(2) Sustaining	* Lose track of thoughts * Difficulty finishing * Sentences disjointed
(3) Inhibiting	* Impulsive/Distractable
(4) Shifting	* Perseverations * “Stuck” on topic

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Executive Functioning and Written Language

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<u>Classification</u>	<u>Writing Dysfunction</u>
(5) Poor Organization	* Frequent erasers * Forget main idea * Disjointed content
(6) Poor Planning	* Poor flow of ideas * Lack of cohesive ties
(7) Poor Word Retrieval	* Limited word choice * Simplistic sentences
(8) Poor Self Monitor	* Careless miscues * Sloppy work

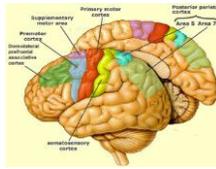
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3 Subtypes of Written Language Disorders:

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(1) **Graphomotor Dysgraphia** - apraxia refers to a wide variety of motor skill deficits in which the voluntary execution of a skilled motor movement is impaired.



- a) **Premotor cortex** - plans the execution of a motor response.
- b) **Supplementary motor area** - guides motor movement.
- c) **Cerebellum** - provides proprioceptive feedback.
- d) **Basal Ganglia** - procedural memory and automaticity of handwriting.

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3 Subtypes of Written Language Disorders

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(2) **Dyslexic Dysgraphias: (Spelling Miscues)**

- a) **Dysphonetic dysgraphia** - the hallmark feature of this disorder is an inability to spell by *sound* due to poor *phonological* skills. There is often an over-reliance on the visual features of words when spelling (i.e. "sommr" for "summer").
- b) **Surface dysgraphia** - a breakdown in the *orthographic* representation of words. Miscues made primarily on phonologically irregular words (i.e. "laf" for "laugh"; "juse" for "juice"; "mite" for "mighty").
- c) **Mixed Dysgraphia** - characterized by a combination of both *phonological* errors and *orthographical* errors depicting faulty arrangement of letters and words (i.e. "cshinte" for "kitchen").

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3 Subtypes of Written Language Disorders

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(3) **Executive Dysgraphia** - deficits in *working memory* and *executive functioning* in frontal lobes hinders written output.

- a) **Verbal Retrieval Skills** - the frontal lobes are critical in retrieving words stored throughout the cortex, often stored by semantic categories.
- b) **Working Memory Skills** - helps to recall spelling rules and boundaries, grammar rules, punctuation, and maintaining information in mind long enough for motoric output.
- c) **Organization & Planning** - syntactical arrangement of thought needed to sequence mental representations.

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5 Steps for Executive Dysgraphia (Ray, 2001)

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- (1) **Prewriting** - use graphic organizers.
- (2) **Drafting** - use model to take notes and model how to organize in a text form using topic sentences.
- (3) **Revising** - second draft emphasizing content, and elaboration of ideas and making connections.
- (4) **Editing** - re-read for capitalization and punctuation errors.
- (5) **Publishing** - peer assisted strategies and teaching students to give and receive feedback base upon a writing rubric.



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- A neurodevelopmental assessment of written language disorders.
- Pre-K to College (Ages 4-21)
- 12 subtests in complete battery/10 subtests core
- Diagnoses 3 subtypes of writing disorders:
 - 1) **Graphomotor Dysgraphia**
 - 2) **Dyslexic-Dysgraphia**
 - 3) **Executive Dysgraphia**
- Includes the FAW-S dysgraphia screening battery
- Yields a Compositional Writing Index (CWI)

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Thank You!

Questions?

Comments?

Suggestions?



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Workshops: feifer@comcast.net
Books: www.schoolneuropsychpress.com
Tests: www.parinc.com

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