I can show you
I can tell you, but
PLEASE don’t make me write!

Dr. Terri Zerfas
19th State Dyslexia Summer Institute
The “Write” Stuff
July 31, 2014

Writing is the most difficult
Of all language skills.
It is acquired the latest,
Mastered by the fewest,
And learned with the
Most effort over the longest period of
time.
Johnson & Myklebust, 1967

<table>
<thead>
<tr>
<th>Investigation</th>
<th>the work of inquiring into something thoroughly and systematically</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interference</td>
<td>What observable factors hinder, obstruct, or impede written language competence?</td>
</tr>
<tr>
<td>Information</td>
<td>How do I gain knowledge about a student’s written language skills through study, communication, and/or research?</td>
</tr>
<tr>
<td>Interpretation</td>
<td>How does the information explain the student’s struggle with written expression?</td>
</tr>
<tr>
<td>Intervention</td>
<td>How do I change the outcome of this struggle through effective interventions (direct teaching, accommodations, and/or teaching and learning strategies)?</td>
</tr>
</tbody>
</table>
| Independence | What level of written expression independence was achieved as a result of the implemented intervention(s)? *Freedom from the control, influence, support, or aid of others
Observable Interference in Structured Academic Tasks

• **Unexpected** in comparison to other skills

• Involves some or all **written language skills**

• Level of **frustration** impedes performance

• Level of **effort** does not match finished product

Observable Interference in Structured Academic Tasks

• **Volume** of written language demands exceeds competency

• **Pace** of written language demands exceeds competency

• **Complexity** of written language demands exceeds competency

• **Disparity** between oral language skills and written language skills areas may be significant

Sources of Interference

- Oral Language Skills
- Executive Function Skills
- Basic Writing Skills

OR...some combination of the above
Oral Language

- In this section, you will learn:
  - Which oral language skills are directly related to written language skills
  - How deficits in oral language increase the risk for writing failure

Components of Oral Language

<table>
<thead>
<tr>
<th>Form</th>
<th>Content</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phonology</td>
<td>Vocabulary</td>
<td>Pragmatics</td>
</tr>
<tr>
<td>Morphology</td>
<td>Semantics</td>
<td></td>
</tr>
<tr>
<td>Syntax</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Oral Language/Written Language

Oral language skills, spelling and letter-writing fluency are uniquely related to end of kindergarten writing skills.

- Weak expressive language skill and/or poor word retrieval skills are both “red flags” for students who have difficulty with written syntax.

Kim, Al Otaiba, Puranik, Folsom, Greulick, & Wagner, 2011

Farrell, Chard, & Kiger 2006

Farrall 2013
How Does Academic Language Differ from Oral Language?

- More **formal** use of language
- More **abstract** vocabulary
- More **complex** sentence structure
- More **teacher-controlled** interactions and topics
- Classroom language is **decontextualized**

Look for history of and/or current *interference* in these areas

- Speech Sound Awareness
- Word Retrieval
- Verbal Memory
- Speech Production/Perception
- Comprehension

Observable Oral Language *Interference*

- Rhyming
- Comparing/contrasting phonemes
- Counting syllables
- Letter-sound relationships
- "critical age hypothesis"
  - Nathan, et al., 2004
  - Pullen & Justice, 2003
  - Soifer, 2005
 Observable Oral Language Interference  
**Difficulty with Word Retrieval**  
- Difficulty with word retrieval (tip of the tongue)  
- Poor memory for names of peers  
- Uses pauses or fillers  
- Frequent use of nonspecific words  
- Difficulty with rote verbal sequences (days of week, months of year)

Observable Oral Language Interference  
**Difficulty with Verbal Memory**  
- Difficulty remembering instructions or directions  
- Difficulty learning names of people, places, or things  
- Difficulty remembering words to songs/poems  
- Difficulty learning a second language

Observable Oral Language Interference  
**Difficulty with Speech Production/Perception**  
- Difficulty saying multisyllabic words  
- Mishears/mispronounces words  
- Confuses similar sounding words  
  *pork chops*  
- Combines sound patterns of similar words  
- Frequent slips of the tongue (SOT)  
  *mustard/ketchup*  
- Difficulty with tongue twisters  
  *three free throws*
Observable Oral Language Interference

**Difficulty with Comprehension**

- Responds to only part of a multiple request or instruction
- Requests multiple repetitions/clarifications without performance improvement
- Difficulty understanding age-appropriate stories
- Difficulty making inferences, predicting outcomes, drawing conclusions
- Difficulty with spatial/directional terms
- Over-reliance on context to understand
- Difficulty understanding questions

Soifer, 2005

Observable Oral Language Interference

**Difficulty with Expressive Language**

- Short/truncated sentences
- Grammatical errors in speaking
- Limited vocabulary
- Difficulty giving directions/explanations
- Difficulty with sequenced narrative
- Explanations, stories, etc. lack detail
- Difficulty with pragmatic language

Soifer, 2005
Farrall, 2013

Information Sources for Oral Language

- Verbal Interaction with student
- Parent(s)
- Teacher(s)
- Cumulative Folder
- Progress Measures
- Response to Intervention
- 504 Information
- Observation in formal academic settings
- Observation in informal/unstructured settings
**Interpretation of Data**

**Oral Language**

- Identify the oral language **strengths** that support communicative and academic competence.

- Identify the oral language **deficits** that **interfere** with communicative and academic competence.

*Which deficits would most likely be responsive to intervention?*

**Interpretation of Data**

**Oral Language**

- Are the identified deficits clinical? If so, referral for a speech/language evaluation may be necessary.

- However, if the identified deficits are “sub-clinical” (no eligibility for special education), language intervention will need to be integrated into all academic/non-academic opportunities throughout the day.

**Oral Language**

**Intervention**

The case studies this afternoon will include specific intervention strategies for problems with oral language.
Oral Language Independence

### Quantitative Data
- Progress Measures
- Language Arts Grades

### Qualitative Data
- Direct observation of behavior/attitudes
  - Improved ability to answer questions
  - Increased verbal interactions
  - Increased independence
- Feedback from student/parent/teacher
  - Reduced frustration
  - Reduced time to complete assignments
  - Social language interactions

### Executive Function

- In this section, you will learn:
  - Which executive functions are directly related to written expression
  - How do deficits in executive function increase risk for writing failure

### Core Executive Functions

- **Inhibitory Control** of attention, behavior, thoughts, and emotions

- **Working Memory** temporal retention of information and manipulation of that information

- **Cognitive Flexibility** ability to change perspective, adjust to changed demands, address unexpected problems

  *Diamond 2014*
Why is EF important?

- EF skills or cognitive controls are more strongly associated with school readiness than are intelligence quotient (IQ) or entry level reading and math skills.  
  Blair & Razza, 2007

- Of the EF skills, working memory capacity is the strongest predictor of written expression skills  
  Naidoo 2007

Why is EF Important?

- Writing, summarizing, note taking and reading complex text for meaning may be particularly challenging for students with weak executive function  
  Meltzer, 2010

- As the demands on EF increase, there is a progressive deterioration of performance  
  McCloskey, Perkins, & Van Dinser (2009)

- A struggling writer cannot think of the next word, phrase, or sentence. The attentional demand of the moment is thoroughly consuming and results in pauses that actually stop the writing process  
  Fearn & Farman (2008)

Essential Executive Functions

- EFs are necessary when learning new information or faced with a novel situation

- EFs are necessary when information or situations change

  Roebers & Jager, 2014
### Verbal Reasoning

Mediated by cognitive flexibility, inhibitory control, and working memory

- Self-monitor
- Self-regulation

### Metacognition

**Before/During/After**

- Consider events and information
- Think about circumstances
- Solve problems

---

### Observable EF Interference

**Inhibitory Control**

- Difficulty focusing attention
- Loses track of thoughts
- Difficulty completing written activity
- Writes disjointed sentences with disorganized meaning

*Feifer & DeFina, 2002*

---

### Observable EF Interference

**Inhibitory Control**

- Impulsive *(finish first)*
- Distractible *(finish last)*
- Fidgety and restless while writing
- Adds letters into words

*Feifer & DeFina, 2002*
Observable EF *Interference*  
**Inhibitory Control**

- Difficulty generating ideas
- Poor independent learner

---

Observable EF *Interference*  
**Inhibitory Control**

- Poor dictation skills
- Perseverations
  - Thoughts
  - Words
  - Topics

---

Observable EF *Interference*  
**Inhibitory Control**

- Frequent erasures
- Forgetting main idea of topic
- Messy desk and workspace (and bedroom!)
- Difficulty in setting goals

---

*Feifer & DeFina, 2002, Farrall, 2013*
Observable EF **Interference**

### Working Memory

- **Phonological loop** (rehearsal)
- Difficulty attending to, processing, and formulating response
- Difficulty slows processing and drains mental energies, which results in more frequent errors

Dehn, 2008

---

Observable EF **Interference**

### Working Memory

- Difficulty with simultaneous processing (think note taking!)
- Difficulty retaining information
- Difficulty coordinating memory with other cognitive processes
- High demand even after reaching level of automaticity

Dehn, 2008

---

Observable EF **Interference**

### Cognitive Flexibility

- Decline in performance as the complexity of the task increases
- Difficulty “seeing” writing problems from multiple perspectives
- Difficulty revising writing
Observable EF Interference

Cognitive Flexibility

• Difficulty in the use of strategies to implement plan

• Difficulty in implementing, monitoring, and adjusting plan based on feedback

• Poor verbal fluency

• Lack of cohesion between sentences

Barkley (1997), Feifer & DeFina (2002)

Observable EF Interference

Cognitive Flexibility

• Difficulty monitoring own performance in writing tasks

• May lack strategies that would facilitate efficiency in writing

• May be unable to independently implement known strategies

• Inability to use multiple self-regulation EFs at one time (e.g. hold, manipulate, retrieve, generate and execute)

Barkley (1997), Feifer & DeFina (2002)

Information Sources for Executive Function

• Direct observation: Can the student establish and maintain self-regulation strategies?

• Baseline data for writing tasks

• Pattern Analysis
  (time of day, specific task, teaching/learning styles)
Interpretation of Data
Executive Function
• Are the identified deficits *clinical*? If so, referral may be needed.

• However, if the identified deficits are “*sub-clinical*” (no eligibility for special education), executive function intervention will need to be integrated into all academic/non-academic opportunities throughout the day.

Interpretation of Data
Executive Function
• Identify the executive function strengths that *support* communicative and academic competence

• Identify the executive function deficits that *interfere* with communicative and academic competence

*Which deficits would most likely be responsive to intervention?*

EF *Instructional* Techniques
*Student is best served by the teacher when:*
• EF challenges are not framed as negative character flaws

• The target behavior is stated in terms that indicate the behavior can be changed

• Transitioning target behaviors from negative to positive
**EF Instructional Techniques**

*Student is best served by the teacher with:*

- Understanding of EF maturational issues
- Increased practice time for all stages of writing process
- Teaching self-regulation strategies

---

**Executive Function Intervention**

The case studies this afternoon will include specific intervention strategies for the following:

- Inhibitory Control
- Cognitive Flexibility
- Working Memory

---

**Toward Independence in Executive Function Skills**

<table>
<thead>
<tr>
<th>Quantitative Data</th>
<th>Qualitative Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grades in Language Arts</td>
<td>Increased independence</td>
</tr>
<tr>
<td>RtI Progress Measures</td>
<td>Increased use of self-regulation strategies</td>
</tr>
<tr>
<td>Citizenship Grades</td>
<td>Decreased frustration</td>
</tr>
<tr>
<td></td>
<td>Teacher/parent/student feedback</td>
</tr>
</tbody>
</table>
Basic Writing Skills

In this section, you will learn:

• Which basic skills are directly related to written expression?

• How deficits in basic skills increase cognitive load

• How deficits in basic skills decrease cognitive flexibility

Look for history of and/or current *interference* in these areas

- Delayed or inadequate handwriting
- Delayed or inadequate spelling skills
- Delayed or inadequate writing mechanics
- Delayed or inadequate sentence construction

Transcription *Interference*

*Spelling and handwriting deficits may impede* writing development:

• Avoidance of writing tasks results in less practice and competency than peers

• *Reduction* of written vocabulary due to insecurity about spelling and handwriting

• Develop an “I can’t” mind set
The Importance of Handwriting

• The demands of handwriting on working memory (EF) interfere with written expression.

• Handwriting affects writing fluency - 66% of variability in writing output
  Swanson, Harris, & Graham, 2003

The Importance of Handwriting

• Effective orthographic-motor integration requires handwriting automaticity (think cognitive load)
  (Gathercole, et al., 2004)

  fast and accurate

• Pausing patterns in handwriting are related to misspelled words; therefore, writing is less efficient
  (Connelly, Dockrell, Critten, & Walker, 2012)

Observable Handwriting Deficits

• Incorrect or inconsistent letter formations

• Awkward or inefficient pencil grasp

• Poor spatial orientation

S.P.I.R.E.
Observable Handwriting Deficits

- Poor writing posture (core strength)
- Incorrect paper position
- Smudged final copy due to erasures/cross-outs

The Importance of Orthography

- Phonemes translated to graphemes for purpose of written communication
- Competency dependent on awareness and skill level in
  - Phonology
  - Morphology
  - Syntax
  - Semantics
  - Orthographic knowledge
  Carreker, 2005
  Swanson, Harris & Graham 2003

The Importance of Orthography

*By the numbers...*

- 87% of English orthography is reliable, consistent, and rule-based
  Carreker, 2005

- Spelling accounts for 41% of variability in writing input and lays the *foundation* for higher order writing skills.
  Swanson, Harris & Graham 2003
Orthography and Grade Inflation

The Mouse Has Little Pants

The mouse has little pants. On the pants is a patch. The patch has stitches and has two stitches on each side. The mouse has a squiggly tail. It looks like a smile because it was wavy like water.

His left leg has a bandaid. The bandaid has three dots. Under his bandaid is socks. One of his socks is crinkled. His shoes are oval-shaped. His shoe laces are untied.

My dog came up to me and scared him away.

Orthography and Grade Deflation

- washed/yard
- pocks/picked
- exams/exam
- thare/there
- enormous/enormous
- familiar/familiar
- thare/there
- candiate/candiate
- achere/achere
- enextremely/extrremely
- chantchant
- chicniche/cheap
- thare/there
- snac/snake
- crinckled/crinkled
- ovale/oval
- inchi/inchi
- suspenders/suspenders
- inchi/inchi
- battons/buttens

Orthography and Grade Deflation

- pans/pants
- stichis/stiches
- look/looks
- snack/snake
- crinkled/crinkled
- ovale/oval
- shaped/shaped
Observable Spelling *Interference*

- Recalling correct order of letters
- Retrieving nonphonetic spellings
- Overreliance on spelling word like it sounds (luv/love)
- Difficulty distinguishing homophones (hair/hare)

Observable Spelling *Interference*

- Possible letter reversals (b,d,p,q)
- Difficulty segmenting whole word into parts
- Multiple spellings of same word
- Confusion of voiced/unvoiced cognates (f/v)

Observable Deficits in Mechanics

- Struggling writer may place *undue* emphasis on form and mechanics during the writing process
- Switching attention to mechanical concerns while writing taxes working memory and causes the student to lose ideas or plans
- Lost opportunities for metacognitive thinking due to *cognitive load*, associated with mechanics


Saddler & Graham, 2007
Basic Writing Skills

*Intervention*

The case studies this afternoon will include specific intervention strategies for the following:

- Handwriting
- Spelling
- Writing Mechanics
- Editing

Toward *Independence* in Basic Writing Skills

<table>
<thead>
<tr>
<th>Quantitative Data</th>
<th>Qualitative Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Grades in Language Arts</td>
<td>• Increased independence</td>
</tr>
<tr>
<td>• RtI Progress Measures</td>
<td>• Increased use of self-regulation strategies</td>
</tr>
<tr>
<td>• Citizenship Grades</td>
<td>• Decreased frustration</td>
</tr>
<tr>
<td></td>
<td>• Increased willingness to write</td>
</tr>
<tr>
<td></td>
<td>• Teacher/parent/student feedback</td>
</tr>
</tbody>
</table>

Advanced Written Expression

- In this section, you will learn:
  - How oral language, executive functions, and basic writing skills interact
  - How patterns of skill deficits impede written expression
Oral vs. Written Language

**Oral Language**
- Language by Mouth and by Ear
- Does not allow the reader to review and re-review the fleeting sounds in spoken words.

**Written Language**
- Language by Hand and by Eye
- Allows the writer to read and review and re-view the written words
- Helps overcome working memory limitations by externalizing cognition

Berninger & Dunn, 2008

The *Not-So-Simple View of Writing*

Simultaneous/sequential Integration

**Text Generation**
(higher-order cognition and language: words, phrases, sentences, discourse)

**Working Memory**
(long-term memory during composing; short-term memory during reviewing)

**Transcription**
(lower-level skills including handwriting, keyboarding, spelling)

**Executive Functions**
(conscious attention, goal setting, planning, reviewing, revising, strategies for self-monitoring and regulating)

Berninger and Amtmann (2004)

Motivation to Write

*In the absence of effective intervention, the struggling writer:*

- Exhibits **limited** persistence during writing tasks
- Displays more **negative** feelings about writing
- May appear **overconfident** about writing skills in comparison to peers who do not struggle

Graham & Harris, 2009
LD and the Writing Process

• <1 minute planning

• <20% of revisions made by LD students changed content of writing

• >70% of revisions focused on mechanics, spelling, and/or format

Swanson, Harris, & Graham (2003)

MacArthur & Graham, 1987

Cumulative Interference

Advanced Written Expression

<table>
<thead>
<tr>
<th>Writing Behavior</th>
<th>Oral Language</th>
<th>Executive Functions</th>
<th>Basic Writing Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inaccurate/incomplete word order in sentences</td>
<td>Verbal Memory Syntax</td>
<td>Working memory Inhibitory Control</td>
<td>Cognitive load interference due to spelling or handwriting deficits</td>
</tr>
<tr>
<td>Misuse of homophones</td>
<td>Semantics Word Retrieval</td>
<td>Cognitive Flexibility Working Memory</td>
<td>Spelling Grammar</td>
</tr>
<tr>
<td>Poor organization of ideas</td>
<td>Semantic mapping Inhibitory Control Working memory</td>
<td>Cognitive load interference due to spelling or handwriting deficits</td>
<td></td>
</tr>
<tr>
<td>Writing Behavior</td>
<td>Oral Language</td>
<td>Executive Functions</td>
<td>Basic Writing Skills</td>
</tr>
<tr>
<td>------------------</td>
<td>--------------</td>
<td>---------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Limited vocabulary/content</td>
<td>Poor Verbal Memory, Word Retrieval, Expressive Language</td>
<td>Working Memory, Inhibitory Control</td>
<td>Spelling, Handwriting</td>
</tr>
<tr>
<td>Difficulty remembering ideas</td>
<td>Verbal Memory</td>
<td>Working Memory, Inhibitory Control, Cognitive Flexibility</td>
<td>Transcription skills increase cognitive load</td>
</tr>
<tr>
<td>Difficulty articulating ideas</td>
<td>Language processing, Word retrieval, Speech Production</td>
<td>Inhibitory Control</td>
<td>Spelling, Handwriting, Grammar</td>
</tr>
<tr>
<td>Difficulty with handwriting</td>
<td>Inhibitory Control, Working Memory, (letter shapes)</td>
<td>Motor maturation, Space/Direction issues</td>
<td></td>
</tr>
<tr>
<td>Resistance to generating topics/ideas from self or others</td>
<td>Comprehension, Expressive Language</td>
<td>Inhibitory Control, Cognitive Flexibility</td>
<td>Transcription skill deficits lead to negative mind set about writing</td>
</tr>
<tr>
<td>In comparison to adequate store of knowledge and adequate oral skills, written text is simplified</td>
<td>Working Memory, Inhibitory Control, Cognitive Flexibility</td>
<td>Spelling, Handwriting, Mechanics</td>
<td></td>
</tr>
<tr>
<td>Difficulty maintaining pace of writing over time</td>
<td>Word Retrieval, Verbal Memory</td>
<td>Inhibitory Control</td>
<td>Cognitive load for transcription skills, Motor fatigue</td>
</tr>
<tr>
<td>Difficulty reasoning coherently</td>
<td>Comprehension, Cognitive Flexibility, Cognitive Load, Working memory, Inhibitory Control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficulty creating a visual image with words</td>
<td>Word Retrieval, Expressive Language</td>
<td>Inhibitory Control, Working memory</td>
<td>Interference from transcription skills</td>
</tr>
</tbody>
</table>
Advanced Written Expression

**Intervention**

The case studies this afternoon will include specific intervention strategies for the following:

- Writing strategies
- Measuring progress
- Teaching for transfer

Thanks to each of you for your dedication of time, effort, and patience to help students who struggle with writing!

*Dr. Terri Zerfas*

tzerfas@swbell.net