**Why Phonemic Awareness Tx?**

- Necessary for reading and spelling in alphabetic writing systems
- Very teachable skill
- Reading disabilities explained by phonemic awareness deficits
  - Developmentally-limited explanation (Stanovich)
  - Affects decoding initially, then decoding deficits and lack of reading affect comprehension (Matthew Effect)

**Phonemic Awareness in Reading**

- In scientifically-based curricula
- In NICHD (2000) report as 5 big areas of reading:
  - **Phonemic awareness**, phonics, vocabulary, comprehension, fluency
- In simple view of reading
  - In the Decode part of Decode + Comprehend
- In DIBELS progress testing for K-1
  - First phoneme matching, phoneme segmenting
- In actual teacher practices
  - Classroom reading curricula and instruction

---

**So What Should SLPs Do?**

- Formally our domain as an oral language skill important for reading
- Used to teach teachers about it but no longer
- Still our domain for children with language disorders
- But need to be strategic and efficient in tx, doing only what is needed for as long as needed

*For once, we may need to do less rather than more!*

**OLD View of Developmental Order**

3-4 yrs: Sounds & sentences tasks

4-5 yrs: Rhyme & syllable tasks

5-6 yrs: First phoneme tasks

6-7 yrs: All other phoneme tasks in monosyllabic words

8 yrs+: All other phoneme tasks in multisyllabic words

---

**NEW View of Developmental Order**

3-4 yrs: First phoneme tasks

4-5 yrs: First phoneme, rhyme, syllable tasks

5-6 yrs: Phoneme segment & blend in monosyllabic words

7 yrs+: Other phoneme tasks in monosyllables & multisyllabic words

---

**Revising the Recommendations – Start and Stay with Phonemes**

- Larger speech units not an easier entry
- Some first phoneme tasks the easiest phonological awareness tasks
- Moving from syllable segmenting to phoneme segmenting can be confusing
- Don’t spend time on supra-phoneme speech units
- A bit of rhyming can be helpful
- No set order needed, so long as enough help is given

(Ukrainetz, 2008; McGee & Ukrainetz, 2009; Ukrainetz, 2009)
Current Recommendations

- Teach phonemic awareness
  - Rhyme and syllable not needed for reading/spelling
  - Rhyme and syllable not needed for entry into phonemes
- Right from the get-go
  - Start with phonemes for K and preschoolers
  - Use rhyme incidentally to highlight sounds of words
- Phoneme achievements
  - Preschoolers can master first sounds (many without explicit instruction)
  - K can master simple segmenting

So that should save time!

Common Core Kindergarten Standards

Demonstrate understanding of spoken words, syllables, and sounds (phonemes)

1. Recognize and produce rhyming words
2. Count, pronounce, blend, and segment syllables in spoken words
3. Blend and segment onsets and rimes of single-syllable spoken words
4. Isolate and pronounce the initial, medial vowel, and final sounds in three-phoneme (CVC) words (not including final /l/, /r/, or /x/)
5. Add or substitute individual phonemes in simple, one-syllable words to make new words

First Grade Standards

Demonstrate understanding of spoken words, syllables, and sounds (phonemes)

1. Spoken single-syllable words
2. Orally produce single-syllable words by blending sounds, including consonant blends
3. Isolate and pronounce initial, medial vowel, and final sounds in spoken single-syllable words
4. Segment spoken single-syllable words into their complete sequence of individual sounds

Standards & Research Evidence

- Phoneme isolation, segmenting, and blending for simple words needed for reading and spelling
- First grade standards make sense
- Lack of second grade fancy task standards make sense
- BUT kindergarten standards include optional skills, adding unnecessary complexity and work

Don’t interpret the CCSS [Common Core] as a mandate to shoehorn more stuff into an already overcrowded curriculum (Calkins et al., 2012, p. 182)

Tasks to Teach

1. Isolating first, middle, final phonemes
2. Matching first, middle, final phonemes
3. Segmenting simple words into phonemes
4. Blending simple words from phonemes

Just teaching these should save time.

What About These Fancy Tasks?

1. Deleting and substituting (change the /g/ in blog to /t/)
2. Multisyllabic words (extraordinary, inspirational)
3. Deleting and substituting communicatively (Pig Latin)

Maybe benefits, but not as advanced phonemic awareness per se

- Phonemic awareness contributes little to reading ability beyond 3rd grade level
- Advanced phonemic awareness tasks involve cognitive operations, memory, and spelling
- Reading and spelling experiences improve phonemic awareness
A Reciprocal Relationship

Phonemic Awareness

Reading and Spelling

Who Should Get Phonemic Awareness Tx?

• Children on our IEPed caseload (Tier III)
  – First phoneme awareness for preschool
  – Basic phonemic awareness for K-2, depending...
  – Fancy phonemic awareness for 3+, depending...
• Basic phonemic awareness part of Tier I and II reading instruction
  – Check on explicitness and quality
  – Possibly participate in Tier II remediation

You can be an extra pair of hands, but don’t you have something else you should be doing?

Phonemic Awareness Tx Need

• Basic phonemic awareness (isolating, segmenting, blending)
• Indicators:
  – Low on first phoneme isolating or matching in late preschool or early K
  – Low on phoneme segmenting in late K
  – Spelling is pre-phonetic or missing phonemes:
    
    \[
    \begin{array}{cccc}
    m & m & o & m \\
    a & b & c & a & t \\
    s & a & \_ & s & u & n \\
    p & a & s & \_ & p & l & a & c & e \\
    f & a & t & \_ & f & a & t & \_ & f & a & s & t \\
    \end{array}
    \]

Overview of Phonemic Awareness Instruction

1. A culmination of a vertical hierarchy of environmental sound, word, syllable, rhyme, and phoneme activities
2. Hierarchical vertically-ordered discrete skill phoneme tasks
3. Cycled horizontally-ordered mix of contextualized and discrete phoneme tasks

Phonemic Awareness Activities

1. Name play
   – No materials needed
2. Contrived drill-games
   – Matching, Fishing, Guess-the-Word
   – Artic cards, phonology cards, plastic food, puzzles
3. Shared books
   – Alphabet
   – Alliterative
   – Rhyming
4. Message Writing
   – Writing to dictation, child writing
   – White board, paper, or computer

Talking about Speech Sounds during Book Sharing

• There was a boy named Fred. He didn’t want to go to bed.
• What are the rhyming words?
• What is the first sound of Fred and bed?
• Let’s count the sounds in Fred and bed, get your fingers ready. Which is longer?
• I’m going to say the sounds of another word that rhymes with Fred and shed. /r-E-d/
Talking about Speech Sounds while Message Writing

- Let’s write *Happy Birthday Mom.*
- What is the first sound in *happy?* I will write that.
- Let’s say all the sounds in *happy.* Fingers ready? /h-ae-p-i/ 4 sounds, I will write the letters.
- There should be 4 letters for 4 sounds, but writing is funny sometimes, 4 sounds, 5 letters!

Critical Tx Features: RISE

- Repeated Opportunities
- Intensity of scheduling
- Systematic support
- Explicit Skill Focus

✚ The Learner Factor of Attention & Engagement

<table>
<thead>
<tr>
<th>How Much R-I-S-E?</th>
<th>RISE with Phonemic Awareness</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Repetition</strong></td>
<td>Repeated Opportunities</td>
</tr>
<tr>
<td>Few ⇒ Some ⇒ Many</td>
<td>Isolate + segment two words / pg for 5 pgs = 20 opps</td>
</tr>
<tr>
<td><strong>Intensity</strong></td>
<td>Intensity</td>
</tr>
<tr>
<td>Class ⇒ Group ⇒ Individual; Occasional ⇒ Regular ⇒ Frequent; Short ⇒ Middling ⇒ Long</td>
<td></td>
</tr>
<tr>
<td><strong>Systematic Support</strong></td>
<td>Structural scaffolds: Rhyme to highlight form &gt; content; letters to represent phonemes; simple single skill games</td>
</tr>
<tr>
<td>S Little ⇒ Some ⇒ Lots</td>
<td></td>
</tr>
<tr>
<td>E Implicit ⇒ Explicit ⇒ Meta</td>
<td></td>
</tr>
<tr>
<td>✚ Passive &amp; minimal ⇒ Motivated attentive ⇒ Self-directed &amp; sustained engagement</td>
<td></td>
</tr>
</tbody>
</table>

Gail Gillon’s (2004) Intervention Recommendations

- Integrated with sound-letter instruction
- Phoneme level
- Skill mastery or integrated multiple skill approach
- Individual or small group for tx
- Program flexibility
- Following general language instruction

Vertical vs Horizontal Task Order

**Vertical:**

/\b/ /\b-a/ /\b-a-d/ /

- Single subskill or task focus
- Contrived, controlled tasks
- Ordered in difficulty
- Mastery of each task before the next
- Minimal instructor support during task

**Horizontal:**

/\b/ /\b-a/ /\b-a-d/ /

- Multiple subskill or task focus
- Purposeful, complex tasks
- Varied difficulty
- Varied performance across tasks
- Interactive scaffolding matched to need
Phonemic Aware Tx: What, How, When, To Whom, and How Much Nowadays

Thursday, March 27, 1:30-4:30pm

Teresa A. Ukrainetz, Ph.D.
University of Wyoming

Single Skill Vertical Tx Sequence

<table>
<thead>
<tr>
<th>Week</th>
<th>Skill</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rhyme</td>
<td>Bingo, odd-one-out</td>
</tr>
<tr>
<td>2</td>
<td>Initial phoneme</td>
<td>Bingo, matching, odd-one-out</td>
</tr>
<tr>
<td>3</td>
<td>Final phoneme</td>
<td>Bingo, matching, odd-one-out</td>
</tr>
<tr>
<td>4 &amp; 5</td>
<td>Phoneme blending</td>
<td>Drawing, singing, bingo; mainly 2-3 phoneme words; 4-phoneme and consonant clusters to extend students</td>
</tr>
<tr>
<td>6 &amp; 7</td>
<td>Phoneme segmenting</td>
<td>Drawing, singing, bingo; mainly 2-3 phoneme words; 4-phoneme and consonant clusters to extend students</td>
</tr>
<tr>
<td>8 &amp; 9</td>
<td>Phoneme manipulation</td>
<td>Letter cards and white board for manipulating letters and sounds in words to create new words</td>
</tr>
<tr>
<td>10</td>
<td>Review</td>
<td>Reviewed prior 9 wks with focus on phoneme segmenting and blending</td>
</tr>
</tbody>
</table>

Multiple Skill Horizontal Tx Cycle

<table>
<thead>
<tr>
<th>Session</th>
<th>Activities</th>
<th>Skills/Tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>a. Open Skill Qn</td>
<td>a. What and why from one child</td>
</tr>
<tr>
<td></td>
<td>b. Naming</td>
<td>b. Naming has one primary skill task</td>
</tr>
<tr>
<td></td>
<td>c. Book</td>
<td>c. Book has four skill tasks</td>
</tr>
<tr>
<td></td>
<td>d. One Game</td>
<td>d. Game has one primary skill task</td>
</tr>
<tr>
<td></td>
<td>e. Close Skill Qn</td>
<td>d. Specific answer from each child</td>
</tr>
<tr>
<td>2</td>
<td>a. Open Skill Qn</td>
<td>See Session 1; Games each address different skill tasks</td>
</tr>
<tr>
<td></td>
<td>b. Naming</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c. 2-3 Games</td>
<td></td>
</tr>
<tr>
<td></td>
<td>d. Close Skill Qn</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>a. Open Skill Qn</td>
<td>See Session 1; Writing has four skill tasks</td>
</tr>
<tr>
<td></td>
<td>b. Naming</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c. Writing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>d. 1-2 Games</td>
<td></td>
</tr>
<tr>
<td></td>
<td>e. Close Skill Qn</td>
<td></td>
</tr>
</tbody>
</table>

Why I Like Horizontal

• Alternative to vertical
• Less advance planning
• Learned more like in daily life
• Taught like other language skills
• Allows child self-regulated learning
• Allows SLP to respond to need in the moment
• Allows variation in level within a group
• Links to use in books and message writing
• More interesting for everyone

Scaffolding Phoneme Isolation

<table>
<thead>
<tr>
<th>Level</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy</td>
<td>Isolate and exaggerate phoneme in isolation and in the word, point to mouth and tell children to look, say the correct response, elicit response from child.</td>
</tr>
<tr>
<td>Moderate</td>
<td>Isolate phoneme and exaggerate point to mouth and tell children to look, exaggerate phoneme in word (use two or more depending on need).</td>
</tr>
<tr>
<td>Light</td>
<td>Emphasize beginning phoneme in the word. What is the first sound in milk? /m/ /m/ /m/ /m/ /m/ milk? Watch my mouth, /m/ /m/ /m/ /m/ /m/ milk. The first sound is /m/. You say /m/.</td>
</tr>
<tr>
<td>None</td>
<td>Ask the question. What is the first sound in milk? /m/ /m/ /m/ /m/ /m/ milk? (point to mouth).</td>
</tr>
</tbody>
</table>

Arriving at Independence for Isolation

<table>
<thead>
<tr>
<th>Level</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light</td>
<td>Emphasize beginning phoneme in the word. What is the first sound in milk?</td>
</tr>
<tr>
<td>None</td>
<td>Ask the question. What is the first sound in milk? /m/ /m/ /m/ /m/ /m/ milk?</td>
</tr>
</tbody>
</table>
Phonemic Aware Tx: What, How, When, To Whom, and How Much Nowadays
Thursday, March 27, 1:30-4:30pm

Scaffolding Segmenting

<table>
<thead>
<tr>
<th>Heavy</th>
<th>Isolate and raise finger for each phoneme in the word. The child copies and counts. Confirm correct number, repeat segmented sounds.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate</td>
<td>Get mouth ready for first phoneme, but pause for children to say it, raise finger, then mouth sound but pause for the other phonemes. Have child tell how many phonemes.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Light</th>
<th>Get the mouth ready to say each phoneme. Raise finger for each phoneme. Say aloud only the middle sounds.</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>Ask the question.</td>
</tr>
</tbody>
</table>

Arriving at Independent Segmenting

| None          | Ask the question.                                                                                  |

Scaffolding Tips for Young Children

- Recognize partial and increasing correctness vs success
- Segmentation – Mouth and finger assists segmentation
- Blending – Closed choices with pictures/objects
- Present the correct model but accept approximations
  - Almost there – responding to partially correct performance
  - The old qn of telegraphic vs simple but correct language
- For preschoolers, aim is principle of phoneme segmentation and embedded isolation opps, not fully accurate segmentation
- Ks can learn simple segmentation

Getting a Preschooler Started – Initiating Speech Sound Awareness

- Isolated phoneme practice, but tied to word context
- Choral and individual, for a few minutes
- First sound in my name, Teresa, /t-t-t-t-t/ (point to my mouth) everyone say this together… vs /s/ vs /n/

How Much – The Teaching Episode & Tx Dosage

- To determine intensity, think about drug dosages
- Active treatment element in its minimal unit
  - Teaching episode = Initiation+Response+Evaluation
- A dosage framework (Warren, Yoder, & Fey, 2007)
  - Dose: 1 session
  - Form: Nature of activities in session
  - Strength: Number of episodes in 1 dose
  - Frequency: Number of doses per week
  - Duration: Number of weeks of does
  - Total intensity: Duration x Frequency x Strength

Beyond the Basic IRE Episode

- IRE plus
  - Clinician model without response
  - Peer response heard as model
  - Choral response belonging to whom?
- Multiple task episodes
  - Let’s see if sun and slow match. What is the first sound in sun? [match + isolate]
  - Let’s say the all the sounds in sun. You start, the first sound is-- [segment + isolate]
  - What am I holding in this bag? /P-i-ch/. Peach. Your turn. You say the sounds in the next word and I will guess. [blend + isolate]
Intensity Evidence to 2001

- Large number of controlled studies have obtained significant and large gains.
- Intensity has varied considerably:
  - Session lengths of 15 to 90 minutes
  - Frequencies of 1 to 5 times weekly
  - Durations of 4 to 32 weeks
  - Individual, group, and whole class arrangements
  - Learners from 4 to 8 years of a range of abilities
- No report of number of teaching episodes
- Rarely treatment fidelity or child attendance info

Ehri et al. (2001) Meta-Analysis

- Part of NRP (2000)
- Evidence for phonemic awareness treatment effects
- 52 studies with 96 treatment-control comparisons reviewed
  - Mixed pre-phonemic and phonemic
- Results:
  - Small group better than individual or whole class
  - Typical learners had larger gains than weaker learners
  - 1-2 tasks better than 3+ phonemic/pre-phonemic tasks
  - 5 to 18 hours best, with no difference in this span

Examples with Typically Developing Children

- **Maybe 6 months** if the full phonological spectrum, with whole K class 15-min daily instruction:
  - Brady et al. (1994), moderate gains on segmenting: $d = 0.57$
- **Maybe 7 weeks** if phoneme-level only and small K groups, 3-4x/ wk of 20-30 min instruction:
  - Ukrainetz et al. (2000): Sound talk embedded in rhyming books and shared writing activities; Segmenting: $d = 1.37$

Tx Intensity for Children with Language Impairment

- 7 controlled group studies at phoneme level (incl. rhyme) for 4-7 yr olds
- 4 included other speech/language objs
- Individual or small group, 3-20 hrs
- Best results for 12-20 hrs, large segmenting effect ($>d = 1$)

Does the Old Evidence Still Apply?

- Studies until recently contrasted phonological awareness tx to regular classroom instruction with
- BUT now...
  - One of the 5 pillars of reading (NRP, 2000)
  - Part of K-1 standardized reading dx (DIBELS)
  - Often taught in RTI and in classroom
  - Primarily at the phoneme level in K
- **So how much is enough for tx with classroom phonemic awareness instruction?**

A Study of Intensity

Ukrainetz, Ross, & Harm (2009)

- 41 5-6 year old kindergartners, including 22 English learners, with low letter and first sound knowledge on DIBELS
- 11 hours of phonemic awareness treatment:
  - Concentrated (CP, 3x/wk, Oct - Dec)
  - Dispersed (DP, 1x/wk, Oct to March)
  - Vocabulary control (CON, 1x/wk to March)
Programming Intensity

- ≥ 5 teaching episodes per task & child across 3-4 activities ≥ 20 episodes per session
- Number of teaching episodes roughly controlled in 3 ways:
  1. Maximum of 30 minutes for all sessions
  2. Consistent number and array of activities
  3. Minimum number of teaching opportunities per session

Results for Phonemic Awareness Intensity Tx Study

- Over a school yr, for SLP tx and classrm instruction
- English learners = native English speakers
- Short intense tx = long weekly tx
- Ks with moderate deficits benefit more than those with mild deficits
- At-risk Ks improve a lot with only classroom instruction and incidental self-regulatory gains from tx for another area

Recommendations for Phonemic Awareness Intensity

- Total intensity
  - 5-18 hours for typical ch
  - 12-20 hours for ch w/ lang imp
- Most of this in the regular classroom
- Additional tx?
  - 8 sessions of 20 episodes per child?
  - 5 episodes per child in tx sessions on other goals over 24 sessions?
  - An additional boost for our kids, but not a lot

Saying the Words – The Production Part of Phonological Processing

- Not a significant part of phonological processing deficits
  - For ch with sig speech sound disorders, 1/3 show comprehension deficits and 3/4 production deficits (Shriberg & Kwiatkowski, 1994)
  - BUT low co-morbidity (~2%) for Ks ided with language impairment (Shriberg et al., 1999)
- If only phonological disorder, not a significant predictor of later reading problems
  - BUT LI and RD show mild difficulties with multisyllabic pronunciation (Goffman, 2004; Munson et al., 2005)
  - And oral & limb motor coordination (Zelaznik & Goffman, 2010)

What About the Rest of the Story of Phonological Processing Tx?

Deficits underlying most reading disabilities (aka dyslexia)
1. Phonemic awareness
2. Phonological working memory
3. Phonological code retrieval (wordfinding)
What about #4, Phonological Production?

Phonological Processing Tx Need

- Word-reading problems
- Persistent trouble on phonemic awareness compared to peers
- Low on auditory memory and rapid automatized naming (CTOPP)
- Spelling may show conventional spelling but lost in multisyllabic words
decious delicious
camatily calamity
- Watch the student spell: Spelling process shows forgetting and repeated tries even if answer correct
**A Fancy Task Program**

Lindamood Phoneme Sequencing Program (LiPS, Lindamood & Lindamood, 1998):
- Structured hierarchical procedure with step-by-step tasks and prompts
- Blocks and letter-blocks represent phonemes in nonsense & real words
- Initiated with articulatory phonetics instruction on distinctive features (stop, fricative, alveolar)
- Invented vocabulary to describe articulators (tip tapper, lip popper, skinny air)
- Often extended time of 1+ years
- Phonemic awareness, letter-sound correspondence, auditory memory, word retrieval, conventional spelling

**But Maybe It is Intense Quality Tx More than LiPS?**

- **Reading**: LiPS & Embedded Phonics for 10-12yr SLD: **indiv 100 min/day for 8 wks** --> For both txs, rdg accuracy & compreh average range, rate improved, 40% no longer SPED (Torgesen et al., 2001)
- **Language**: Computerized or SLP tx for 6-9yr SLI: **indiv 100 min/day for 8 wks** --> For all txs, big changes in standardized language measures incl phonemic awareness & auditory temporal proc (Gillam et al., 2008)

**Phonological Memory Intervention**

- Advanced phonemic awareness segmentation, substitution, and deletion “work-outs”
- As a way in to less-accessible components of phonological processing?
  - With or without color-coded tiles and letters
  - Require sustained attention, memory, retrieval and problem-solving
- What about Pig Latin?
- Memory and rapid naming drills?
- Specialized computer training software?

**Emerging Positive Evidence**

Maridaki-Kassotaki (2002)
- Randomly assigned 120 6-9 yr Greek ch to tx & no-tx control
- Tx: Non-word repetition exercises for 15-min, 4 days/wk, 7 mos
- Results: Significantly better non-word rep and reading

Garcia-Madruga et al. (2013)
- Randomly assigned 31 Spanish 8-9yr to tx & control
- Tx: Drills on attnal focus, attn switching, using prior knowledge, semantic updating in working memory, & inhibition
- Results: Sig better IQ scores, reading compreh, and working memory

**CogMed Dual n-back Training**

- **n-back** task: Listen to or look at stream of letters or numbers and decide if item matches one that occurred a designated number of items earlier
  - 2-back: 1-4-5-7-2-7-2-3-6-8-6
  - Dual version, participants look at and listen to different sequences simultaneously
- Tx involves moving incrementally from 1-back to 2-back and so on
- Claims to improve memory and intelligence
- See www.soakyourhead.com

**Promising But…**

- Controlled studies have obtained improvements in attention, working memory, and reading (Gillam & Gillam, 2010; Holmes et al., 2009, 2010)
  - BUT with no-tx comparisons, not known what tx features responsible (e.g., greater monitoring and encouragement)
  - Or whether outcome measures respond equally well to other language txs that demand mental rehearsal and manipulation
  - Or whether changes maintain and generalize to academics
  - Or what is changing (Holmes et al., with 8-11 yr olds)
    - Changes in capacity or control of attention & strategy use?
    - Majority of ch reported concentrating harder to improve perf
    - Strategies incl. closing eyes, rehearsing items, and tracing visual patterns with eyes
Phonemic Aware Tx: What, How, When, To Whom, and How Much Nowadays
Thursday, March 27, 1:30-4:30pm

Phonological Retrieval Txs

1. Improving word depth and elaboration in traditional semantics treatment
2. Using phonological and semantic cues to aid word retrieval
3. Teaching children how to cue and organize themselves
4. Rapid naming drills for letters, digits, objects

Phonological Code Retrieval

• Accurately and quickly accessing the phonological code representing the meanings of known words
  – AKA word retrieval, word-finding, rapid naming
  – In spoken language expression and in fluent reading
• Rapid naming has a central phonological retrieval component, but also taps attentional, perceptual, memory, lexical, and articulatory elements
• Combo of difficulties in phonological awareness and phonological code retrieval (rapid naming) a “double deficit” source of severe reading difficulties (Wolf & Bowers, 1999)

Effects of Tx on Retrieval

• Improves accuracy and latency of word retrieval in confrontation naming tasks (McGregor & Leonard, 1995)
  – BUT little generalization to untrained words (e.g., Bragard et al., 2012)
  – And none to communicative and reading tasks
• Rapid letter naming txs show immediate increase in letter naming speed and reading fluency
  – BUT improvements are temporary or require additional orthographic training (Kirby et al., 2010)
• Rapid naming performance can improve somewhat as a result of reading intervention (Torgesen et al., 2010)

Phonemic Awareness References
