

### The 'Big Picture' on Intervention Decisions for Children with Speech Sound Disorders

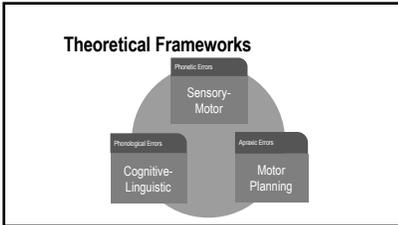
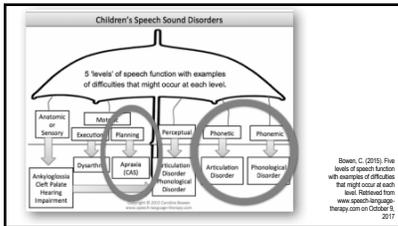


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### Significance of our Work

- SSDs are very common!
  - 32% of all communication disorders
  - 15-16% of preschoolers
  - 6% of children 14-17th grade
  - Over 90% of preschool and school-based SLPs work with children who have SSDs
- 50-70% have academic difficulties through H.S.
- More likely to be bullied, have poorer peer relationships, and like school less
- % of elementary teachers perceive as having less academic potential

Arthur et al., 2011; ASHA, 2011; 2010; Stok, 2010; Campbell et al., 2010; Fehreback, Steen, & McMan, 1994; Ocker, 1998; Jastak & Ciel, 2000; Liu et al., 2000; McCormick et al., 2011; Pennington & Bishop, 2009; Overby et al., 2007; Overby et al., 2012; Stok, 1995; Shriberg et al., 2005; Shriberg et al., 1999; Shriberg et al., 2005; Van Dyke & Nalla, 2005



### Phonetic Errors

8-year-old female - /r/ productions under two reading conditions - connected speech & single words with /r/ in variety of word positions (e.g., prevocalic, blends, intervocalic, postvocalic)

**Video Example**

"There were ten bears in the bed, and the little one said, 'Roll over!' 'Roll over!' So they all rolled over and one fell out. There were nine in the bed, and the little one said, 'Roll over!' 'Roll over!' So they all rolled over and one fell out."

**Video Example**

red, rabbit, deer, ears, gears (grins), tears, cereal (cereal), fire, bear, sis, son (son), bird (burned), air, treasure, sister, baker, Earth, purple, flower, friends, toylike, grapes, core, bride (bird), fires (flies), father, crown, oak, car, bank, artist, horse (house), storm, com

### Traditional Motor-based Approach

**Features**

- Logical tx continuum
- Error sound treated individually, one after the other (vertical attack strategy)
- Practice yields success
- Adaptable
- Works for clients of all ages

**Limitations**

- General guidelines, but no details
- Not efficient when sound classes are affected



(Van Riper, 1978; Van Riper & Erickson, 1986; Bernthal et al., 2013)

### Traditional Motor-based Approach (cont.)

<p><b>Principles of Motor LEARNING</b></p> <ol style="list-style-type: none"> <li>Be motivated to learn and understand why a strategy is useful.</li> <li>Have an adequate understanding of how to perform the movements.</li> <li>Be able to make a correct movement at some level.</li> <li>Specify a goal for performance rather than 'do the best you can'.</li> <li>Be challenging. Learning is hindered if task is too easy or too hard.</li> </ol>	<p><b>Principles of Motor PRACTICE</b></p> <ol style="list-style-type: none"> <li>Practice Amount</li> <li>Practice Distribution</li> <li>Randomize Strategy Practice</li> <li>Monitoring</li> <li>Vary Linguistic Complexity</li> <li>Feedback</li> </ol> 
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### Big Picture on Traditional Motor-based Approach: Withstood test of time for phonetic errors because it affects change.

### Phonological Errors

6-year-old male - GFTA-2 administration

Note presence of multiple phonological process/pattern errors

- Systematic
- Multiple sound classes
- Syllable structure
- Typically significantly affects intelligibility

**Video Example**



### Cycles Approach

- Cyclical approach to address target sound classes
- Designed for unintelligible speakers
- Targets patterns not present in child's speech
- Lots of clinical support, but limited evidence-base



(Pobson, 1997; Hudson & Paden, 1993, 1991; Hazark & Wendt, 2010)

### Minimal Opposition

- Use with students who:
  - Have multiple substitution errors
  - Are unintelligible to teacher
  - Have older SSD's
- Use pairs of words that differ by 1 production feature
  - Steps for intervention
    1. Vocabulary identification
    2. Discrimination training
    3. Production training
    4. Carryover training
- Research support (Baker, 2010; Bache, Parsons, & Humphreys, 1991; Dodd et al., 2008; Wilmar, 1991)



Word	Phoneme	Production	Meaning
bat	/b/	bat	bat
pat	/p/	pat	pat
cat	/k/	cat	cat
bat	/t/	bat	bat
pat	/p/	pat	pat
cat	/k/	cat	cat

### Maximal Oppositions

- Use with clients that:
  - Have at least 8 sounds missing from inventory
  - Have moderate to severe SSD's
- Use pairs of words that differ by all 3 production features
- Phases in intervention
  1. Initiation
  2. Spontaneous
- Research support (Cech, 1999, 1992, 2001, 2007)

Word	Phoneme	Production	Meaning
bat	/b/	bat	bat
pat	/p/	pat	pat
cat	/k/	cat	cat
bat	/t/	bat	bat
pat	/p/	pat	pat
cat	/k/	cat	cat

### Multiple Oppositions

- Use with clients that:
  - Collapse multiple phonemes to one sound
  - Have severe SSD's
- Select sounds that differ by at least 2 features AND significantly affect intelligibility
- Phases of intervention
  1. Initiation
  2. Spontaneous production of trained words
  3. Spontaneous production of untrained words
  4. Conversation
- Research support (Pigman, 2000; Williams, 2000; Vitami, 2010)



### Contrast Therapy Comparisons

Approach	Comparison	Research	Benefits	Drawbacks
Minimal Pairs	bat/pat	Strong	Clear contrast	Simple
Maximal Pairs	bat/pat	Strong	Clear contrast	Simple
Multiple Oppositions	bat/pat	Strong	Clear contrast	Simple

Baker, C. (2010). Comparison of four minimal pair approaches. Retrieved from www.speech-language-therapy.com on October 9, 2017

Approach	Comparison	Research	Benefits	Drawbacks
Minimal Pairs	bat/pat	Strong	Clear contrast	Simple
Maximal Pairs	bat/pat	Strong	Clear contrast	Simple
Multiple Oppositions	bat/pat	Strong	Clear contrast	Simple

Sound Contrasts in Phonology (Lear's Manual, 2008)

**Big Picture on Treatment Approaches for Phonological Errors: Contrast therapies have research support, but more data needed regarding clinical effectiveness and everyday utilization.**

### Apraxic Errors

4,7-year-old male - GFTA-2 and multisyllabic word production

Note difficulty with motor planning

- Vowel distortions
- Difficulty achieving articulatory configurations
- Prosodic errors
- Distorted substitutions
- Syllable segregation
- Slow rate
- Voicing errors
- Increased difficulty with multisyllabic words



### Apraxia Defined

A neurological childhood speech sound disorder in which the precision and consistency of movements underlying speech are impaired in the absence of neuromuscular deficits

A deficit of motor planning - initiating, sequencing, coordinating, executing

(ASHA, 2007)

### ASHA CAS Features

- Motor programming/planning disorder
- Inconsistent errors
- Lengthened and disrupted articulation
- Inappropriate prosody

(ASHA, 2007)

### CAS Features

- Vowel Distortions
- Difficulty achieving initial articulatory configuration
- Stress errors
- Distorted substitutions
- Syllable segregation
- Intrusive schwa
- Voicing errors
- Slow rate
- Multisyllabic word difficulty
- Disordered resonance

(adapted from Shriberg, Pitzer, & Strand, 2011)

## Apraxia Treatment Goals

- Increased consistency
- Increased accuracy
- Phonemic inventory expansion
- Naturalness of speech

Motor learning vs. motor performance

## Apraxia Treatment Principles

Focus on principles of Motor Learning

- Number of trials (few vs many)
- Practice schedules (random vs blocked)
- Stimuli variability (constant vs variable practice)
- Stimuli complexity (simple vs complex)

Feedback type (knowledge of performance vs. knowledge of results)

- Feedback frequency (high vs low)
- Feedback timing (immediate vs delayed)

(Mass & Farnella, 2012; Farnella & Mass, 2012)

## Specific approaches for CAS

Incorporate principles of motor learning:

- Integral Stimulation/Dynamic Temporal and Tactile Cueing

(Steed et al., 2006)

- Rapid Syllable Transition Treatment (ReST)

(Salzer et al., 2010)

- For severe cases, the focus may take a Core Vocabulary approach
  - Principles of motor learning still apply

Big Picture on CAS Treatment: CAS is a motor planning/programming disorder and SLPs should incorporate principles of motor learning when planning treatment

## A Note on NS-OME

- Don't use – little to no theoretical or research support for this population!

- Lof, 2009
- Lof, 2007
- Lof & Watson, 2006

- Want to improve speech → need to work on speech

(not on things that LOOK like they are working on speech)



## Target Selection Considerations

Process Selection

- Interfere the most with intelligibility
- Result in early success
- Have the most negative impact
- Occur early in development
- Impact on the greatest number of segments
- Syllable structure processes

Sound Selection

- Stimulable phonemes?
- High frequency of occurrence
- High value to the child
- Those that are acquired early...or those that are acquired later? (Complexity theory)

## Selected References

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## Online Resources

- [Asha.org/Practice-Portal/Clinical-Topics/Articulation-and-Phonology/](http://asha.org/Practice-Portal/Clinical-Topics/Articulation-and-Phonology/)
- [Asha.org/Practice-Portal/Clinical-Topics/Childhood-Apraxia-of-Speech/](http://asha.org/Practice-Portal/Clinical-Topics/Childhood-Apraxia-of-Speech/)
- Mayo Clinic CAS informational videos: [https://www.youtube.com/watch?v=x15n1\\_McOy](https://www.youtube.com/watch?v=x15n1_McOy)
- [Speech.com](http://Speech.com)
- [Speechable.com](http://Speechable.com)
- [speech-language-therapy.com](http://speech-language-therapy.com)
- [Speechtx.com](http://Speechtx.com)

