An Update on Some Clinical Practices for Speech Sound Disorders

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Introduction

Incidence and Prevalence
- Among the most prevalent communication disability in preschoolers and school age children
- Affects approximately 10% of this population
- For 80% of these children, the disorder is sufficiently severe to require treatment.

Prevalence of speech delay in 4 to 5-year old children from Australia (McLeod & Harrison, 2009)
- 4,983 children in Australia; Data were obtained in 2 ways:
  1. Questionnaires from parents
  2. Questionnaires from teachers
- 25.2% of parents indicated they had concerns about how their child “talks and makes speech sounds”
- 22.3% of teachers reported similar levels of concern

Prevalence of speech delay in 6-year old children and comorbidity with language impairment (Shriberg, Tomblin, & McSweeny, 1999)
- Speech delay was approximately 1.5 times more prevalent in boys (4.5%) than girls (3.1%)
- Cross-tabulations by sex, residential strata, and racial/cultural backgrounds yielded prevalence rates for speech delay ranging from 0% to approximately 9%
- Approximately 11–15% of children with persisting speech delay had SLI
- Approximately 5–8% of children with persisting SLI had speech delay
- More than half of the children diagnosed with speech sound problems will have later academic difficulties in language, reading, and spelling.

School SLPs Work with Speech-Sound Disorders (Mullen & Schooling, 2010)

<table>
<thead>
<tr>
<th></th>
<th>Percentage of Students</th>
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<tr>
<td></td>
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<td>Speech-sound production</td>
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<tr>
<td>Pragmatics</td>
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Effects on Daily Life
- Long term consequences
- Difficulty processing linguistic information
- Fewer years of formal education
- Hold jobs as unskilled laborers
- Difficulties in reading/writing
- May have children with speech sound problems

**Effects on Daily Life**
Canadian 25 year follow up on children with and without speech-language impairments (Johnson, Beitchman, Brownlie, 2010)
- Academic achievement in reading and math were similar for speech only and control groups (but not for language impaired children).
- Both speech group and control group had 92% completion rate for high school graduation (76% for language impaired).
- 32% of speech group and 27% of control group had completed an UG degree (but only 3% for language impaired group).
- Different results from prior data, probably because other studies combined speech/language problems.
- Comorbid language problems are a key predictor of language and academic problems in children with speech sound disorders.

**Societal Attitudes** (Silverman & Paulus, 1989)
Children with minor /w/ for /r/ substitution are considered to be: ● Less talkative ● Dysfluent ● Unpleasant to listen to ● Soft ● Boring ● Nervous ● More tense ● Afraid ● Isolated ● Uncomfortable ● Less confident ● Dull

**Societal Attitudes** (Anderson & Antonak, 1992)
Social acceptance of an actor with mild speech-sound impairment was less positive than the same actor demonstrating a physical disability.

**Societal Attitudes** (Felsenfel & Broen, 1992)
People with speech impairment were found to be less extroverted and socialized with fewer people than people with typical speech productions.

**Societal Attitudes: Ontario Association for Families of Children with Communication Disorders** (http://www.oafccd.com/factshee/fact74.htm)
*Communicative competency is strongly linked to social acceptability and popularity in preschool and school-age children.*

**Societal Attitudes** (Overby, Carrell, & Bernthal, 2007).
Examined 2
th grade teachers’ perception of the academic, social, and behavioral competence of students with moderate speech sound disorders. Compared to children with no speech sound disorders: ● Will have social difficulty ● Peers will make fun ● Possible behavior problems ● Shy because of speech ● Seems young ● Hard to understand ● School extremely hard ● Reading affected ● Spelling delay ● Writing a challenge ● Felt sorry for child

**Genetic Bases of Speech Sound Disorders** (Lewis, Shriberg et al., 2006).
- Speech sound disorders are complex disorders.
- The search for genetic influences is challenging.
- There will be much to learn from studies on the genetic basis of SSD and Childhood Apraxia of Speech (CAS). This could get interesting!

**Terms: A History Lesson of Terms**
- Before 1920s: Lalling
- 1920-1970: Articulation
- 1970-1980: Articulation/Phonology
• 1980-2000: Phonology
• Current Term: Speech Sound Disorders

Terms
• **Articulation/phonetic disability:** Movement of the articulators; faulty movement of the articulators
• **Phonemic/phonological Disability:** Concerned with the underlying system that accounts for the specific output problem; the systematic patterns of sound changes

A Model of “Input” and “Output”

**Mental Dictionary**
Stored form for understanding/producing words. Each word has its own “entry”

**Linguistic Perception**
Identifying the words in “Input” message

**Linguistic Encoding**
Choosing the words and sounds for “Output” message

**Phonetic Decoding**
Discriminating the speech sounds in “Input” message

**Motor Planning**
Planning oral movements to produce desired words

**Auditory Sensitivity**
Sounds received by auditory system

**Articulation**
The sounds are actually produced

**Feedback**
Speaker hears speech; feels articulators move

**“Input”**
Message transmitted by another speaker

**“Output”**
Message is produced

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**Questioning the Use of Developmental Norms**

Some Practical Questions about Developmental Norms
• Do you use speech-sound norms in your clinical work?
• Why do you use them?
• Which ones do you use?
• Do we know when speech sounds are learned?
• Can we use norms to determine if a child is eligible for therapy?
• Can we use norms to choose targets for therapy?

Assumptions about Developmental Norms
• Universal order: Rigid regularity; Unfolding of the system; Orderly development
• Developmental prerequisites: Specific order; Implication rules
• Methodological issues involved in gathering norms
Frequently Used Speech Sound Norms
- The Classics: Sander (1972); Prather, Hedrick, & Kern (1975); Templin (1957)

More Recent Norms
- Smit et al. (1990); Goldman-Fristoe Test of Articulation (2000)

More about the Sander Norms
- Left hand beginning of the bar = Customary Production (50%)
- Right hand end of the bar = Mastery Production (90%)
- This is NOT a developmental progression!!

A “Sequence” of Development (Shriberg, 1993)
- Early 8: m, b, j, n, w, d, p, h
- Middle 8: t, η, k, g, f, v, t̪, d̪
- Late 8: ζ, θ, s, z, ð, l, r, ʒ

Norms for Treatment Eligibility
- Problem 1: Which set of norms can you believe?
- Problem 2: Holding children with disorders to HIGHER standards

Norms for Target Selection
- Issue 1: Universal Order? Data from other languages. Do children with disorders follow “normal?”
- Issue 2: Developmental Prerequisites (Is mastery of earlier developing sounds necessary before production of later developing sounds?)
- Issue 3: Early vs. Late (Which sounds treated in therapy will produce the best long-term outcomes?)

Moving Beyond Phonological Processes

Some Practical Questions about Phonological Processes
- Do SLPs routinely use phonological processes?
- If so, why?
- Do SLPs use them for Dx and Tx?

Phonological Processes: Historical Origins
- Stampe’s Natural Phonology Theory
- Assumptions: Full perception hypothesis; Underlying representation assumption; Suppression instead of development
- Explanation vs. Description

Reasons NOT to Use Phonological Processes
- Philosophical reasons
  Not viable theory
- Clinical reasons
  If not for explanation, then what about for description? Do they adequately describe?
- Terminology reasons (processes vs. processing)
  Phonological PROCESSING: The ability to use phonological codes to encode, store and retrieve information. Phonemic and phonological awareness are tasks that depend on phonological processing abilities.
• Processes are NEGATIVE. They identify what the child is doing WRONG. Do not write negative goals. IEPs should not be written in the negative.

Start off with the process, then look for the pattern. Things to look for to help identify non-obvious patterns (Klein, 1996)
• Phonetic Context (e.g., stopping of fricatives which follow high vowels; stopping of fricatives in words with nasals)
• Position (e.g., stopping of final fricatives)
• Intra-Class Variability (e.g., stopping of fricatives except for /s/ and /z/; stopping of non-alveolar fricatives)
• Syllable Structure (e.g., stopping of fricatives in CVC words; stopping of fricatives in multi-syllabic words)
• Morphological Endings (e.g., deletion of unstressed morphemes)
• Syllable Stress (e.g., stopping of fricatives in unstressed syllables)
• Syllable Boundary (e.g., stopping of fricatives when the syllable boundary immediately precedes the fricative)
• Situational Context (e.g., stopping of fricatives when playing with younger sister)

Some Thoughts on Assessment

Procedures that should be accomplished…
• Articulation test (52% of SLPs use Goldman-Fristoe Test of Articulation)
• Continuous speech analysis (citing vs. talking)
• Hearing screening
• Stimulability assessment
  o Stimulable for a SOUND
  o Stimulability as a Dynamic Assessment
  o Teaching Stimulability:
    ▪ Enhancing stimulability to increase the phonetic inventory (Miccio & Elbert; 1996; Miccio, 2005), using a multi-sensory approach: Concept, Movement, Icon
    ▪ Use with young children with a very limited phonetic inventory.
    ▪ Pair consonant sounds with alliterative characters and motions.
    ▪ 7 Components of Treatment to Enhance Stimulability
      1. Determine Stimulability
      2. Directly Target Nonstimulable Sounds
      3. Make Targets the Focus of Joint Attention (more likely to produce a sound when they are attending to and interested in its corresponding referent. Speech sounds may be easier to learn when they are associated with interesting objects that have been verbally labeled for them.)
      4. Associate Speech Sounds with Hand/Body Motions (multi-modal input increases children’s ability to retain newly learned speech sounds. Hand motions serve as retrieval cues for remembering).
      5. Associate Speech Sounds with Alliterative Characters of Interest to the Child. (interesting characters increase interest in the activity and encourage full participation. Enhances the opportunity for a child to develop conscious awareness of the newly learned sound segments. For example:
6. Encourage Vocal Practice (do not use drill; instead, encourage vocal practice by including sound elicitation activities that involve turn-taking and requesting).

7. Ensure Early Success (teach stimulable and nonstimulable sounds concurrently so they can have success but also receive remediation for nonstimulable sounds).

- **Summary of Stimulability**
  - Production of a sound during stimulability testing attests, to some degree, to the child’s ability to perceive, to recognize as different, and to produce the sound in question.
  - If the child is not stimulable for a sound, then one might question the child’s: Motoric abilities, Perceptual abilities, Linguistic abilities, Attention (focus), Non-compliance.
  - If a child is stimulable for a sound, then that sound is likely to be added to the child’s phonetic inventory, even without direct treatment on that sound.
  - If a child is NOT stimulable for a sound, then the likelihood of short term gains is poor; normalization without therapy is much poorer than normalization for sounds that the child is stimulable for.
  - Training on stimulable sounds is likely to improve regardless of what is taught.
  - Sounds that are NOT stimulable are unlikely to change without direct treatment.
  - In therapy, we need to encourage exploratory sound productions and provide phonetic placement or other types of cues to effect stimulability skills.
  - Once stimulability has been achieved, generalization is more likely to occur.
  - To avoid frustration in training nonstimulable sounds, use less directive sound play activities (e.g., those suggested by Miccio & Elbert, 1996) to provide a nurturing and supportive therapy environment.

- **Perception/discrimination assessment**
  - Is it still relevant? What assessment tools should be used?
  - Locke (1980) Speech Production/Perception Test (SPPT)

- **Oral-peripheral screening**
  - Is it still relevant? Why? Why not?

- **Case history**—Some potential question to ask parents:
  - Describe your child’s current speech performance; How often can your child’s speech be understood by parents, siblings, playmates, other relatives, strangers?; How often does your child try to self-correct the speech errors?; How willing is your child to repeat words after you, to try to say them correctly?; How is your child’s speech in imitation compared to when s/he says the words by him/herself?; How would you describe your child’s willingness to repeat his/her idea if it is not understood?; How would you describe your child’s willingness to talk?; What is your estimation of severity of your child’s speech problem?; Did your child ever have ear infections or uninfected fluid in the ears?; Would you consider your child’s physical development as typical? Please comment.

- **What else?**
Intelligibility (see Ertmer, 2011)

- “Speech assessments that rely mainly on clinician impressions and word-based articulation tests appear to be inadequate for monitoring the development of intelligible connected speech.” “Recent research has shown that word-based articulation tests are not dependable estimates of connected speech intelligibility.”

- Words from the G-F Articulation Test had higher percentage of words identified than words in short sentences (86.7% vs. 54.5%).

- Articulation tests were poor predictors of connected speech intelligibility. “Children may correctly articulate a variety of consonants and vowels in single words but still not have readily intelligible connected speech.”

Intelligibility Assessment: Scaling Procedures

- Asking listeners to rate intelligibility along a continuum (10-point equal appearing interval scale or use descriptors: not at all, seldom, sometimes, most of the time, always).

- Disadvantages: Listeners have different internal criteria (pretty good for one may be not very good to another); Numerical numbers do not have clear meaning; Scaling is insensitive to the middle range of intelligibility (ratings may not well distinguish between 30% and 60% intelligibility).

- Modifications: Use clear descriptors instead of numbers: No words were understood; a few words were understood; approximately half of the words were understood; most of the words were understood; almost all of the words were understood.

Intelligibility Assessment: Item Identification Procedures

- Open set where listener writes down the words understood; Audio recordings of unfamiliar sentences, listeners write words understood, place an X for words not understood; Scored as a percentage of the number of times there was a match.

Intelligibility Assessment: Item Identification Procedures for preschool and early elementary (4 lists, 10 sentences each)

- Presentation: Clinicians says each sentence while using objects to act it out; Children watch and then imitate the sentence; Presented 2x for listener to write down all words; Percentage of words correctly written.

Intelligibility Assessment: Item Identification Procedures for children who can read

- Presentation: Clinicians shows the card and says the sentence; Card is turned over and child is asked to say the sentences; Presented 2x for listener to write down all words; Percentage of words correctly written.

Procedures that are “always used” in assessment (Skahan, Watson, & Lof, 2007)

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Case History</td>
<td>76%</td>
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<tr>
<td>Intelligibility</td>
<td>75%</td>
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<tr>
<td>Single Word Test</td>
<td>74%</td>
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<tr>
<td>Hearing Screening</td>
<td>71%</td>
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<tr>
<td>Stimulability</td>
<td>68%</td>
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<tr>
<td>Parent Interview</td>
<td>61%</td>
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<tr>
<td>Oral Motor-Non Speech</td>
<td>58%</td>
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<tr>
<td>Oral Motor-Speech</td>
<td>54%</td>
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<tr>
<td>Connected Speech Sample</td>
<td>36%</td>
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<tr>
<td>Phonological Inventory</td>
<td>36%</td>
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<tr>
<td>Classroom Observation</td>
<td>31%</td>
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<tr>
<td>Perception/Discrimination</td>
<td>13%</td>
</tr>
<tr>
<td>Phonological Awareness</td>
<td>13%</td>
</tr>
<tr>
<td>Contextual Testing</td>
<td>11%</td>
</tr>
<tr>
<td>Syllable/Word Shapes</td>
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Helpful Assessment Forms

- Place/Manner/Voicing forms
- Phonetic/Phonemic Inventory Forms
Phonetic Inventory: A listing of speech sounds that are produced regardless of the target (independent analysis)
Phonemic Inventory: A listing of the speech sounds produced in comparison to the target sound (relational analysis)

- Cluster Analysis

Some questions to ask about potential targets:
- How are word/syllable structures affected by error patterns?
  - Frequency of different syllable structures; Match between target & structure productions; Determine affected syllable structures
- Which sound classes are proportionally more affected by error patterns?
  - Fricatives? Stops? Liquids? Place/Manner/Voicing analysis is helpful
- Are there positional constraints?
  - Do the errors occur in all positions? Is it an inventory constraint or positional constraint?
- What sounds are present/absent in the phonetic inventory?
  - Use a phonetic inventory form; do you expand the inventory or do you make the inventory more useful?
- What is the stimulability status of the sounds in error?
  - Do you select stimulable or nonstimulable sounds?

10 Factors for Selecting Targets
(1) Age of Child/Age Appropriateness of Error(s): Use norms and other developmental information
(2) Effect on Intelligibility—Error type: Deletions → Substitutions → all others
(3) Effect on Intelligibility—Deviancy: Unusual, deviant, idiosyncratic
(4) Frequency of Sound Occurrence (Shriberg & Kent, 2003)

```
1. n 7. ø 13. p 19. η
2. t 8. k 14. v 20. θ
3. s 9. m 15. f 21. dʒ
4. r 10. w 16. h 22. й
5. l 11. z 17. g 23. tʃ
6. d 12. b 18. j 24. z
```
(5) Homonymy: The production of one phonetic form for several adult target forms (e.g., [bat] for bad, bark, bent, bite; [bi] for beach, beat, beak, bike)
(6) Markedness (a part of complexity models): The aspects that have more features are considered marked and more complex. Working on the most marked aspects can be more effective in therapy (e.g., fricatives are more marked than stops; affricates are more marked than fricatives; clusters are more marked than singletons; voiced is more marked than voiceless).
(7) Morphological Status: Evaluate the tense markers and language structures that mark agreement. Those complex final clusters should then be targeted (especially if client has speech AND language problems)

```
Present Progressive “ing”  barking
Regular Plural “-s”  dogs
Possessive “’s”  baby’s
Regular Past “-ed”  jumped
Regular Third Person “-s”  she eats
```
Contractable copula  He’s the baby
Contractable auxiliary  She’s going slow

(8) **Phonetic Inventory**: Determine completeness of the phonetic inventory, the repertoire of speech sounds produced independent of the adult model.

(9) **Relevance to Child**: Select sounds/patterns important to the client.

(10) **Stimulability**: Reasons to and not to select nonstimulable sounds.

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### Phonological Therapy Approaches

**Baker (2004); Baker and McLeod (2010)**

- Minimal Pairs
- Maximal Pairs
- Multiple Opposition
- Language-Based
- Metaphon/Metaphonology
- Cycles

#### Minimal Pairs (a.k.a.: Minimal Opposition Contrast Therapy)

- Use pairs of words that differ by one phoneme only
- Used to establish contrasts not present in the phonological system
- Usually words are selected with one word as the target, the other the replacement
- Child should be stimulable for correct sound
- An example: *bow/boat*
- Have child say both words in the pair
- Show a communicative confusion if both words are said the same
- Use objects that can be manipulated

#### Maximal Pairs (a.k.a.: Maximal Oppositions Therapy)

- Word pairs have multiple feature contrasts (maximal oppositions)
- Features can differ on place, manner, and voicing
- The oppositions contrasts only two sounds
- A sound the child correctly produces is compared to a maximally different one
- An example: *chop/mop*
  - Suppose a child produces /ʃ/ for /t/
  - Maximal Pairs: /t/ is contrasted with maximally opposed sound from /ʃ/ (perhaps /m/)
  - For example: me/she; Mack/shack, my/shy
- Follow the procedures for minimal pairs
- Who is best to use Maximal Pairs?
  - Best used for moderate/severe children
  - Meant to change the child’s entire phonological system
  - Research shows it promotes generalization

#### Multiple Oppositions

- Much like minimal pairs, but pairs all or most errors simultaneously
- Good approach if child substitutes a single sound for multiple sounds
- Child confronts the rule from multiple contrasts
- For example: /t/ for /s, k, ʃ, tr/
Metaphon

- Developed in the UK
- Specifically teaches the child to focus on languages phonological details
- Focuses on phonological awareness (a type of metalinguistic awareness)
- Two phases of therapy:
  - Phase 1: Developing phonological awareness
    - Purpose: To capture the child’s interest in sounds and the entire sound system.
    - Child remains a listener for all of Phase 1.
    - There are 4 levels to Phase 1: concept, sound, phoneme, word
      1. Level 1: Concept Level
         - Sharing the concepts and vocabulary through play.
         - Not sounds but instead their characteristics (e.g., long vs. short; front vs. back; noisy vs. whisper).
      2. Level 2: Sound Level
         - To show that all sounds can be classified according to the previously taught concepts.
         - E.g., use noisemakers, cars racing, people singing, rattles, etc.
      3. Level 3: Phoneme Level
         - All sounds from the error category are used.
         - Pair the speech sounds with the taught concepts (e.g., sssssss for long, t for short).
      4. Level 4: Word Level
         - Minimal pair words are used.
         - Child tells which of the pair is long/short, front/back, noisy/whispered.
  - Phase 2: Developing communicative awareness
    - Incorporate Phase 1 activities.
    - Clinician and child take turns producing minimal pairs.
    - Follows the minimal pair approach.

Metaphonological

- A subcategory of metalinguistics.
- Involves child’s conscious awareness of sounds within the language.
- Phonological awareness is the awareness of sound/phonological structure of spoken words in contrast to written words.
- Intervention to enhance early phoneme awareness and letter knowledge, combined with intervention to improve speech intelligibility, may ensure that children with speech impairment approach literacy instruction with age-appropriate phonological awareness development and will help with speech sound productions.
- This combined approach has shown to work for both speech sound training and for literacy development.
- Work on intelligibility, phoneme awareness, and letter-name/letter-sound knowledge.
  - Phoneme blending (adult says: b—a—I, child says “ball”).
  - Phoneme segmentation (adult says: “ball”, child says “b—a—I”).
Phoneme manipulation: Say “boat” without the “t”; What word would you make if you put “o” before “pen”?

Cycles Approach
- First developed by Hodson & Paden (1983).
- Patterns are trained successively (in cycles).
- No predetermined level of mastery for movement to next cycle.
- Several sounds in a pattern are worked on in each cycle.
- Primarily used for highly unintelligible children (remediates intelligibility).
- Modified Cycles Approach
  - A cycle is 3 weeks; 1 pattern per week
  - 2 training sounds per pattern
  - Emphasis is eliciting numerous correct productions in 5-10 carefully selected words.
  - See Schematic of the Modified Cycles Approach below.

Language-Based Intervention
- Many children with speech sound disorders also have difficulties with other aspects of language.
- There is an intricate web of inter-dependencies between various aspects of language.
- Some studies have shown that moderately severe children may improve in phonology and other language domains with a combined phonological/language approach.
- Children who are more severe may need focused attention directly on both domains.
- Tyler found that a “cycles” approach to language and phonological therapy is effective.
- Work on language for one cycle, phonology for the next cycle.
- Work on morphology can also help with phonology (plural, possessives, past tense, etc.)

Other Approaches:
- PACT (Parents & Children Together); Psycholinguistic (using reading methods); Nonlinear Phonology; Core Vocabulary

Principles of Phonological Therapy
- The treatment is based on a phonological assessment, and the aims are defined by the phonological assessment.
- Therapy is based on the principle that there are regularities in the child’s pronunciation patterns (i.e., “order in disorder”).
- Therapy is based on the principle that the primary function of phonological organization is communicative (i.e., differences in sounds and sequences signal meaning differences).
- Therapy aims to facilitate change in the child’s pronunciation patterns in order to build up a more adequate system of sound contrasts and sound structures.
- Therapy is designed to make maximally effective use of the organization of phonological patterning in the target system by introducing and establishing changes in the child’s patterns through use of natural classes of contrastive phones and structures.

General Comments and Suggestions for Therapy
- Remediating a pattern, not individual sounds
  - Successive approximation; Not trained to 90% criteria
Communication is the goal of training.
  o Successful communication is its own best reward; Misarticulation is miscommunication; Internal rewards, not external rewards

Use child-led interactive activities.
  o Play-like therapy; Meaningful linguistic contexts

Phonological acquisition is gradual.
Work on phonetic problems along with phonological ones.
Carefully select words and sounds for therapy.
Children generalize new skills to other targets.

### Schematic of Modified Cycles Approach

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<tr>
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<th>Week 1</th>
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<td>Target Sound 1</td>
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<td>Target Sound 2</td>
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<th>Week 2</th>
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<tbody>
<tr>
<td>Target Sound 1</td>
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<tr>
<td>Target Sound 2</td>
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<table>
<thead>
<tr>
<th>PATTERN 3</th>
<th>Week 3</th>
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<tbody>
<tr>
<td>Target Sound 1</td>
<td></td>
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<tr>
<td>Target Sound 2</td>
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| PROBE |

- A cycle is based on 3 weeks. Each week focuses on one pattern.
- Two training sounds are chosen for each pattern, thus each sound is the focus of one of the two therapy sessions in the week.
- Emphasis of each session is on eliciting numerous correct productions of the training sound in 5-10 carefully selected words.
- A different training sound is the focus of the next session unless the child achieves only 20% accuracy or less, in which case a second session is spent on that sound.
- After the week of two sessions with two different training sounds, the next pattern is worked on for the next week. This is repeated so that all three patterns are targeted.
- A probe is administered at the end of the cycle (about every three weeks).
- If probing indicates that the target sound is less than 50% correct, target sounds (or patterns) are re-cycled at the word level.
- If probing indicates that the target sound is greater than 50% correct, then the target sounds (or patterns) are targeted at the carrier phrase or sentence level of those sounds.

### References and Resources


Ontario Association for Families of Children with Communication Disorders http://www.oafcced.com/factsheet/fact74.htm


### Reference List of Helpful Books


