

### The Name Game

- The new “umbrella term”
  - Speech Sound Disorders
    - Articulation
    - Phonology
    - Phonological processes
    - Phonological processing



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### Prevalence of Speech Sound Disorders

- How many children have speech sound disorders?
  - 10-15% of preschoolers
  - ~6% of school-age children (grades 1-12)
    - » ASHA, 2000 in Williams, 2003



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### Why is it important to intervene early?

- EBP: 50-70% of children with SSDs have academic difficulties (Williams, 2003)
  - Stackhouse (1982) - difficulty with grapheme-phoneme connections
  - Dodd et al (1995) –delayed phonological awareness skills
- EBP: High correlation between SSDs and poor reading/writing; worse if speech disorder not resolved by 5:6 (Bishop & Adams, 1990)

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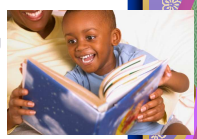
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### Why is it important to intervene early?

47% of preschoolers with isolated articulation difficulties and 63% of preschoolers with artic + language problems scored >1sd below the mean on reading test at end of 1<sup>st</sup> grade

Nathan, Stackhouse, Goulandris, & Snowling (2004) JSLHR



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### Delay vs Disorder in Preschoolers

Williams & Elbert (2002)

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| <p><b>Delay</b></p> <ul style="list-style-type: none"> <li>■ Larger inventories:             <ul style="list-style-type: none"> <li>■ 13-15 initial Cs</li> <li>■ 8-11 final Cs</li> </ul> </li> <li>■ Greater diversity             <ul style="list-style-type: none"> <li>■ 9.2 different syllable structures</li> </ul> </li> <li>■ Higher PCC (56%)</li> <li>■ Lower sound variability (1.2)</li> <li>■ Typical error patterns</li> <li>■ Steady progress</li> </ul> | <p><b>Disorder</b></p> <ul style="list-style-type: none"> <li>■ Smaller inventories:             <ul style="list-style-type: none"> <li>■ 6-9 initial Cs</li> <li>■ 1-5 final Cs</li> </ul> </li> <li>■ Limited diversity             <ul style="list-style-type: none"> <li>■ 7 different syllable structures</li> </ul> </li> <li>■ Lower PCC (34%)</li> <li>■ Greater sound variability (1.74)</li> <li>■ Atypical patterns</li> <li>■ Little to no change</li> </ul> |
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### Diagnosis

- Low—characteristics of phono disorder:
  - Restricted range and frequency of segments
  - Extremely limited fricatives, glides, and liquids
  - Absent clusters
  - Pervasive use of glottal stop substitution

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### Diagnosis

- Low—characteristics of phono disorder:
  - Vowels usually OK, but tendency to neutralize
  - Syllable structure tends toward CV or CVCV
  - Inclusion of sounds outside the language
  - HX of static system, plateau at early stage




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### John

Target		PCC	PWM
fork	[fɔk]	2/2	+
nose	[nouz]	2/2	+
glove	[gwʌv]	2/3	+
string	[stiŋ]	3/4	-
crayons	[kweɪɔnz]	3/4	-
ice cubes	[aɪ tʊbz]	2/4	-
thumb	[fʌm]	1/2	+
dog	[dɔg]	2/2	+
yellow	[jejo]	1/2	+
		PCC = 17/25 (72%)	PWM = 6/9 (66%)

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### Michelle

Target	M	PCC	PWM
fork	[bʌ]	0/2	-
nose	[tʊv]	0/2	-
glove	[bʌ]	0/3	-
string	[ti]	1/4	-
crayons	[te]	0/4	-
ice cubes	[aɪʔu]	0/4	-
thumb	[nʌm]	1/2	+
dog	[ɔ:]	0/2	-
yellow	[εo]	0/2	-
		PCC = 2/25 (8%)	PWM = 1/9 (11.1%)

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**Target Selection Factors**

■ Traditional approach:

- Select targets that are:
  - stimulable
  - early developing
  - easier to produce
  - frequently occurring
  - most likely to interfere with intelligibility

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**Target Selection Factors**

- Principle of nontraditional approach:
  - teaching more complex targets results in greater overall change in the child's phonological system
- Note:
  - traditional approach changes *sounds*
  - nontraditional changes the *system*

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**Target Selection Factors**

- **Non-traditional approach:**
  - **Target sounds that:**
    - Are non-stimulable
    - Are later-developing
    - Are phonetically more complex
    - Are linguistically marked
      - fricatives harder than stops
      - voiced harder than voiceless
      - affricates harder than fricatives
      - clusters harder than singletons

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**Target Selection Factors**

- **Systemic Approach:**
  - **Target functional sounds: consider role of sound for individual child**
  - **Target sounds based on distance metric:**
    - **Select targets that are maximally distinct from the child's error in terms of place, manner, voice, and linguistic unit.**

Williams, Division 1 Newsletter April 2003

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- For a child who needs system-wide change, which phoneme is the best contrast for /j/?
  - a. /f/
  - b. /l/
  - c. /m/
  - d. /w/

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### Target Selection Factors

- **Lexical Properties:**
  - Two aspects: Frequency and density
  - Frequency = how common the word is in a language
  - Neighborhood density = number of phonetically similar words based on one sound substitution, deletion, or addition. (e.g., "feet" is in the neighborhood with "fleet," "meet," and "eat")
    - High-density = has 10 or > "neighbors"
    - What are neighbors for "ball"?

Williams, Division 1 Newsletter April 2003

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### Neighborhood for ball

- fall, small, hall, tall, mall, doll, crawl, stall, call, wall, boss, bought, bog, balk, bomb, bop

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### Target Selection Factors

- **Lexical Properties:**
  - Target words with **high frequency** and/or **low density** to facilitate generalization
  - Good treatment targets based on high frequency and low density (i.e., <10 similar words)
    - drive (105, 9)
    - house (591, 7)
    - three (610, 9)
  - (high frequency =100 or >, low density = <10)
- <http://slpath.com> – word lists

Williams, Division 1 Newsletter April 2003

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### Target Selection Factors

- When child has significant phonotactic constraints (e.g., no final C, no clusters, no multisyllabic words, frequent reduplication or assimilation), need to work on the **frame** before addressing accuracy of segments.

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### Target Selection Factors

- Ingram's 3 major rules in choosing targets:
  - Eliminate instability
  - Eliminate homonyms
  - Establish feature contrasts

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### Target Selection Factors

- Bleile chooses error patterns that are:
  - Frequent (50-75%)
  - Present (25-49%)
- Does not start therapy with patterns that are:
  - Highly frequent (75-100%)
  - Disappearing (1-24%)

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### Target Selection Factors

- Low considers context, semantic potency, syllable shape, phonetic inventory
- Context**-target should be only error in word; require least articulatory adjustment
- Potency**—functional words for ADL
- Syllable shape**—introduce new sound in familiar syllable shape
- Phonetic inventory**—use to select sounds for *nontarget* part of stimulus words

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### My Advice



1. Focus on error patterns that have a major impact on intelligibility.
2. Choose target phonemes/structures that have an impact on error patterns and/or expand the system.
3. Consider personal/social factors (e.g., motivation, confidence, IQ).
4. Choose a goal attack strategy (vertical, horizontal, cyclical) based on error patterns.

(adapted from Tyler in Kamhi & Pollock, 2005)

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### John

Target		PCC	PWM
fork	[fɔk]	2/2	+
nose	[noʊz]	2/2	+
glove	[gʌv]	2/3	+
string	[striŋ]	3/4	-
crayons	[kweɪɔnz]	3/4	-
ice cubes	[aɪ tʊbz]	2/4	-
thumb	[fʌm]	1/2	+
dog	[dɔg]	2/2	+
yellow	[jeɪjə]	1/2	+

PCC = 17/25 (72%) PWM = 6/9(66%)

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**Michelle**

Target	M	PCC	PWM
fork	[bʌ]	0/2	-
nose	[tov]	0/2	-
glove	[bʌ]	0/3	-
string	[ti]	1/4	-
crayons	[te]	0/4	-
ice cubes	[aɪʔu]	0/4	-
thumb	[nʌm]	1/2	+
dog	[ɔ:]	0/2	-
yellow	[εo]	0/2	-

PCC = 2/25 (8%)    PWM = 1/9 (11.1%)

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**Goal Attack Strategies/Structures**

- Vertical (deep):** address one goal to specified criterion before proceeding to second goal
- Horizontal (broad):** address multiple goals in each session
- Cyclical:** several goals are cycled at regular intervals

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### Deep or Broad?



<ul style="list-style-type: none"><li>■ Training Deep<ul style="list-style-type: none"><li>■ Remediate just 1 or 2 sounds</li><li>■ Phonetic approach, using traditional artic treatment strategies</li><li>■ Lots of drill</li></ul></li></ul>	<ul style="list-style-type: none"><li>■ Training Broad<ul style="list-style-type: none"><li>■ Target a few exemplars for each pattern being addressed</li><li>■ Use cognitive-linguistic approach</li><li>■ Limited drill</li></ul></li></ul>
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### Why does it matter?



- Training deep with a child whose problem is phonological will take too long to remediate all the errors.
- Training broad with a child whose problem is primarily motoric will not allow for necessary intensive drill.

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### Sample Goals

- Elly will increase the % of intelligible words in conversational speech from 60% to 75%, based on a spontaneous speech sample of at least 50 unduplicated words.
- Elly will increase her Percentage of Consonants Correct (or PWM) from baseline of 52% to 70%, based on a spontaneous speech sample of at least 50 unduplicated words.

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### Sample Objectives

- Child will produce target CVC and VC words with a final consonant in x% of trials, regardless of consonant accuracy (imitated, elicited, spontaneous).
- Child will produce 8 out of 10 target two-syllable words with two syllables, regardless of consonant or vowel accuracy.
- Child will produce target two-consonant clusters with two consonants in 18 out of 20 words, regardless of consonant accuracy.

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### Sample Objectives

- Child will produce 8 of 10 two-consonant words ( CVC or CVCV) with consonants that differ in place and/or manner, regardless of consonant accuracy.
- Child will contrastively produce /s/ and /g/ in four out of five meaningful CV, VC, or CVC words, given a clinician model.

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### Treatment Approaches



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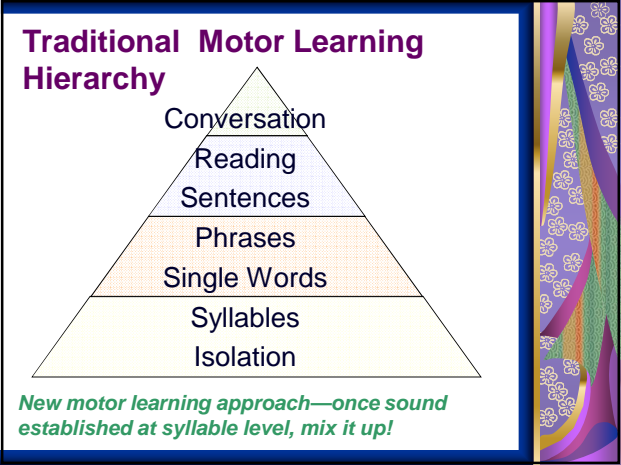
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- ### Motor Learning Approach
- **1. Pre-practice/placement**
    - Teach target sound in isolation and syllables until 80% accurate
  - **2. Practice** Randomized variable sequence of tasks
    - Student practices at different levels during each session
    - Context is not “fixed” at a particular level as in traditional treatment
  - **3. Generalization**

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- ### Motor Learning Techniques
- Imitation/modeling
  - Facilitating contexts
  - Phonetic placement
  - Successive approximation/shaping
  - Slow motion speech
  - Shadowing (echo speech)
  - Unison speech
  - Flooding

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### Practice Conditions

- **Random vs. Blocked Trials**
  - **Blocked:** many repetitions of same target—better performance within a session, but poorer generalization and retention
  - **Random:** targets presented in random order—leads to better generalization
  - **SO, use start with blocked practice and move to random trials**

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### Getting 200+ Responses!

- Use tally counters to challenge students for multiple productions ([www.tallycounterstore.com](http://www.tallycounterstore.com))
- Have students subvocalize (“voices turned off”) during other students’ turns to increase number of practice opportunities (may have to monitor initially)
- Add up group total and have contests across groups to see who produces the most

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### KR and KP

- **Knowledge of results**
  - Was the production right or wrong?
- **Knowledge of performance**
  - What should the child do to improve? (e.g., “open bigger”, “tighten up your tongue”)

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### Achieving Generalization

- Changing levels (words, sentences, conversation)
- Changing the order of target words
- Changing number of responses
- Changing stress, intonation, rate
- Talking while doing other things!




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### Contrast Therapy

- create new phonemic distinctions in language by teaching feature contrasts (e.g., place, manner, voice)
- “Make these two words sound different.”
- Tyler (2005) says child not ready for minimal pairs until he has ~ 40% accuracy for target in words produced after a model

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### 3 Versions of Minimal Pairs

- Target-substitute
  - Target and error sound
- Target-known sound
  - Target and another sound already in child’s repertoire
- Target-target (aka “empty set” approach)
  - Two new sounds introduced simultaneously

– Gierut, LSHSS, Oct. 2001

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### 3 Versions of Minimal Pairs

- All 3 result in generalization, but pairing 2 new sounds leads to greater change in the phonological system
- Supportive evidence from studies of syntax, semantics, even motor skill learning—practice of more difficult skills results in greater learning

– Gierut, LSHSS, Oct. 2001

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### Maximal Opposition Contrast Tx

- Uses minimal pairs, but target sounds are as different as possible
  - Target phoneme /s/
    - minimal opposition = sew, toe
    - maximal opposition = sun, gun
- Sound pairs are more salient, more learnable
- Best candidates = moderate to severe, missing 6 or > sounds from inventory

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**Chart of Feature Differences**

Sound	One Feature	Two Features	Three Features
m	n, ɱ, b, w	p, d, g, v, θ, z, dʒ, l, r, j	t, k, f, θ, s, ʃ, tʃ, h
l	d, z, n, r	b, t, g, v, θ, s, dʒ, m, ɱ, j, w	p, k, f, θ, ʃ, tʃ, h
p	b, t, k	d, g, f, θ, s, S, tʃ, m, w, h	v, θ, z, dʒ, n, ɱ, l, r, j
j	w	b, d, g, v, θ, z, dʒ, m, n, ɱ, l, r, h	p, t, k, f, θ, s, ʃ, tʃ

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**Maximal Opposition Contrast Tx**

- **Example:**  
 Child has /w, j/, nasals, /p, b, t, d, h, f, v/  
 Does not have /r, l, k, g, s, z, ʃ, ʒ, tʃ, dʒ, θ, ð /
- **What phonemes would you target?**

Gierut et al LSHSS July 1996

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- **Child has /w, j/, nasals, /p, b, t, d, h, f, v/  
 Does not have /r, l, k, g, s, z, z, ʃ, ʒ, tʃ, dʒ, θ, ð /**
- **What would each choice teach?**
- /r/ or /l/ - liquid
- /k/ or /g/ - velar
- /s, z, z, ʃ, ʒ, tʃ, dʒ / - strident

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**Multiple Oppositions Tx**

- **Addresses homonymy by using larger treatment sets (e.g, minimal trios instead of pairs)**
- **Used for children with extensive phoneme collapse (usually severe disorder)**

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### Multiple Oppositions Tx

- Example: child collapses all voiceless nonlabial obstruents and clusters to /t/ in word-initial  
So, *Kip, chip, ship, trip, skip, clip, sip* are all produced as *tip*.
- Tx might target /k/, /s/, /tʃ/, /tr/
- Example targets: too, Sue, chew, true

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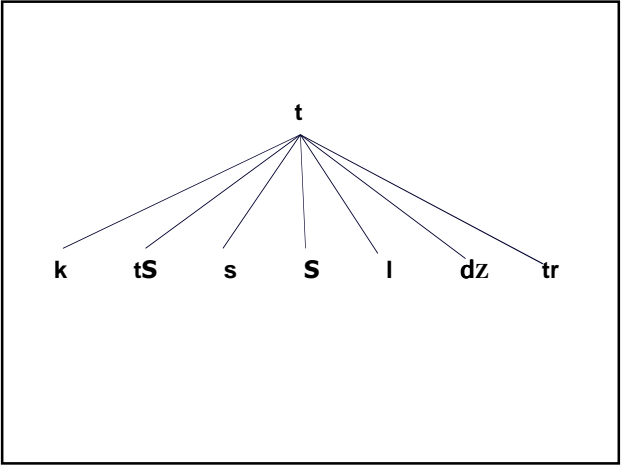
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### Minimal Trios

- pill sill spill
- pin sin spin
- lamb Sam slam
- core sore score
- clap class clasp
- lap sap slap

Peter Flipsen

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### Phonotactic Therapy - FCD

Most Cs are first mastered in onset; but velars, fricatives, and voiceless stops are acquired first in coda.

- Normally produce codas following short vowels rather than long vowels.
- So what are some ideal target words for teaching final consonants?
  - Kick, hat, house, half, bus, pot

(Velleman, Seminars in Speech and Language, 2002)

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### Phonotactic Therapy - Syllableness

**Treatment Ideas:**

- Target syllable repetition in:
  - movement activities (e.g., up, up, up)
  - daily routines (e.g., bowl, bowl, bowl)
  - reading counting books (e.g., repeat name of object repeatedly instead of counting occurrences “ball, ball, ball”)
- Target words with reduplicated structure (e.g., boo-boo, mama, pee-pee).

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### Phonotactic Therapy - Stress

- Weak syllables are most likely to be omitted in the word initial position (i.e., iambic stress pattern: giRAFFE), but not when in the final word position (e.g., trochaic: lion).
  - Target longer words with a trochaic (S-w) pattern.
  - Target iambic (w-S) words in phrases with a stressed word directly preceding the target word (e.g., BIG giRAFFE).

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### Trochaic Sequences

- Wonder Woman  
teeter totter  
itty bitty  
alligator  
magic pudding  
humpty dumpty  
make it better  
see you later  
get the paper  
Cinderella  
fasten seatbelts



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### Cycles Approach

- No predetermined level of mastery; therapy intended to stimulate *emergence* of a specific sound or pattern, not *mastery*
- Several sounds are targeted within one cycle (at least 2 exemplars for each pattern)
- Target population: highly unintelligible children, age 3 or older
- Emphasis on listening (“auditory bombardment”)



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### Cycles Approach

- A cycle = number of weeks needed to target every pattern for about 60 minutes, which usually ranges from 5-15 weeks
- Typical program requires 3 to 5 cycles, or about 30-40 hours of therapy
- Uses real words for objects and actions, not nonsense words; preferably monosyllabic with facilitating contexts



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**Cycles Approach**

- Typical Cycle 1: syllableness, word-initial singleton consonants (labials), word-final voiceless stops, anterior/posterior contrasts, /s/ clusters, liquids
- Recycle primary patterns until:
  - Velars/alveolars are used contrastively
  - /s/ clusters are emerging
  - Liquids are emerging
  - Initial and final consonants are used

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**Cycles Approach**

- Session sequence for child with severe disorder – Cycle 1
  1. syllableness – 2-syllable compound words
  2. syllableness -2/3 syllable compound words
  3. prevocalic singletons - /m/
  4. prevocalic singletons - /b/
  5. prevocalic singletons - /w/
  6. postvocalic singletons - /p/
  7. postvocalic singletons /k/

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**Cycles Approach**

- 8. back consonants - /h/
- 9. back consonants - /k/
- 10. consonant clusters – initial /sm/
- 11. consonant clusters – initial /sn/
- 12. consonant clusters – final /ts/
- 13. consonant clusters – final /ps/
- 14. liquids – initial /l/
- 15. liquids - /r/

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**Cycles Approach**

- Possible secondary target patterns:
  - Voicing contrasts in prevocalic
  - Palatal glide /j/
  - Palatal sibilant /ʃ/
  - /r/
  - Singleton stridents /f/ and /s/
- Now begin using minimal pairs
- Recycle until target emerges (<40% error)

Hodson, AJSLP, August 2002

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**Cycles Approach**

- Potential advanced target patterns
  - For upper-elementary grade level children with intelligibility problems
    - Complex consonant sequences (e.g, extra, square, astronaut)
    - Combinations of nasals (e.g., unanimous)
    - Multisyllabicity

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**Typical Cycles Session**

- Review last session's words
- Listen to 15-20 words with target pattern, using amplification
- Produce 5-6 carefully selected words, using cues/prompts as needed; goal is near 100% accuracy so they don't practice error
- Metaphonological activity (e.g., rhyming)
- Probe for next session's target
- Repeat listening activity
- Home practice (2 minutes per day)

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**Language-Based Approach**

■ **Basic assumptions:**

- 1. SLI and speech sound disorder co-occur in 35-60% of cases.
- 2. Intervention focusing on clarifying communication can affect phonology and other aspects of language simultaneously.
- 3. Whole-to-part learning and top-down processing: changes in higher linguistic levels may cause changes in lower levels (i.e., phonology).

■ Tyler, Seminars in Speech & Language, 2002




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**Language-Based Approach: Example Strategies**

- 1. Scaffolding narratives – enhances whole-to-part learning through storytelling at increasingly higher levels of discourse structure and semantic complexity.
- 2. Focused stimulation – provides child with multiple models of target morphosyntactic structures in a natural communicative context.

Tyler, Seminars in Speech & Language, 2002




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**Language-Based Approach: Example Strategies**

- 3. Elicited production procedures – increases opportunities for the production of morphosyntactic targets with clinician support (e.g., cloze tasks, preparatory sets, etc.)
- 4. Naturalistic intervention – use of normal speech models while applying facilitative strategies to elicit the increased accuracy of specific sounds/words and the elimination of error patterns.

Tyler, Seminars in Speech & Language, 2002




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**Example targets addressing both phonology and morphosyntax**

- **Therapy goal = CR**
  - Plurality – boat-boats, cup-cups
  - Reg. Past – walk-walked, kiss-kissed
- **Therapy goal = FCD**
  - Plurality – toe-toes, key-keys
  - Possessive – Ray-Ray’s mama-mama’s
  - Reg. Past – show-showed
  - 3<sup>rd</sup> pers. Singular – I go-he goes

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**Morphology Sequence based on Phonemic Complexity**

- Combine early morphology and phonology goals in this order:
  - Early free morphemes (in, on)
  - -ing
  - Irregular forms (mouse-mice, think-thought)
  - Syllabic forms (horses, patted, pushes)
  - Non-syllabic forms where root word ends in V (shoes, Joe’s, goes, tried)
  - Non-syllabic forms where root word ends in C (ducks, walks, bowled)
- **EBP:** each form of past tense and plural is a different response class; not likely to generalize (Hegde & McConn, 1981)

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**Morpho-syntax intervention**

- **Typical session for morphosyntax:**
  - **Auditory awareness:** Brown Bear, Brown Bear “Brown Bear SEES a blue horse. . .”
  - **Focused stimulation:** craft activity “John TAPES ears on the blue horse.”
  - **Elicited production**
    - Forced choice: “The man jumps or runs?”
    - Cloze task: “This man jumps and this man \_\_\_\_”
    - Preparatory set: indirect models
      - » Tyler et al LSHSS January 2002

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### Phonology intervention

- Typical session for phonology:
  - Auditory awareness: Three Little Pigs final /f/ words: huff, puff, wolf
  - Target sound identification: /f/ = “fan” sound
  - Conceptual: LONG sound (sort short and long spaghetti)
  - Production practice: feed final /f/ words to puppet
  - Naturalistic activity: make LOAF with playdough
  - Phonological awareness: odd-one-out (huff, puff, star)

» Tyler et al LSHSS January 2002

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### Language-Based Approach: Cross-Domain Effects

- Tyler, Lewis, Haskill & Tolbert (2003) recommended using *lexical* focus for toddlers (new words with old sounds) but for preschoolers alternate morphology and phonology weekly or use blocks, beginning with block of intervention focusing on more affected domain
- Tyler et al found that addressing morpho-syntax first resulted in change in phonology, but not vice versa

- Tyler et al LSHSS January 2002

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### Language-Based Approach: Communication-centered therapy

- Hoffman, Norris, & Monjure (LSHSS, 1990) found that narrative intervention facilitated gains in phonology
- Emphasize “phonetic production in the service of language use”
- Use story-telling and reading activities, and address speech only as it interferes with communication
- Focus is on increasing intelligibility within a natural context

■ Ingram & Ingram LSHSS Oct 2001; Norris & Hoffman, 1990

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### Core Vocabulary Approach

- Premise: Children with intelligibility problems have limited phonemic repertoires, few complex syllable shapes, and few correctly-produced words.
- Intelligible word production is highly reinforcing for children.
- Begin with sounds in the child's phonetic inventory, and combine these sounds into a core vocabulary.
- Gradually add phonemes and syllable shapes.

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### Caroline Bowen's Brag Book Idea

- "Bryce's Brag Book"
  - Pictures of words the child can say.
  - Pictures of words the child can approximate.
  - Pictures of sound-effects the child can make (e.g., a car noise).
  - Pictures of sounds that carry meaning that the child can make (e.g., "mmm" for yummy; "sss" for snake).
- Homework activity 5-7", once or twice a day

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### Velar Targets for "Going on a Picnic"

■ Carrots	■ Picnic
■ Cake	■ Milk
■ Candy	■ Bake
■ Cookies	■ Take
■ Koolaid	■ Like
■ Ice cream	■ Sack
■ Coke	■ Back pack

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**Target: Fricatives**  
**Theme: At the Beach**

- **Books**
  - Rainbow Fish
  - Rainbow Fish Lost at Sea
  - Rainbow Fish to the Rescue
  - At the Ocean
  - The Ocean: Alphabet
- **Sand/Water Table**
  - Sand, seashells, shells, salt water, same/different, fish, swim, swish,
- **Craft**
  - Painting seashells, brush
- **Snack**
  - Fish, sand dollar cookies, seaweed slaw



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**Curriculum-based Intervention**

- Mark has received speech therapy since age 3, when his intelligibility was <50%. His speech has improved significantly, but stopping and cluster reduction still occur at levels between 30 and 60%.
- Recently, Mark failed the school hearing screening. Follow-up audiological testing revealed a sloping sensorineural hearing loss in the right ear.



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**Example IEP Goal**

- Mark will increase intelligibility from baseline of 68% to 80% through the use of target phonological patterns as measured by spontaneous speech sample of at least 50 words.
  - Reduce postvocalic devoicing, stopping, and cluster reduction



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**2<sup>nd</sup> Grade Reading TEKS**

**Blend initial letter - sounds with common vowel spelling patterns to read words**

Curriculum-Friendly Tips:

- write the letters on notecards and push together to make the cluster
- assign one student /s/ and another student /l/-push the students together until the /s/ and the /l/ are blended
- as a class or group, create lists of words that start with /s/, words that start with /l/, and words that start with sl.
- Point out that SLap means to hit someone and Sap comes from trees.

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**2<sup>nd</sup> Grade Reading**

■ Examples of books containing blends

Title	Author	Target Phonemes	Target Words
<i>Cows Can't Fly</i>	David Milgrim	Initial /l/ blends	fly, flying, flew, flocked, fluttered, flapped
<i>Big Frank's Fire Truck</i>	Leslie McGuire	Initial /r/ blends	Frank, truck, brush, frightened, crew
<i>Caps, Hats, Socks, and Mittens</i>	Louise Borden	Final /s/ blends	caps, hats, socks, sleds, mugs, cups, cuts, pots, eggs, twigs, picnics, flags, dogs, fast, bugs, cats, frost, dusk, pumpkins, husks, desks, last, first

Sterling-Orth, Angela (2005). *Sound Reading*. Thinking Publications.

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**Data Collection**

- Administer probe of target sound/pattern in untrained words (5 untrained words with target sound/feature every 4-6 weeks)
- Administer probe of related but *untrained sound/pattern* affected by same error (5 words with untrained sound/pattern every 4-6 weeks)
- Consider moving target to "maintenance" when 40% of *untrained* probe items are correct (Olswang & Bain,1994)

Flyer in Kammi & Folslock, 2005

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### EBP - dismissal

- Olswang & Bain (1994) when child reached 40% correct on *untrained* probe items, did not need additional treatment on target
- Williams (2003) – indicates that treatment for a specific phoneme collapse can be terminated when child achieves 50% accuracy on conversational probe

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### EBP - Dismissal

- Diedrich & Bangert (1980) students dismissed at 75% correct for /s/ and /r/ at conversational level had as much retention after 4 months as those dismissed at 95%+ correct level
- McKercher et al (1995) – children who achieved 75% accuracy maintained or improved performance after therapy ended
- Elbert et al (1990) – preschoolers continued to improve 3 months post-treatment

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### Internet Resources

- <http://www.mnsu.edu/comdis/kuster2/sptherapy.html>
- <http://speech-language-therapy.com/sitemap.htm>
- <http://slpath.com>
- <http://www.apraxia-kids.org>
- EdHelper /r/ (www.edhelper.com/phonics/Consonants12.htm) and "er" (www.edhelper.com/phonics/Vowels11.htm)

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### Internet Resources

- John's [/r/ word search](http://www.thepotters.com/puzzles/rwords.html) - (www.thepotters.com/puzzles/rwords.html)
- [Vowel + r flash cards and handout set](http://www.mes-english.com/phonics/rcontrolled.php) (www.mes-english.com/phonics/rcontrolled.php)
- [A story for /r/](http://www.speechctx.com/emergent/consonant_r.htm) (www.speechctx.com/emergent/consonant\_r.htm)
- [Racer Rabbit Rummy](http://edweb.sdsu.edu/courses/edtec670/Cardboard/Card/R/RacerRabbit.html) by Amy Strommer (http://edweb.sdsu.edu/courses/edtec670/Cardboard/Card/R/RacerRabbit.html)
- [Say It Right](http://www.sayitright.org/free-stuff.html) (www.sayitright.org/free-stuff.html)

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### Joshua – Phonological Processes

■ Comb = hom	k>h/#____
(Backing)	
■ Cold = tot	FR, CR, PVD, AA
■ Big = bit	FR, PVD
■ Sheep = ti	FR, Stop, SD, FCD
■ School =tu	FR, CR, SD, FCD
■ Wet = bɛp	Stop, LA
■ Ball = ba	FCD
■ Soup = tu	Stop, SD, FCD

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### Case Analysis - PCC

	Correct	Intended
■ balloon = bʌʔu	1	3
■ coat = do:	0	2
■ Dad = dæ:	1	2
■ get = dʌ	0	2
■ no = no	1	1
■ one = wʌ	1	2
■ Mommy = mami	2	2
■ foot = fuʔ	1	2
■ that = dæ	0	2
	7	18
		7/18 (38%)

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Target	Production	PCC	PWM
comb	hom	1/2	CVC > CVC (+)
cold	tot	0/3	CVCC > CVC (-)
big	bit	1/2	CVC > CVC (+)
sheep	ti	0/2	CVC > CV (-)
school	tu	0/3	CCVC > CV (-)
wet	bEp	0/2	CVC > CVC (+)
ball	ba	1/2	CVC > CV (-)
soup	tu	0/2	CVC > CV (-)
		3/18 = 16.6%	3/8 = 37.5%

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