The Name Game

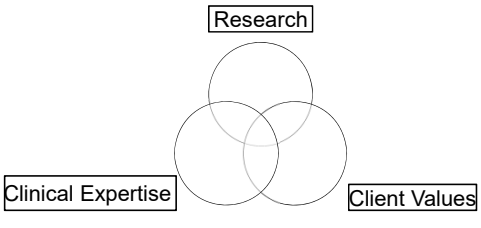
- The new "umbrella term"
  - Speech Sound Disorders
    - Articulation
    - Phonology
    - Phonological processes
    - Phonological processing

Prevalence of Speech Sound Disorders

How many children have speech sound disorders?

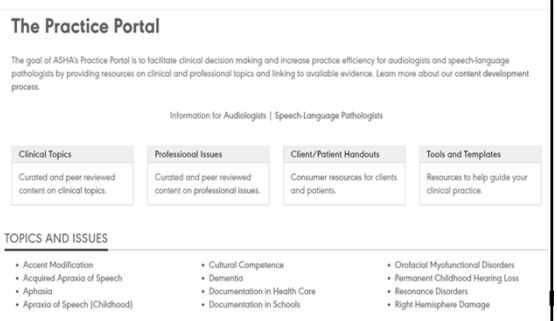
- **10-15% of preschoolers**
- **~6% of school-age children (grades 1-12)**
  - » **ASHA, 2000 in Williams, 2003**

Making Evidence-Based Decisions



Kamhi, 2006; Cirrin et al, 2010

ASHA Practice Portal



EBP Resources

- Compilation of ASHA resources:
  - http://www.asha.org/slp/schools/prof-consult/EvdncBsdSchls.htm
- User friendly guide to using research evidence:
  - http://www2.ed.gov/rschstat/research/pubs/rigorousevid/guide_pg3.html
- Combination electronic and print, peer-reviewed journal covering a different EBP topic in every issue:
  - http://www.speechandlanguage.com/ebp-briefs
- Database of **B**est **I**nterventions and **T**reatment **E**fficacy across the scope of SLP practice:
  - http://www.speechBITE.com
- Smartphone apps:
  - PubSearch (search PubMed—free app)
  - ArticleSearch (search scientific papers, journals, magazines)

Treatment Effectiveness

Which is the most **effective** treatment?

Target matters more than treatment (Gierut, 2005)

Weston & Bain, 2003

Efficiency: Is Faster Always Better?

Desired outcome is a crucial factor in determining which approach is most efficient.

Kamhi, 2006

Treatment Intensity

- SLPs prescribe treatment in the same way a doctor prescribes medicine
- Treatment dose, frequency, and duration are prescribed based on individual needs

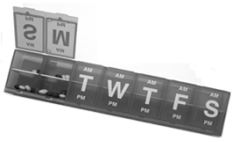
Dose

- Number of "active ingredients" provided each session (Justice et al., 2017)
- Number of opportunities or trials the client has within a single session
  - 2 pills, a spoonful, 50 trials

Prescription: Take 2 pills daily for 30 days

Frequency

- Number of times therapy is provided per day or week
  - How often is the dose taken?



Prescription: Take 2 pills **daily** for 30 days

Duration

- How long does the client need therapy?
- Total length of time treatment is provided
  - 10 days, 6 weeks, 3 months, forever

Justice et al., 2017

Prescription: Take 2 pills daily for 30 **days**

More is not always better!

Best treatment outcomes
high frequency/low dose
low frequency/high dose

Worst treatment outcomes
high frequency/high dose (over-treating)
low frequency/low dose (under-treating)

- ***Consistent with other findings that distributed practice and spacing leads to better retention.***

AD3: Algorithm Driven Dosing Decisions
Laura Justice
Mary Beth Schmitt
Jessica Logan
Hui Jiang

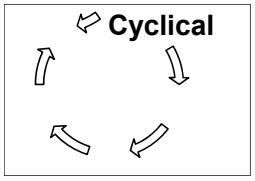
Designing Intervention

Choosing a Goal Attack Strategy

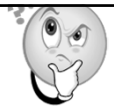
Vertical

Horizontal

Cyclical



Which strategy is best?



- **Training Deep**
  - **Remediate just 1 or 2 sounds**
  - **Phonetic approach, using traditional artic treatment strategies**
  - **Lots of drill**
- **Training Broad**
  - **Target a few exemplars for each pattern being addressed**
  - **Use cognitive-linguistic approach (e.g, contrast therapy or cycles)**
  - **Limited drill**

Likely candidates for vertical strategy

- School age or older
- Does not have problems with syllable structures
- Intelligibility is mildly to moderately affected
- Primarily distortions and substitutions

Smit et al ASHA 2004

Likely candidates for horizontal/cycles

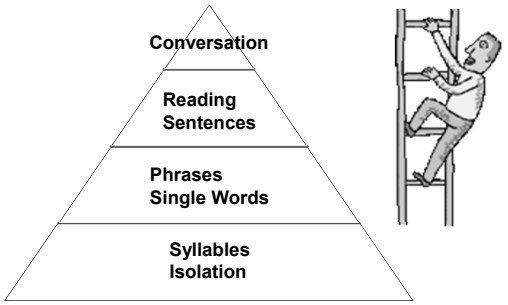
- Preschool or early school age
- Difficulty with syllable structures
- Intelligibility is significantly affected
- Many omissions, along with substitutions and a few possible distortions

Smit et al ASHA 2004

Traditional Target Selection Criteria

- Stimulable
- Early developing
- Easier to produce
- Frequently occurring
- Most likely to affect intelligibility

Traditional Production Hierarchy



New Motor Learning Hierarchy

1. **Pre-practice/placement (Establishment)**
   - Teach target in isolation and syllables until ~80% accurate
2. **Practice** – "concurrent treatment"
   - Randomized targets across difficulty levels during each session
3. **Generalization**
4. **Maintenance**

Maas et al, 2008; Ruscello, 2008

Establishing the Target Sound

21s Century tools - Apps

Speech Tutor
Sensory Cinevox
Speech Flipbook
Artik Pix
Articulation Station

Phonetic Placement

- Verbal descriptions
- Pictures/photos
- Mirror work
- Tongue depressors
- Bite blocks
- Straws

Phonetic Placement

raise tongue so sides contact inner surface of teeth ("butterfly" or /l/ position)

place tongue tip behind upper or lower teeth (apico-alveolar or predorsal-alveolar?)

direct airstream toward cutting edge of teeth

— http://www.speech-language-therapy.com/fsd-butterfly-procedure.htm (Bowen, 2009)

Shaping

Example: Shaping for /r/

- Produce /l/ while lowering the jaw slowly
- Produce /l/, /n/, or /d/ and pull the tongue back until /r/ results. (Assist with a tongue depressor, if needed.)
- Place the tongue lightly between the teeth and produce a voiced "th" sound. Then retract the tip straight back into the /r/ position.

Pena-Brooks & Hegde, 2007; Secord et al, 2007; Ruscello, 2008

Contextual Facilitation

- Can you find "key words" to use as models?
- **Contexts to facilitate production of /r/**
  - After /j/: "Eureka!," "your rabbit," "you're reading"
  - After /t/ in clusters: "tree," "trip," "tray"
  - After /k/ in clusters: "creek," "creep"
  - Between vowels: "teary," "berry"

Hegde & Pena-Brooks, 2007; Secord et al, 2007; Ruscello, 2008

Contextual Facilitation

- If /st/ cluster is too difficult in "stay" or "fast", try this trick!
  - roos-ter, fas-ter, Eas-ter
- /f/ + front vowels
- light /l/ + front vowels; dark /l/ + back vowels
- /k/ + back vowels

Facilitating Context + Shaping

Practice Stage: Words and Beyond

Concurrent Treatment

Each session includes
- The full range of tasks
  - Words, phrases, sentences, conversation
  - Both imitative and spontaneous productions
- Multiple target sounds

Do you ever use nonsense syllables?

Skelton & Kerber, 2005; Skelton & Price, 2006; Ruscello, 2008; Bowen, 2009

The Problem with "Artic Cards"

Word length	**Position of the target sound in the word**	**Syllable structure**
Syllable stress	**Coarticulation factors**	**Familiarity**

sock, seal, hats, mouse, dice, lips, sign
horse, soccer, sandwich, skate, whistle

Practice Strategies

- Slow motion speech with prolonged vowels
- Shadowing (echo speech)
- Unison speech
- Backward build-ups for multisyllabic and/or fossilized forms
  - ball
  - ketball
  - basketball
- Backward chaining

Smit, 2004; Ruscello, 2008; Bowen, 2009

Backward Chaining for Intervocalic /k/

- Elicit "king"
- Practice saying, "bay," "may," "way" briefly
- Practice saying, "KING-bay," "KING-may," "KING-way"
- Switch the syllable order, "bay-KING," "may-KING," "way-KING," keeping the stress on KING
- Shift the stress to the first syllable to get *baking*, *making*, *waking*

Bowen, 2009 http://speech-language-therapy.com/tx-facts-and-tricks.htm

The Intrusive /h/

For Prevocalic Voicing

- Prime with initial /h/ words: heel, heap, hoe
- Model target words with an intrusive /h/: p-heel-peel, p-heap-peep, t-high-tie, t-hoe-toe

For Stopping of Fricatives

- Prime with initial /h/ words: heel, hum, hoe
- Practice target words with an intrusive /h/: f-heel-feel, th-hum-thumb, s-hoe-sew

Bowen, 2009 http://speech-language-therapy.com/tx-facts-and-tricks.htm

Carrier Phrases: A New Twist

Carrier phrase + target word

- It's a _____.
- I have a _____.

Embed a target in the carrier phrase

- Touch the _____.
- I see a _____.
- That's a _____.

Motor-Based Approaches

Phonetic Approaches

- **Multiphonemic Approach**
  - **Addresses several sounds each session**
- **Paired Stimuli Approach**
  - **Pair 4 key words (where sound is produced 90% correctly) with 10 training words on a picture board**
  - **Elicit "training strings" with key word and target alternating: see-seal, see-sand, see-sun, see-sofa; work to 80% accuracy across 3 consecutive sessions**

Core Vocabulary

- Targets children with severe, inconsistent speech sound productions
- Develop personalized list of 50-100 "functionally powerful" words
- Target 10 words per week
- Words are removed from the list as they are produced consistently

Dodd, Crosbie, & McIntosh (2006)

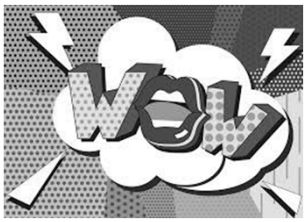
Inconsistent Ian

Target	Initial	Medial	Final	Total
m	w, j		n	3
p			ø	1
f	s, d, w	n	ø, p	6
v	m, b	b	b, p, ø	4
s	n, t	w	ø	4
				Total = 18 CI = 18/5 (3.6)

PROMPT

- Prompts for Restructuring Oral Muscular Phonetic Targets
- tactile-based, externally applied cues to articulators; SLP cues each target
- Requires completion of 2 courses for certification

Maximizing Outcomes



Increasing Automaticity

- **Speed drills**
  - Repeat set of phrases or sentences, constantly reducing time but maintaining accuracy rate
- **Auditory masking**
  - Repeat practice material while masking noise is played through headphones
- **Rehearsal matrices**
  - Repeat nonsense syllables with varied syllable shapes: VC, CVC, CV, VCCV

Ruscello, 2008

Facilitating Generalization

- Response levels (e.g., words, sentences, narrative)
- Rate: "regular talking" vs. "fast talking"
- Stress, intonation, and emotion
  - Target sentence: Bob ate pie.
    - *Who* ate pie? Did Bob *make* pie? Did Bob eat *cake*?
- Number of repetitions
- Body position or activity
  - Chanting, singing

Predicted Generalization

- **Final /s/ to other final fricatives**
- **From /tS/ to /dZ/ and /j/ because of identical place**
- **From initial /fl/ to other clusters because fricative + liquid cluster is marked**
  (Gierut, JSLHR, 1999)

44

Involve Other Partners

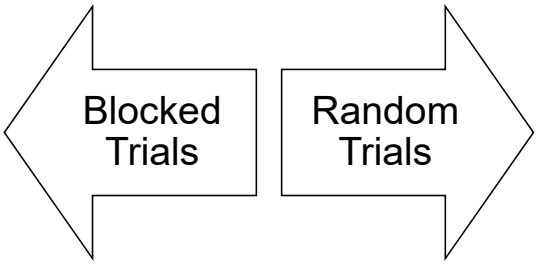
- Use fun, play-based, sound-loaded activities that involve models and recasts
  - Provide set-ups—choices, communicative temptations
  - Elicit protests (e.g., playfully calling something the wrong name)
  - Provide focused auditory stimulation
  - Use distributed, random 5- to 7-minute bursts of homework
  - Compile "power word" and phrase lists
  - Make a brag book (Bowen, 2009)

Manipulate Therapy Schedules

Massed practice
Fewer, longer sessions

Distributed practice
Shorter, more frequent sessions

Manipulate Trials Within Sessions



Frequency of Productions

How many productions are needed per session?

- Edeal & Gildersleeve-Neumann, (2011)
  - Compared 30–40 productions of each speech target to 100–150 productions per 15-minute session

Tips for Eliciting 150+ Productions

- Challenge students with a tally counter.
- Make a "friendly" contest for students/groups
- Create stations around the room (board, table, floor, computer). The child will do something different at each station.

Provide Extrinsic Feedback

KR vs. KP

- **Knowledge of results** = Right/wrong (old way/new way)
- **Knowledge of performance** = Specific comments about how to modify production
- **Tip:** Provide nonverbal feedback to a interfering with the auditory trace

Shift to Intrinsic Feedback

Self-monitoring and self-correcting are important intervention targets.

Teach contingency priming.

Pena-Brooks & Hegde, 2007

Monitor Generalization

Probe:

- target sound/pattern in untrained words
- target sound/pattern in untrained context
- related but untrained sound/pattern
- control behavior

"There's an app for that!"

Plan for Dismissal

- **Consider:**
  - **Initial starting severity level**
  - **Years in treatment**
  - **Overall motivation, tolerance, and satisfaction with treatment program**
  - **Comparison to age-matched peers**
  - **Number and type of errors in conversational speech, and stimulability for those errors**

Tyler, 2005

Dismissal – *Hotel California*?

- **Diedrich & Bangert (1976) students dismissed at 75% correct for /s/ and /r/ had as much retention after 4 months as students who stayed in therapy until at the 95%+ correct level**
- **Mowrer (1982) – better retention after frequent short sessions (distributed practice) than fewer, longer sessions (mass practice)**
- **Elbert et al (1990) – preschoolers continued to improve 3 months post-treatment**

EBP - dismissal

- **Olswang & Bain (1994) when child reached 40% correct on untrained probe items, did not need additional treatment on target**
- **McKercher et al (1995) – children who achieved 75% accuracy maintained or improved performance after therapy ended**
- **Williams (2003) – indicates that treatment for a specific phoneme collapse can be terminated when child achieves 50% accuracy on conversational probe**

Principles of Phonemic Approaches

- Phonemes establish meaning differences between words, so therapy begins at the ***word*** level.
- Focus is on the ***system-***-expanding the inventory of speech sounds and syllable shapes.

Selecting Intervention Targets

Speech sample - George

Adult Word	George's Form	Initial	Final
coat	[do]	k→d	t→Ø
show	[so]	ʃ→s	
dish	[dɪs]		ʃ→s
pack	[bæ]	p→b	k→Ø
leave	[wif]	l→w	v→f
rain	[wen]	r→w	
ship	[sɪ]	ʃ→s	p→Ø
gun	[dʌn]	g→**d**	
buzz	[bʌs]		z→s
can	[dæn]	k→d	

Target Selection Factors: Frame versus Content

Common phonotactic constraints:

- Lacking final consonants
- Lacking clusters
- Limited varied syllable shapes
- Frequent reduplication or assimilation

Build the **frame** first!

Target Selection Factors

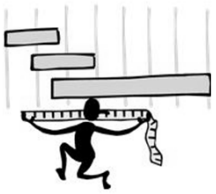
Ingram's 3 major rules in choosing targets:

- **Eliminate instability**
- **Eliminate homonyms**
- **Establish feature contrasts**

Target Selection Factors: Distance Metric

Select targets that are maximally distinct in terms of:

- Place
- Manner
- Voice
- Linguistic unit



Williams, 2000

Target Word Selection Factors: Frequency & Density

- **Frequency** = how common the word is
- **Neighborhood density** = number of phonetically similar words based on one sound substitution, deletion, or addition
  - High-density = has 10 or more "neighbors"

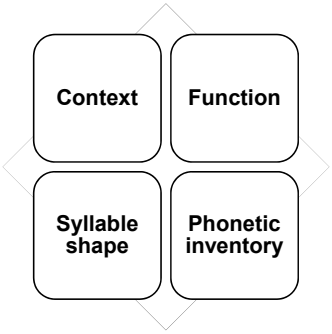
What are neighbors for "ball"?

High Frequency, Low Density

- slpath.com (word lists)
  - High frequency = rating of 100 or >
  - Low density = <10 neighbors

- drive (105, 9)
- house (591, 7)
- three (610, 9)

Target Selection Factors



Target Selection Factors: My Advice!

Consider:

- What will affect intelligibility the most?
- What will expand the system?
- What personal factors should be considered?
- What goal attack strategy is best?

Selecting Intervention Approaches

Phonotactic Therapy
(Velleman, Seminars in Speech and Language, 2002)

- **Focus on the frame before content**
- **Frame = structure or shape of the syllable/word**

Major phonotactic patterns

- **Deletion of initial or final consonant**
- **Harmony and reduplication**
- **Reduction of multisyllabic words**
- **Errors affecting word stress patterns**
- **Reduction of consonant clusters**

Initial Consonant Deletion

- **Possible result of hearing impairment or childhood apraxia of speech.**
- **Treatment considerations:**
  - **Begin CV syllables using a consonant the child can already produce successfully.**

Initial Consonant Deletion

- Treatment Considerations:
  - Repeat VC syllable to induce syllable onsets (e.g., "ick-ick-ick" to "kick-kick-kick")
- Goal:
  - Child will produce target CV words with an initial consonant, in x% of trials, regardless of consonant accuracy (imitated, elicited, spontaneous).

Final Consonant Deletion

- Common in English language in children under 3.
- Consonants acquired first in final:
  - velars
  - fricatives
  - voiceless stops

Final Consonant Deletion

- Treatment Considerations:
  - Use lax vowels.
  - Use words with consonant harmony (e.g., kick, pop, mom).
  - Use CVCV sequences while gradually removing the second vowel.
  - Use two words in which the final C of one word is the same as the initial C of the second word (e.g., "hit ten")

Reduction of Multisyllabic Words

- Use reduplication
- Treatment Considerations:
  - Target syllable repetition in various activities: movement activities (e.g., up, up, up), daily routines (e.g., bowl, bowl, bowl), and reading of counting books (e.g., repeating name of object repeatedly instead of counting occurrences, "ball, ball, ball").
  - Target words with reduplicated structure (e.g., boo-boo, mama, pee-pee).

Reduction of Multisyllabic Words

- Gradually introduce words that are not reduplicated, but contain either consonant or vowel harmony.
- Goal:
  - Child will produce target two-syllable words (e.g., CVCV) with two syllables in X% of trials, regardless of consonant accuracy

Word Stress Patterns

- Weak syllables most likely to be omitted when in words with iambic stress : giraffe
- Target iambic (w-S) words in phrases with a stressed word directly preceding the target word (e.g., BIG girAFFE, RED baLLOON).

Consonant Cluster Development

- **Some clusters in initial and final produced at age 2**
- **Full clusters produced 75% of the time by age 3.5**
- **Typical progression of cluster errors:**
  - **complete deletion**
  - **deletion of one element (marked)**
  - **substitution of one element**

Consonant Cluster Reduction

- **Treatment Considerations:**
  - **Targeting marked clusters (e.g. /fl/)will generalize to less marked clusters.**
- **Goal:**
  - **Child will produce target two-consonant sequences with two consonants in x% of trials, regardless of consonant accuracy (imitated, elicited, spontaneous).**

Contrast Therapy

- Create new phonemic distinctions in language by teaching feature contrasts (e.g., place, manner, voice)
- "Make these two words sound different."
- Child should be stimulable for target.

What errors cannot be adequately addressed using contrast therapy?

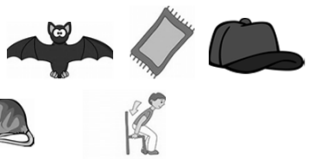
Ruscello, 2008

Minimal Pairs x 3


- Target-substitute
  - Target vs. error sound
- Target-known sound
  - Target vs. another sound already in child's inventory
- Target-target ("empty set")
  - Two new sounds introduced simultaneously

Minimal or Maximal Opposition?

- Minimal opposition: sounds differ by 1 feature—place, manner, or voice
- Maximal opposition: sounds are as different as possible and differences include major class features
  - Vocalic
  - Consonantal
  - Sonorant



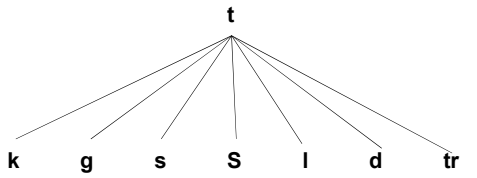
Gierut, 2001, 2005

Feature Differences

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

Targets for Minimal Oppositions?

Adult Word	George's Form	Initial	Final
coat	[do]	k→d	t→Ø
show	[so]	ʃ→s	
dish	[dɪs]		ʃ→s
pack	[bæ]	p→b	k→Ø
leave	[wif]	l→w	v→f
rain	[wen]	r→w	
ship	[sɪ]	ʃ→s	p→Ø
gun	[dʌn]	g→**d**	
buzz	[bʌs]		z→s
can	[dæn]	k→d	



Phoneme collapse leading to many homonyms

Adapted from Williams, Division 1 Newsletter April 2003

Multiple Oppositions

Uses larger treatment sets

- For a child who collapses to /t/:
  - tea **vs.** tree Lee she see
  - toe **vs.** show go low dough
  - tie **vs.** try lie sigh dye
- For a child who reduces clusters:
  - pill sill spill
  - core sore score
  - clap class clasp

Williams, 2000

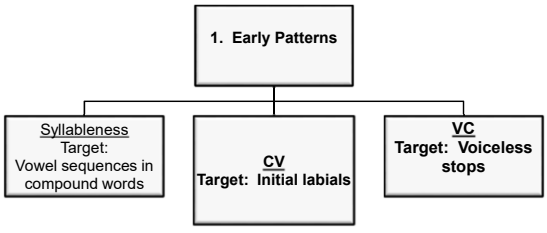
Cycles Approach

- **Cycle** = time needed to target every pattern/phoneme for 60 minutes (1 cycle typically takes 5-15 weeks)
- Typical program - 3 to 5 cycles (~30-40 hours of therapy)
- Goal is increasing intelligibility by stimulating ***emergence*** of sounds/patterns, not mastery

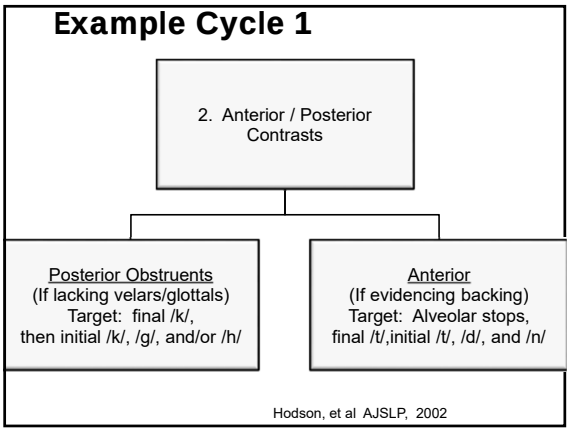
Cycles Approach

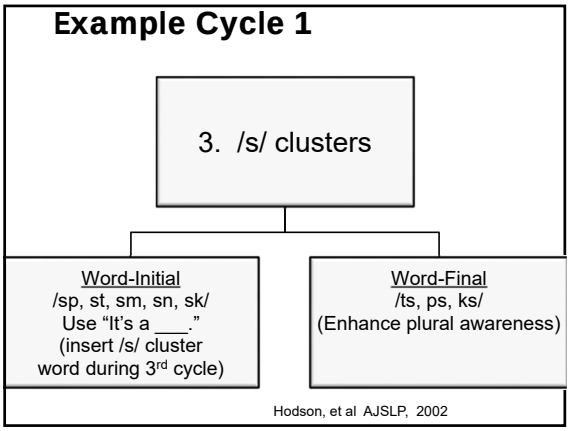
- **Typical Cycle 1:** syllableness, word-initial and word-final singleton consonants, anterior/posterior consonants, /s/ clusters, liquids
- **Recycle primary patterns until:**
  - Velars/alveolars are used contrastively
  - /s/ clusters are emerging
  - Liquids are emerging
  - Initial and final consonants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

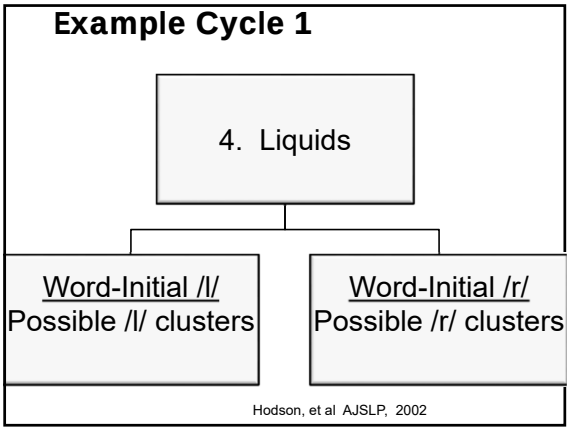
Example Cycle 1



Hodson, et al AJSLP, 2002


Example Cycle 1
2. Anterior / Posterior Contrasts
Posterior Obstruents
(If lacking velars/glottals)
Target: final /k/,
then initial /k/, /g/, and/or /h/
Anterior
(If evidencing backing)
Target: Alveolar stops,
final /t/,initial /t/, /d/, and /n/
Hodson, et al AJSLP, 2002


Example Cycle 1
3. /s/ clusters
Word-Initial
/sp, st, sm, sn, sk/
Use "It's a ___."
(insert /s/ cluster
word during 3rd cycle)
Word-Final
/ts, ps, ks/
(Enhance plural awareness)
Hodson, et al AJSLP, 2002


Example Cycle 1
4. Liquids
Word-Initial /l/
Possible /l/ clusters
Word-Initial /r/
Possible /r/ clusters
Hodson, et al AJSLP, 2002

Cycles Approach

- **Example 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/**

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/**

Cycles Approach

- **Secondary target patterns:**
  - **Voicing contrasts in prevocalic**
  - **Palatal glide /j/**
  - **Palatal sibilant**
  - **Glide clusters**
  - **/r/**
  - **Singleton stridents /f/ and /s/**
- **Recycle until target emerges (<40% error)**

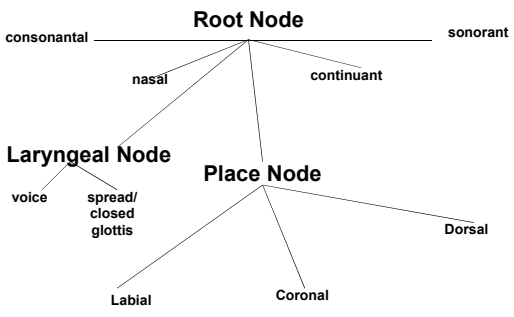
Hodson, AJSLP, August 2002

Cycles Approach

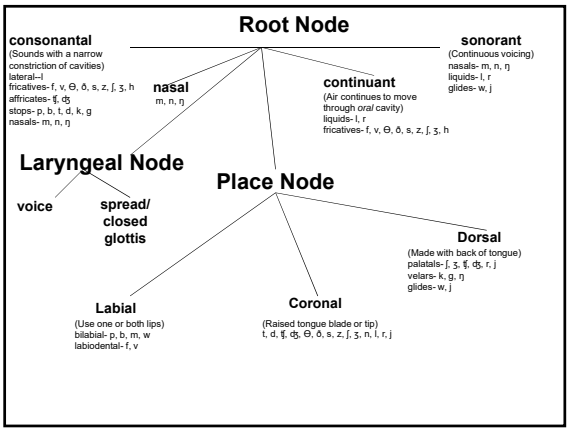
- **Potential advanced target patterns**
  - **For upper-elementary grade level children with intelligibility problems**
    - **Complex consonant sequences**
    - **Multisyllabicity**

Cycles Approach

- **Typical session sequence:**
  - **review of words from previous session**
  - **amplified auditory input with 15-20 words**
  - **drawing/coloring 3-5 new picture cards**
  - **production activity with cards**
  - **stimulability probe for new words**
  - **amplified auditory input with 15-20 words**
  - **phonological awareness activity**
  - **discussion of homework**



Nonlinear phonology – feature geometry

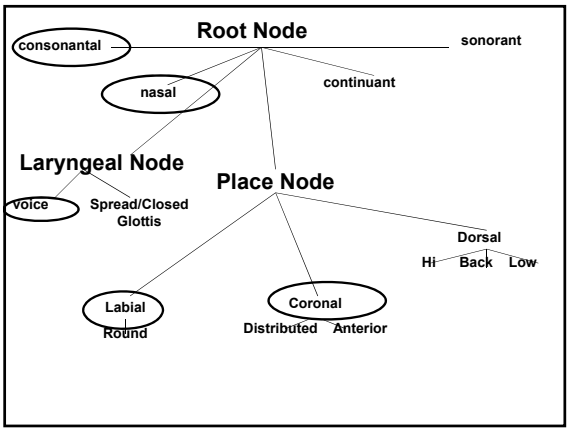


Balloon Speech Sample
R (age 3:4)

	Prevocalic	Postvocalic
Stops	b, k, d	b, t
Nasals	m, n	
Glides		
Fricatives	f, h	
Liquids		
Liquids		

Balloon Speech Sample
Nonlinear Analysis

Phoneme	b	k	d	f	m	n	h	t
consonantal	+	+	+	+	+	+		+
sonorant	-	-	-	-	+	+		-
continuant	-	-	-	+	-	-		-
nasal	-	-	-	-	+	+		-
voice	+	-	+	-	+	+		-
Labial	✓			✓	✓			
Coronal			✓			✓		✓
Dorsal		✓						



Case Analysis - Joshua

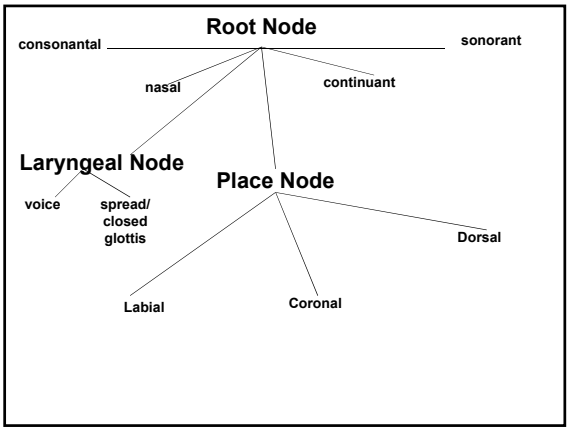
- Comb = hom
- Cold = tot
- Big = blt
- Sheep = ti
- School = tu
- Wet = bEp
- Ball = ba
- Soup = tu

Joshua

	Prevocalic	Postvocalic
Stops		
Nasals		
Fricatives		
Affricates		
Glides		
Liquids		

Case Analysis
Nonlinear Ax - Features

Phoneme	h	t	m	b	p
consonantal					
sonorant					
continuant					
nasal					
voice					
Labial					
Coronal					
Dorsal					



Language-Based Approach

- **Basic assumptions:**
  - **1. SLI and SSD co-occur in 35-60% of identified preschoolers.**
  - **2. Whole-to-part learning and top-down processing: changes in higher linguistic levels may cause changes in lower levels (i.e., phonology).**

Tyler, Lewis, Haskill, & Tolbert (2002)

Language-Based Approach: Example Strategies

1. Scaffolding narratives
2. Focused stimulation
3. Elicited production procedures
4. Naturalistic intervention

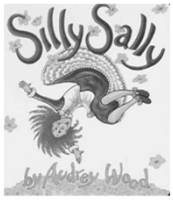
Tyler, Lewis, Haskill, & Tolbert (2002)

Story Resources – Speech Sprouts

- Books for /f/
  - Three Billy Goats Gruff by Paul Galdone
  - Three Little Pigs by Paul Galdone
  - Give Me Half by Stuart Murphy
- Books for /k/
  - Duck on a Bike by David Shannon
  - One Duck Stuck by Phyllis Root
  - Shake my Sillies out by David Allender
- http://www.speechsproutstherapy.com/2015/01/sound-loaded-storybooks-for.html

Speech Bookshelf

- Books for /s/



- http://www.speechbookshelf.com/?page_id=75

Phonology + Morphology

- 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
  - 3rd pers. Singular – I go-he goes

Language-based intervention

- Typical session:
  - 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

Language-based Approach

- Tyler et al found that addressing morpho-syntax first resulted in change in phonology, but not vice versa
  - – Tyler et al LSHSS January 2002

Joshua

	Prevocalic	Postvocalic
Stops	b, t	t, p
Nasals		m
Glides		
Fricatives	h	
Affricates		
Liquids		

Joshua Learns Fricatives

- Book
  - *Spot Goes to the Beach*
- Sand/water table
  - Sand, seashells, shells, saltwater, sun, surf, same/different, fish, swim, swish, sun screen
- Craft
  - Painting seashells, decorating sunglasses
- Snack
  - Fish, sand dollar cookies, seaweed slaw

Adapted from Creaghead & Hodson (2006)

Deshaan

- Deshaan is a 2nd grader who has received speech therapy since age 3, when his intelligibility was <50%. His speech has improved significantly, but stopping, gliding, and cluster reduction still occur at levels between 30% and 60%.

Intrusive /h/ Strategy

/th/ + hum = thumb

/s/ + hi = sigh

Cluster Activities

Make a Word Game

Trio Memory

- pat sat spat
- cat sat scat
- clap class clasp
- cold sold scold
- core sore score
- pill sill spill
- pin sin spin
- sap lap slap
- sick lick slick
- sack tack stack
- sale tale stale
- gas gap gasp

Cluster Activities

Morphology Memory

- **Regular past**
  - walk-walked, kiss-kissed
- **Plurals**
  - boat-boats, cup-cups
- **Possessive**
  - Don-Don's, Matt-Matt's
- **3rd person singular**
  - walk-walks, run-runs, paint-paints

SJ, age 8:1 2nd grade

Dig	dɛg	Cat	tæt
House	haʊθ	Bath	bæt
Knife	nɑf	Red	wed
Duck	dʌt	Ship	sɪp
Fan	fɛn	Ring	wɪŋ
Yes	jɛθ	Thumb	tʌm
Boat	bot	That	dæt
Cup	tʌp	Zip	ðɪp
Lamp	wæmp	Key	ti
Goat	dot	Win	wɪn

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

Resources

- EdHelper /r/ (www.edhelper.com/phonics/Consonants12.htm) and "er" (www.edhelper.com/phonics/Vowels11.htm) sound pictures, sentences, and worksheets.
- John's /r/ word search - (www.thepotters.com/puzzles/rwords.html)
- Vowel + r flash cards and handout set (www.mes-english.com/phonics/rcontrolled.php)
- A story for /r/ (www.speechtx.com/emergent/consonant_r.htm)
- Racer Rabbit Rummy by Amy Strommer (http://edweb.sdsu.edu/courses/edtec670/Cardboard/Card/R/RacerRabbit.html)
- Say It Right (www.sayitright.org/free-stuff.html) AIR Initial Game Board, /r/ Progress Chart
- Activities/Games/Ideas for Articulation Therapy (www.angelfire.com/nm2/speechtherapyideas/articgames.html) therapy ideas for any sound error.