Accelerating Progress for Children with Severe Speech Sound Disorders

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OSSPEAC Conference

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Session agenda

- Synchronize terminology

- What does research say about phonological intervention?

- Applying research to practice

- Designing assessment and intervention

Articulation disorders

- Errors are unrelated to language form

- Single sound or cognate pair errors such as [s,z], [k,g] [Ɵ, ð]

- Class distortions (vocalization, lateralization)

- Motor speech disorders or disorders resulting from structural anomalies

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Phonology disorders

- Deficits in speech sound use characterized by language-based phonemic errors which occur in observable and consistent, though atypical, patterns.

- Patterns can be determined through careful analysis of the child's phoneme use.

- Usually occurs in the absence of deficits of speech motor skills.

- Frequently co-occurs with other language deficits.

- Intelligibility significantly impaired.

Phonetics Review

- 3 phonetic characteristics of speech sounds

- 2 major classes of phonemes

- markedness

Phonetics Review

Consonant Chart

		bilabial	labiodental	interdental	alveolar	palatal	velar	glottal
Obstruent	Stops	p b			t d		k g	
	Fricatives		f v	θ ð	s z	ʃ ʒ		
	Affricates					tʃ dʒ		
Sonorant	Nasals	m			n		ŋ	
	Liquids				l	r		
	Glides	w				j		h

Adapted from Gierut, 2002 Ohio Speech-Language-Hearing Association Convention presentation and Moats, L.C. (2000). *Speech to Print*. Baltimore: Paul H. Brookes Publishing. Updated 10/31/2010

Essentials of *efficient* Phonological Treatment- Gierut and Colleagues

- Careful analysis of phonological errors

- Systematic selection of target phonemes

- Development of stimulability for all error sounds

- Use of specifically selected contrast pairs to teach new sounds

Research Implications for Clinical Practice

- Assessment

- Target selection

- Treatment

Where to start?

Target Selection
based on work of Gierut and colleagues

**Target selection based on
Order of Acquisition of Sounds**

- If early-developing targets were treated, there was greater generalization to the target sound.

- If later-developing phonemes were targeted, there was generalization to and improvement in untreated sound classes, with greater continued improvement post-treatment and system-wide change.

**Target selection based on
Order of Acquisition of Sounds**

- Later developing sounds showed more continued improvement post treatment.

- Teaching later developing sounds produced greater system wide change.

**Target Selection based on Phonological Knowledge
(inconsistent v. Absent phonemes)**

- Target selection based on sounds with most phonological knowledge provides faster generalization of the target sound to other contexts.

- Target selection based on least phonological knowledge provided greater generalization to other sounds and sound classes.

Implications for target selection based on Stimulability

- If the phoneme targets were **stimulable**, there was **greater generalization of the target** to new contexts

- If phoneme targets were **not stimulable**, there was **more widespread generalization to other sounds and sound classes**

Target Selection based on Order of Acquisition <u>AND</u> Phonological Knowledge

- Improvement occurred for untreated stimulable phonemes, but **little improvement occurred for untreated unstimulable phonemes**

- Confirmed the need to find ways to help children imitate sounds

Target selection based on markedness

- Treatment of **less marked** or complex phonemes **did not facilitate the acquisition of more marked phonemes**

- Treatment of **more marked** or complex phonemes **facilitated the acquisition of unmarked properties.**

Teaching Clusters
(Williams, 1991)

- Hypothesis based on Gierut's work:

  - Teaching two new sounds in a cluster may result in acquisition of two new sounds and clusters.
- Results:

  - If the child had **some knowledge** of the sounds and no sequences, learning occurred.

  - If the child had **sequences** but inventory constraints for the sounds, learning occurred.

  - If the child had inventory constraints for the sounds and did not have sequences, learning did not occur.

Word Selection

- High frequency words

- Non-words

- Novel Words

Minimal Pair

- two words that differ in meaning and have only one phonemic difference between them (cape/cake)

- for linguistic purposes, the existence of a minimal pair demonstrates that the contrasting sound is actually a phoneme, and not simply an allophone

Minimal oppositions

- Child's error contrasted to target (tap/cap)

- Child's error contrasted to any phoneme with only one phonetic contrast (sip/zip)

Maximal Oppositions

- All phonetic features differ:
  - Place
  - Voice
  - Manner
- Sound Class distinction
  - Obstruent v. Sonorant

Target Selection: The Nature of Oppositions

Maximal contrast pairs resulted in greater improvement in target sounds, more additions of untreated sounds and less over generalization to known sounds. **May result in a complete reorganization of the child's system!**

Learning is enhanced by maximal phonetic differences and major class distinctions.

Summarizing

•Based on Gierut's principles, phonemic targets for therapy should consist of:

1. phonemes about which the child has little or no productive phonologic knowledge

2. nonstimulable phonemes

3. at least two phonemes that are from different sound classes

4. late-developing phonemes

5. most marked consonants that are in error

English (US) Speech Sound Acquisition; 1931 - 2019
90% criteria
2;0-2;11 [p, b, d, m, n, h, w]
3;0 - 3;11 [t, k, g, ŋ, f, j]
4;0 - 4;11 [v, s, z, ʃ, l, ʧ, ʤ]
5;0 - 5;11 [ð, ʒ, ɹ]
6;0 - 6;11 [θ]

How do we find this data?

**Assessment - quantifying
the child's phonological knowledge**

Three Components of Assessment

1. Elicitation task (standard assessment) with large sample of each phoneme

2. Stimulability testing for error sounds in isolation, syllables and words

3. Spontaneous language sample

Collating Assessment Data

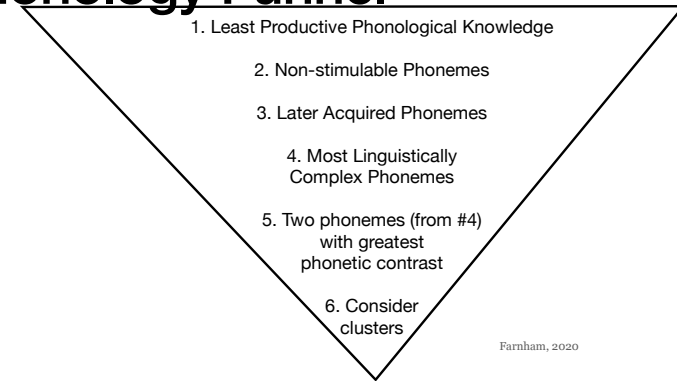**Spontaneous language Sample**

- Authentic

- Quantifies intelligibility

- Establishes baseline
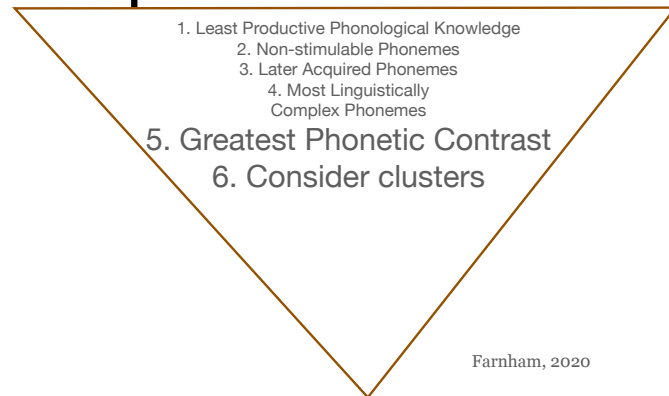
Spontaneous language Samples Made Easy

- Phonetic transcription only for words with errors

- XXXX if the word is completely unintelligible - your word processing app will count it!

- Calculate Percent Words Correct (words spoken correctly or not transcribed/ total number of words spoken) for a simple measure of intelligibility

www.ipa.typeit.org

Phoneme Selection Process - the Phonology Funnel

1. Least Productive Phonological Knowledge

2. Non-stimulable Phonemes

3. Later Acquired Phonemes

4. Most Linguistically Complex Phonemes

5. Two phonemes (from #4) with greatest phonetic contrast

6. Consider clusters

Farnham, 2020

Phoneme Selection Process - final steps

1. Least Productive Phonological Knowledge
2. Non-stimulable Phonemes
3. Later Acquired Phonemes
4. Most Linguistically Complex Phonemes
5. Greatest Phonetic Contrast
6. Consider clusters

Farnham, 2020

Hierarchy of Pair Effectiveness

multiple and major class distinctions ★

multiple distinctions

few distinctions

Sources for Contrast Pairs

- www.lessonpix.com

- teacherspayteachers.com/clarity-SLP

- SCIP app

- bjoremspeech.com

Consider clusters and complexity

- Note: child must have either both members of the cluster OR consonant sequences in his/her system

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Initial True Clusters: Identify/circle true clusters with targets (adjuncts are grayed out)

		bilabial	labio-dental	inter-dental	alveolar	palatal	velar	glottal
Obstruent	Stops	sp			st	ʃt	sk	
Obstruent	Fricatives							
Obstruent	Affricates							
Sonorant	Nasals				sm sn			
Sonorant	Liquids	pr pl bl br	fl fr vr	θr	sl tr dr	ʃr	kl kr gl gr	
Sonorant	Glides	pw pj bj mj	fj vj		dj nj tw sw dw		kj kw gw	hj

Final True Clusters: Identify/circle true clusters with targets (adjuncts are grayed out)

		bilabial	labio-dental	inter-dental	alveolar	palatal	velar	glottal
Obstruent	Stops	pt ps bz			sp st		kt gd	
Obstruent	Fricatives		ft fs vd vz	θs ðz	ts dz zd	ʃt	sk ks gz	
Obstruent	Affricates							
Sonorant	Nasals	mp		nθ	nz nt nd ŋz	ntʃ ndʒ	ŋk	
Sonorant	Liquids	lp lb lm rp rb rm	lf lv rf rv	lθ rθ rð	lt ld ln ls lz rt rd rn rs rz rl	ltʃ ldʒ rtʃ rdʒ	lk rk rg	
Sonorant	Glides							

Individual Plan + Global Plan = Success!

Components of an Effective <u>Individualized</u> Therapy Plan

- Careful selection of targets

- Use of selected targets in meaning-based therapy - maximal contrasts that convey meaning (real words!)

- Flexibility to accommodate rapid, widespread phonological change

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Individual plan
Initial targets: [sl/gr] initial, [k/z] final

- Contrasts:
  - place
  - voice
  - manner
  - sonorant v. obstruent

Contrast Pair Examples - "3" New Target Sounds

Initial [sl/gr]	final [k/z]
slam/ graham	make/ maze
slow/ grow	bees/ beak
slump/ grump	buzz/ buck
slip/ grip	Liz/ lick

Global plan for Effective Speech Sound Therapy

- Multiple phoneme targets
- Develop stimulability for all error phonemes
- Build a bridge to phonics
- Use real language applications
- Plan for active attention, high rates of response, feedback, and rewards.

Slide 1

A Winning Formula for Therapy (Rvachew, 2004)

traditional articulation therapy

+ perceptual training → auditory development/ phonologic awareness

+ training in letter identification

+ training in sound-symbol relationships → bridge to phonics

+ onset identification → initial contrasts/ phonologic awareness

= greater progress than in articulation therapy alone

Slide 2

Developing Stimulability while Building a Bridge to Phonics

m	b	p	w
f	v	th	th
t	d	n	l
s	z	sh	zh
ch	j	y	r

er	k	g	h
a	e	i	o
u			

Slide 3

Building a Bridge to Phonics using Real Language Applications

- **Say-It-and-Move- It (**from Road to the Code, an evidence-based program for phonemic awareness)

- Provides focused, active practice for maximal contrast pairs and learning unknown phonemes

Slide 4
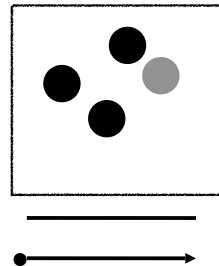
Real Language / Concurrent Practice

- Modeled and independent use of contrast pairs in simple games

Real Language

- Modeled and independent use of target phonemes in formulaic sentences
  - "I want to **look** at that **card.**"
  - "**Can** I look at that **card**?"
  - "She **can** run." "She **likes** to run."
  - "He **likes** to swim."

Putting it All Together:
What does a session look like?

- Phoneme Inventory (Magic Wand):   5 minutes or less
  - Stimulability, letter-sound correspondence

Putting it All Together:
What does a session look like?

- Say-It-And-Move-It: 8 - 10 minutes
  - Phonologic awareness, meaning-based production (maximal contrast pairs)

Putting it All Together:
What does a session look like?

- Maximal opposition pairs and sets used meaningfully in a familiar context (games): 10 minutes
  - Optimize number of responses

Putting it All Together:
What does a session look like?

- Target sounds in high frequency words used in sentences: 5-10 minutes

  - Meaningful use of target phonemes

Writing goals and objectives
What is <u>the main thing</u>?

Writing An Annual Goal

- Think in terms of **intelligibility - <u>the main thing</u>**

- Clearly define the **intelligibility target** in the goal statement. *Example*: "80% of words will be spoken correctly during a 50-utterance language sample"

- Objectives may be written with respect to maximal pairs, processes or specific phonemes, OR for all potential targets referenced to the *global process.*

Annual Goal - The Main Thing!

During a spontaneous language sample of at least 50 utterances, at least 60% of the words Vincent uses will be spoken correctly.

Intermediate Objectives - Refer to the Global Therapy Process

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Intermediate Objective:

Stimulability:

Vincent will imitate the consonant sounds of English in isolation with at least 80% accuracy (# of consonants imitated correctly/23).

Intermediate Objective:
Phonemic Awareness/Maximal contrasts

Vincent will segment 3-5 phoneme words into phonemic segments 6/8 trials with a model.

Intermediate Objective:
Phonologic Awareness/ Maximal Contrasts:

Vincent will imitate 8/10 high contrast word pairs containing target phonemes correctly. Target phonemes include: [m, p, b, t, v, ⊖, ð, t, d, s, z, n, l, ʧ, ʤ, r, k, g, h, ŋ]

(May add an objective for <u>independent</u> use of targets in contrast pairs) *Tip: List All error phonemes!*

Intermediate Objective:
<u>Meaningful Use of Targets in High Frequency Words</u>:

Vincent will use target phonemes in high frequency words in formulaic sentences 8/10 trials correctly independently. Target phonemes include: [m, p, b, t, v, Ө, ð, t, d, s, z, n, l, ʧ, ʤ, r, k, g, h, ŋ]

Who is a candidate for this type of therapy?

- Children with unintelligible speech, multiple speech sound errors and/or severe apraxia
  - Trial therapy is essential to differential diagnosis of apraxia vs. phonological disorders
- Children with substitutions
- Children with deletions - Deletions should be addressed early
- Children with both phonological and cognitive disabilities

Remember that the cascade starts in the heights!

To achieve system-wide improvement, use the productive phonologic knowledge approach

- aim high!

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Monthly Office Hours schedule and registration:
<u>www.clarityforcommunication.com</u>