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Expediting Progress for Children with Severe Phonological Disorders

Presenter: Teresa Farnham, M.A., CCC-SLP

Moderated by:
Amy Natho, M.S., CCC-SLP, CEU Administrator, SpeechPathology.com

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Expediting Progress for Children with Severe Phonological Disorders

Teresa Farnham, M.A., CCC-SLP

terri.farnham@gmail.com

What is your route to successful therapy for phonological disorders?

- How do you assess and analyze errors?
- How do you select target sounds?
- Does your treatment treat the sound system?

What is your top priority for unintelligible kindergartners?

Meet Anna,
a kindergarten student

Which targets would you select for her?

Anna - Fall of Kindergarten Audio

Anna - Errors

Consonant Chart

		bilabial	labiodental	interdental	alveolar	palatal	velar	glottal
Obstruent	Stops	p b			t d		k	
	Fricatives		f v	θ ð	s z	ʃ ʒ		
	Affricates					ʧ ʤ		
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.

Red - all positions, all morphemes
Black - 1-2 positions

Significant phonologic processes: initial consonant deletion, final consonant deletion, deletion of all fricatives, gliding, cluster reduction, syllable deletion.

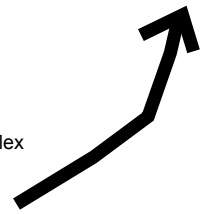
What is your plan to get your students to the goal?

- Stimulability
- Consistency of errors
- Developmental acquisition
- Productive phonological knowledge

Challenges to traditional thinking from 20 years of research by Gierut and colleagues

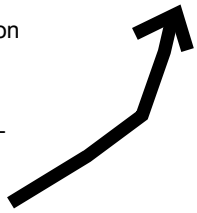
Using Productive Phonological Knowledge to Accelerate Progress

- Stimulability
- Consistency of error
- Start with the least knowledge
- Start with the most complex phonemes
- Start with the latest developing phonemes



Using Productive Phonological Knowledge to Accelerate Progress

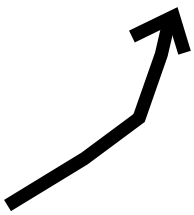
- RESULT: shorter duration of therapy because of cascading improvement and generalization from target phonemes to non-target phonemes



Gierut, 2001, 2005

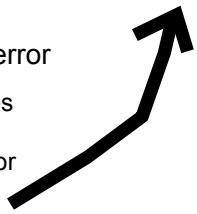
Using Productive Phonological Knowledge to Accelerate Progress

- Stimulability
  - Less stimulable, more rapid progress
  - Assumes that if the sound is stimulable, the child is likely to acquire it without direct intervention



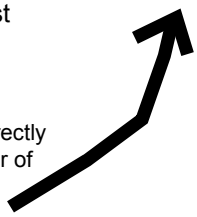
Using Productive Phonological Knowledge to Accelerate Progress

- Consistency of error
  - Select phonemes that are most frequently in error



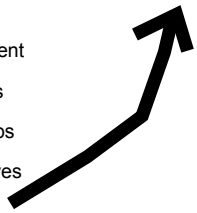
Using Productive Phonological Knowledge to Accelerate Progress

- Start with the least knowledge
  - Not stimulable
  - Is produced incorrectly in greatest number of contexts



Using Productive Phonological Knowledge to Accelerate Progress

- Start with the most complex phonemes
  - Sonorant over obstruent
  - Voiced over voiceless
  - Continuants over stops
  - Affricates over fricatives



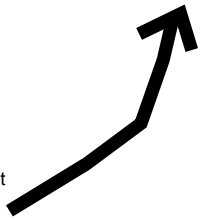
Gierut. J. (2001). Complexity in Phonological Treatment: Clinical Factors. *LSHSS*, *32*, 229 – 241.

Complexity Hierarchy

- True Clusters
  - Affricates
    - Singletons

Using Productive Phonological Knowledge to Accelerate Progress

- Start with later developing phonemes
  - Gierut's research indicates a cascading effect to improvement of early developing sounds in error when later developing sounds are taught first
  - No similar effect was seen when early developing sounds were taught first.



Gierut, J. A., Morrisette, M. L., Hughes, M. T., Rowland, S. (1996) Phonological treatment efficacy and developmental norms. *LSHSS*, 27, 215-230.

Learnability

- Select targets that are outside the child's system.
- Select targets that are the most marked.

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Six types of Productive Phonological Knowledge displayed by children with phonological disorders (Gierut, 1987)

Lexical Representation	Breadth of Distribution	Phonological Rule
1- adult-like	all positions and all morphemes	none
2 - adult-like	all positions and all morphemes	optional or obligatory rules
3 - adult-like	all positions and some morphemes	fossilized forms
4 - adult-like	some positions/ all morphemes	positional constraint
5 - adult-like	some positions/ some morphemes	combination of types 3 and 4
6 - non-adult-like	all positions and all morphemes	inventory constraint

Six types of Productive Phonological Knowledge - Type 6 (Gierut, 1987)

- A child displaying Type 6 knowledge of target /s/ would produce this sound incorrectly in all word positions and for all morphemes. /s/ would never be produced correctly.

Examples:

[ti]	see
[tup]	soup
[mɪtɪŋ]	missing
[mɪt]	miss
[kɪt]	kiss

Principles of Phonological Intervention

(Fey, 1992)

- Modification of groups of sounds that share a common pattern
- Less emphasis on correct sound production and focus on neutralized contrasts
- More emphasis on using speech sounds for communication purposes

Phonological Intervention

(Fey,1992)

- "I believe that there is only one therapy procedure that embodies all of the three principles …It has as its basic underlying principles the notion of 'minimal contrast' and the functional use of speech to transmit unambiguous messages."

Minimal Pair

- Definition
  - Two words that differ by only one phoneme

Target Selection: Multiple, Maximal Oppositions

- Maximal oppositions: Phonemes having multiple, significant contrasts in place, manner, voicing, and sonorance/obstruence
  - [k] v. [l] - differ in all characteristics
  - [ʃ] v. [g] - differ in place, manner, voicing

Target Selection: Multiple, Maximal Oppositions

- Teach phonemes in maximal contrast word pairs
  - Traditional phonology treatment: cap/tap - target sound contrasted with child's substitution
  - Maximal contrast: Words differ by a single phoneme, but the phonemes differ from each other in multiple ways: Type/ripe (differ in place, manner, voicing and sonorance/obstruence)
  - If targeting multiple phonemes, try to select maximal contrasts between target sounds, especially sonorance/obstruence

How does this work in the "real" world?

- Assessment
- Selecting targets and materials: Maximal contrasts, multiple targets, clusters?
- How does one teach a non-stimulable sound?
- What do IEP goals look like?
- How long will it take?
- Who does this work for?

Assessment

- Goal of assessment: To identify phonemes with the least phonological knowledge
- Single-word assessment: Should have multiple samples of each phoneme in each position
- "Deep" testing: Assess error phonemes in multiple contexts to determine which phonemes are not produced correctly in any context
- Spontaneous language sample: A must for establishing baseline performance

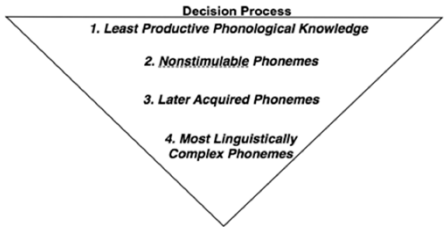
Assessment

- Spontaneous language sample
  - Best done in a known context, such as a story re-tell (this is for the SLP's benefit)
  - RECORD it
  - Transcribe the sample, marking all words with errors
  - Review transcription for any correct production of phonemes previously identified as error phonemes
  - Calculate "Percent Words Correct" by taking total words without any errors divided by the total words spoken

Target Selection Criteria for Greater Efficiency

- Most frequently in error (0 accuracy X contexts)
- Non-stimulable
- Later acquired
- Sonorant over obstruent - or sonorant contrasted with obstruent
- Multiple targets
- Maximal PVM differences
- High frequency word pairs
- Clusters, if possible

The Phonology Funnel



Decision Process

1. Least Productive Phonological Knowledge

2. Nonstimulable Phonemes

3. Later Acquired Phonemes

4. Most Linguistically Complex Phonemes

Why choose higher order sounds?

Selecting Targets

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					ʧ ʤ		
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.

Using the Phonology Funnel to Select Anna's Target Sounds

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		
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Red - all positions, all morphemes
Black - 1-2 positions

Significant phonologic processes: initial consonant deletion, final consonant deletion, deletion of all fricatives, gliding, cluster reduction, syllable deletion.

Target Words and Pairs

she (high frequency)	sh/r contrast	ch/r constrast	l/s contrast
shake - rake	shock-rock	chick - Rick	lip - sip
shack - rack	shoe - Roo	chap - wrap	Lou - Sue
shore - roar	ship - rip	chime - rhyme	line- sign

Target Words and Pairs - Eliciting Initial Fricatives

sh/k, g contrast	sh/l contrast	s/l contrast	ch/l contrast
shape - cape	ship - lip	sip - lip	chip - lip
shoe - goo	jar - car	sock - lock	chalk - lock
shook - cook	Jack - pack	Sam - lamb	chime - lime

Principles of Effective Therapy

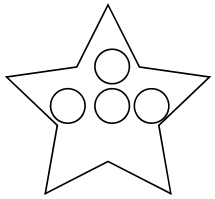
☆A Winning Formula (Rvachew, 2004):

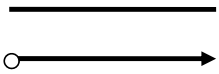
- Traditional articulation therapy
- + Perceptual training
- + Training in letter identification
- + Training in sound-symbol relationships
- + Onset identification
- = Greater progress than articulation therapy alone.

How does this work in the "real" world?

- Gierut: 19-23 sessions
- Anna: weekly sessions throughout the school year - about 30.
  - By February - almost all phonemes were coming into use.
- Expect more rapid change and wider generalization when using target sounds which the child does not use correctly in ANY context

Supporting Strategies





- Road to the Code - Say-it and Move-it
  - Evidence-based practice for phonemic awareness
  - Provides perceptual training and onset identification

Supporting Strategies

- Stimulability training - the Phoneme Inventory
  - Teaches stimulability and sound-symbol relationships simultaneously

Supporting Strategies

- Stimulability training - the Phoneme Inventory
- Teaches stimulability and sound-symbol relationships simultaneously
- Add rime to onsets - get more practice by using target sounds or stimulability targets in rime

Supporting Strategies

- Practice phonemes using high frequency words in sentences
  - She is swimming.
  - She likes to swim.
  - She really likes to swim.
  - She just went swimming.

Writing IEP Goals

- Think in terms of intelligibility and words spoken correctly
- Use “Percent words correct” from the language sample as baseline for the goal
- Keep in mind that not all errors will be eliminated - aim for 60-70%.
- Objectives may be written with respect to maximal pairs, processes, or specific phonemes

Anna - Annual Goal

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

Anna - Sample Objectives

1. ***Anna will imitate the consonants of English in isolation at least 80% accurately (number of consonants imitated correctly/23).***
2. ***Anna will segment 3-5 phoneme words in phonemes 6/8 trials with a model.***
3. ***Anna will imitate high contrast word pairs targeting initial or final consonant deletion (are/far/car, eye/ice) 8/10 trials.***
4. ***Anna will imitate target consonants in high contrast word pairs with 80% accuracy. Target consonants to include [f, ʃ, ʧ, s, z, θ, ð, r, v].***
5. ***Anna will produce familiar high contrast word pairs without a model with 80% accuracy. Target consonants to include [f, ʃ, ʧ, s, z, θ, ð, r, v].***

Anna's progress: Teaching non-stimulable phonemes

- September -
  - [ʃ/r] contrasts
  - Initial fricatives were very difficult - few successful productions
- October -
  - Difficulty with voiceless onset + vowel ([tʃ/r] pairs)
  - Finally stimulable for all consonants ([r] mild distortion)
  - Blended [s] into whispered vowel in CV syllables

Anna's progress: Teaching non-stimulable phonemes

- November -
  - Producing isolated [tʃ], but could not sequence to vowel
  - Began to blend [ʃ] + vowel, produced initial [s] in words
- December -
  - [ʃ]+ vowel successfully sequenced, and some other fricatives with cues and model

Anna's progress: Teaching non-stimulable phonemes

- January -
  - Adding initial fricatives in practice words independently
  - Approximating [r]
- February -
  - Using initial [f] without effort
  - Using medial fricatives independently
  - Using [s] clusters independently
  - Using final [s, z] in formulaic sentences

Anna's progress: Teaching non-stimulable phonemes

- March -
  - Reduced final deletion and stopping
  - Stimulable for final [s, z] - "does" - high frequency practice
  - End of March - only one medial deletion noted; consistently deleted 3rd person [s] in conversation, but used correctly in practice sentences
- April and May -
  - "Cleaning up" errors

Anna - Fall

Consonant Chart

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

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Red - all positions, all morphemes
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Significant phonologic processes: initial consonant deletion, final consonant deletion, deletion of all fricatives, gliding, cluster reduction, syllable deletion.

Anna - Spring

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		
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Sonorant	Nasals	m			n		ŋ	
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Red - all positions, all morphemes
Black - 1-2 positions

Significant phonologic processes: gliding, stopping [d/ ð], deaffrication [ʃ/ʧ], initial and final consonant deletion, weak syllable deletion, cluster reduction.

Anna – February of Kindergarten

- Video

Which children are candidates?

- Children with multiple speech sound errors
  - 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

Worth the time?

- One hour of analysis may equal less than a year of therapy
- Global change and generalization
- "Sign me up for speech next year!"

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