PART 2
CAS AND PHONOLOGICAL DISORDER

PRESENTATION FOR
NORTH SUBURBAN SPEECH-LANGUAGE ASSOCIATION
12-3-22

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DISCLOSURES

FINANCIAL DISCLOSURES
- I received a stipend from NSSLA for this presentation
- I receive royalties from Plural Publishing for sales of "Here's How to Treat Childhood Apraxia of Speech: Third Edition"

NONFINANCIAL DISCLOSURES
- I have not relevant nonfinancial disclosures

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AGENDA

- Review 8 treatments for CAS
- Match children from case studies with the most appropriate treatment(s)
- Review 4 treatments for Phonological Disorders
- Match children from case studies with the most appropriate treatment(s)
- Determine appropriate target utterances for each appropriate phonological treatment
- Question and answers

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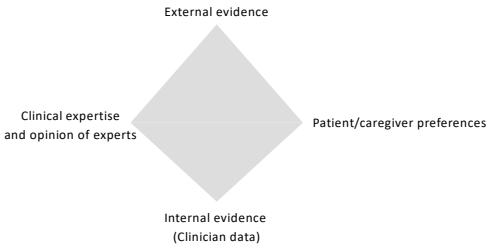
Evidence-Informed Decision Making



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DTTC

DYNAMIC TEMPORAL AND TACTILE CUEING

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Dynamic Temporal and Tactile Cueing (DTTC)

- **COARTICULATION** of speech movements, not individual phonemes
- **FOCUS** on improvement of *movement*
- **PROPRIOCEPTION** Increase proprioceptive awareness by maximizing proprioceptive input
- **INTENSITY** Maximize # of practice trials per session
- **TARGET UTTERANCE SELECTION** Carefully select functional and meaningful targets
- **CUEING** Provide visual/auditory and additional cues as needed
- **FADING** Gradually fade cues to promote carryover

Strand (2020)

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DTTC

- Appropriate for children with **severe CAS** in **early stages of speech development**
- Considered an initial, and often **relatively brief** intervention method
- **Several research studies** have examined the efficacy of DTTC for children with CAS

Strand & Debertine 2000; Strand, Stoeckel & Bass 2006; Bass et al. 2008

- Several research studies have used DTTC as the treatment approach in comparison studies to examine various aspects of the **Principles of Motor Learning**

Edeal & Gildersleeve-Neumann 2011; Maas et al. 2012; Maas & Farinella 2012; Maas et al. 2019

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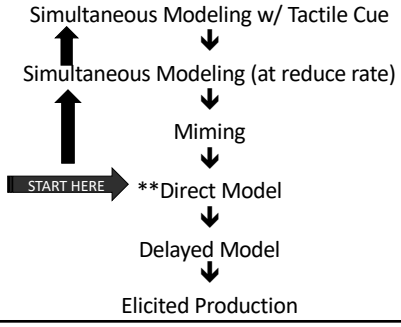
DTTC Cue Sequence-Example



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DTTC

Keep in mind…

- **Be flexible** in your cueing decisions
- Children should be provided with **just the right amount** and **type of cueing** to support the most accurate productions possible
- Care should be taken to **reduce dependence** on cueing and feedback
- Consider **3 accurate productions** at a specific level of cueing as a "rule of thumb" before moving toward a ***less salient cue***.
- At each step of practice, work toward **normal rate** and **varied prosody** in productions of target utterances

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IPA

INTEGRATED PHONOLOGICAL AWARENESS INTERVENTION

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IPA

- **Linguistically-Based** treatment
- **Simultaneously addresses**: speech production (using minimal pairs), phonemic awareness, and letter-sound association
- "Words containing **target speech sounds or patterns are used as stimuli during phonological awareness activities** to strengthen phonological representations that drive speech production" (McNeill and Gillon, 2021)
- Phonological awareness skills targeted:
  - **Letter knowledge**
  - **Phoneme identity and Phoneme matching**
  - **Phoneme blending**
  - **Segmenting**

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IPA

- **Letter knowledge**
  - Recognizing letters of alphabet
  - Naming letters of alphabet
  - Associating phonemes with letters (/p/ = P)
- **Phoneme identity and Phoneme matching**
  - Sample game /k/ versus /m/: Crunching crocodile eats only things beginning with /k/ sound (cow, carrot, cup); Munching monkey only eats things beginning with /m/ sound (mouse, movie, moon)

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IPA Intervention Examples

- **Onset + Rime Blending and Phoneme Blending**

Articulation target - initial /s/

Soup = 's' + 'oup'

Sun ='s' + 'un'

Articulation target – Final consonants /t/ and /p/

Mat = m + at; Map = m + ap

Hot = h + o + t; Hop = h + o + p

- **Phoneme Segmentation**
  - Teach the puppet to talk by saying the word slowly ("c__ow")

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IPA

- McNeill et al. (2009) and Hume et al. (2018) examined use of IPA Intervention in children with CAS – findings suggest **IPA facilitates improved speech production** and **phonological awareness** in children with **CAS**
- Appropriate for children with **mild – to – moderate CAS and phonological impairment**, preschool and older, who **struggle with** both **motor speech control** and **phonological awareness**

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PROMPT

PROMPTS FOR RESTRUCTURING ORAL MUSCULAR PHONETIC TARGETS

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PROMPT

- **Multiple domains** – Unique in CAS approaches – treat child across physical-sensory, cognitive-linguistic, and social-emotional domains
- Incorporates specific **tactile/kinesthetic/proprioceptive input** to facilitate accurate production of phonemes, words, phrases – **Requires advanced training**
- Designed to:
  - **Stabilize** the motor system
  - **Mobilize** the motor system
  - Utilize appropriate **muscle movements**
  - Reduce or **inhibit ineffective movements**
- Ultimate goal is to develop "the **independent**, **flexible** and **coordinated** use of all articulators … for **efficient** speech production" (Hayden, 2004, p. 97)

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PROMPT

Beneficial for children (6 months an above) and adults with a **wide range of motor speech disorders** at **various levels of severity**

Focus on functional language in the context of social interaction

2013 study by Dale and Hayden examined efficacy of PROMPT in 4 children with CAS.

Results: PROMPT was **effective in improving production of trained and untrained targets** in facilitating greater speech intelligibility in children with CAS; **modest evidence for Tactile Cues** adding to effectiveness of PROMPT

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PROMPT

Children participate in both **drill-type activities** and then more **functional activities** (game, book, toy) to address the same goals

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ReST

RAPID SYLLABLE TRANSITION TREATMENT

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ReST

- Designed for children with CAS to facilitate improved:
  - ***SOUNDS*** **- Phoneme accuracy and consistency**
  - ***SMOOTHNESS*** **- Speed** and **fluidity of transitions** from one syllable to the next
  - ***BEATS*** **-** Appropriate **lexical stress**
- Targets used are **phonotactically permissible pseudo-words** (CV.CV, CV.CV.CV) with **varied stress assignment**
- Suitable for **mild-to-moderate CAS** in children able to sustain attention to **structured tabletop work**

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REST

- 2015 randomized control trial study by Murray et al. showed positive results for supporting improvement in:
  - **Segmental accuracy/consistency**
  - **Coarticulation**
  - **Prosody**
- Training materials **available online**

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SAMPLE ReST NONSENSE WORDS

gantibee	gabbity
fargeber	booteger
bofegee	borgify
forbitty	Gofiter
toofeber	forbeter
goofeber	bartifer
toogefy	fabarger
tegooner	bemater
begater	gefoober
fabeemer	tefeener

http://sydney.edu.au/health-sciences/rest/

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SAMPLE ReST NONSENSE WORDS

Speech goals:

- Increasing segmental accuracy of CVCV targets
- Reduce gaps between syllables
- Increase accuracy of syllable stress assignment

Nonword targets contain 4 consonant and 3 vowel phonemes (plus schwa) that vary in place/manner/voicing

Strong-Weak	**Weak-Strong**
Kee-duh	Kuh-dee
Bow-duh	Buh-dough
Fah-buh	Fuh-bah
Dough-fuh	Du-foe
Dee-kuh	Duh-key

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SAMPLE ReST NONSENSE WORDS

Speech goals:

- Increasing segmental accuracy of CVCVCV targets
- Reduce gaps between syllables
- Increase accuracy of syllable stress assignment

Nonword targets contain 4 consonant and 3 vowel phonemes (plus schwa) that vary in place/manner/voicing

Strong-Weak-Weak	**Weak-Strong-Weak**
Fah-buh-kuh	Fuh-**bah**-kuh
Kah-buh-fee	Kuh-**bah**-fee
Dee-fuh-buh	Duh-**fee**-buh
Bow-duh-fuh	Buh-**dough**-fuh
Co-fuh-bee	Kuh-**foe**-bee

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VISUAL BIOFEEDBACK

- **ELECTROPALATOGRAPHY**
- **ULTRASOUND BIOFEEDBACK**

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VISUAL BIOFEEDBACK

ELECTROPALATOGRAPHY (EPG)

- A **dental retainer** covering the palate is **created** from a dental mold – it is **covered with electrodes**
- **Retainer attached** via USB cable **to computer** to see a **visual display of the palate** and the **tongue to palate contacts** in real time
- A visual display of the preferred placement is used and **child attempts to match tongue placement to visual display** that will light up when achieved

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ELECTROPALATOGRAPHY

- The **SmartPalate** technology is used for grade-school children through adult who have struggled to achieve certain lingual consonant phonemes
- Designed to:
  - **Increase tactile awareness** of and more **accurate production** of phonemes in which there is **tongue to palate or lip to lip contact**.
  - Ultimate goal is to **develop increased phoneme accuracy** and improved overall **speech intelligibility.**

Lundeborg, I., & McAllister, A. (2007)

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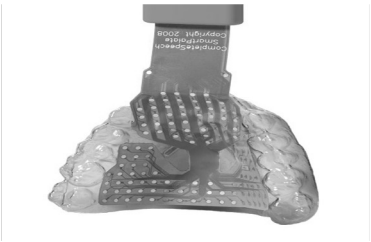
ELECTROPALATOGRAPHY
SMART PALATE



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SMART PALATE

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VISUAL BIOFEEDBACK

ULTRASOUND BIOFEEDBACK

- An **ultrasound probe** (just like a fetal ultrasound probe) is placed **under the chin** in one of two positions, depending on the view you want to achieve (dorsal or sagittal)
- Client attempts to **achieve predetermined placement and shape of tongue for specified sound** with **visual display** on **computer** in real time
- Some **positive results** with children with CAS working on acquiring **residual phonemes** (Preston et al 2013, 2016, 2017)

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ULTRASOUND BIOFEEDBACK

- Ultrasound biofeedback is used primarily for **older children age 7+ with persistent speech sound disorders, including CAS**
- It provides **visual cueing by way of ultrasound technology** to elicit **correct tongue placement** for production of lingual phonemes
- Ultimate goal is to **develop increased phoneme accuracy** and improved overall **speech intelligibility.**

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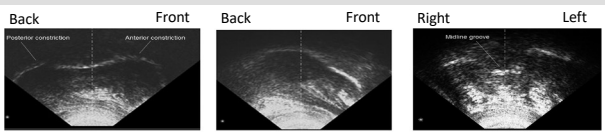

Side view correct /r/ | Side view incorrect /r/ | Front view correct /r/

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PROGRAMS WITH PRELIMINARY EVIDENCE

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BBC

BABBLE BOOT CAMP

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BBC

- Developed for infants with Classic Galactosemia (CG) because of their known risk for developing motor speech disorders and they are identified at birth
- Proactive treatment
- Begins as early as 2 months up to 24 months
- Via telepractice

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BBC

- Parents are educated about normal development and red flags for speech-language disorders/delays
- Parents are coached in a progression of activities and routines that support typical speech-language development

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BBC (17 activities and routines)
Sample Activities and Routines from BBC

Expected age of acquisition	Activities and Routines
Birth-24 months	1. Make regular eye contact
Birth-8 months	3. Use facial expressions to show emotions and establish bonding
2-8 months	5. Imitate and respond to child's coos
4-8 months	6. Make silly faces and play Peek-a-Boo
6-12 months	9. Model and shape greeting (waving "hi")
6-24 months	11. Read books together
8-18 months	12. Create photo book to show pictures of important people, places, and objects
8-24 months	14. Label people and objects baby points to
12-18 months	16. Expand single words into short phrases

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K-SLP

KAUFMAN SPEECH TO LANGUAGE PROTOCOL

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K-SLP

- Teaches **acceptable phonetic modifications** for **high-impact vocabulary** to help children gain communicative power & confidence
- Uses **successive approximations/shaping** to support improved motor planning
- **Modeling** of accurate productions by SLP follows the child's simplified productions
- Appropriate for children with **moderate – to – severe CAS**
- **Preliminary research** (Gomez et al., 2018)
- Additional research **forthcoming**

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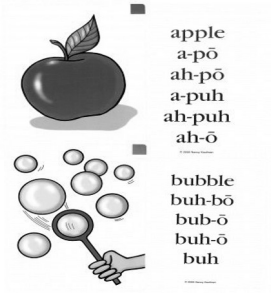
SAMPLE KAUFMAN PICTURES



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SAMPLE KAUFMAN PICTURES

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K-SLP STEPS

1. Use evaluation findings to determine child's phoneme and syllable shape repertoire and **begin to establish core vocabulary** using **best approximations** in functional activities
2. Gradually **shape closer and closer approximations** as child's motor speech skills improve
3. Establish **pivot word phrases** (e.g., my ___, hi ___, no ___, ___ in) and **functional phrases** (e.g., go home, my turn, help me)
4. Establish **increased complexity of syntax and grammar** while continuing to **shape** improved accuracy of target phonemes and sequences

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K-SLP

- K-SLP is appropriate for children ages 2 and above who have or are suspected of having CAS.
- K-SLP promotes shaping of target words through simplifying motor plans and then gradually shaping them into accurate target utterances.
- Promotes early language development
- Promotes functional utterances
- Promotes gradually more complex syllable shapes

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CASE STUDIES

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CASE STUDY #1 - JAYDEN

Age: 2 years, 10 months

- Expressive language – delayed
- Receptive language – strong
- Diagnoses – CAS and expressive language delay
- Syllable shapes repertoire - V, CV
- Phoneme repertoire - /b, d, m, n, ɑ, u, ʌ, ɪ/
- Cueing - Reliant on modeling to produce target words

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JAYDEN

What program(s) may be appropriate for Jayden at this time?

- ❑Dynamic Temporal and Tactile Cueing (DTTC)
- ❑Integrated Phonological Awareness Intervention (IPA)
- ❑Prompts for Restructuring Oral Muscular Phonetic Targets (PROMPT)
- ❑Rapid Syllable Transitions (ReST)
- ❑Visual Biofeedback (Ultrasound and/or Electropalatography)
- ❑Babble Boot Camp (BBC)
- ❑Kaufman Speech to Language Protocol (K-SLP)

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CASE STUDY #2 - KARA

Age: 4 years, 5 months

- Receptive Language – Mildly delayed; difficulty comprehending spatial concepts
- Expressive Language – Speaks in 2- to 4-word utterances; telegraphic language patterns
- Social Interaction – Prefers to speak with adults; shy and hesitant with peers
- Verbal behavior - Poor intelligibility in connected speech in unknown contexts; improving, but remains reliant on cueing to achieve accurate productions of targets
- Phoneme repertoire - /p, b, t, d, m, n, w, h/; /f, s/(final position only); Holes in vowel repertoire – many distortions in connected speech
- Syllable shape repertoire – CV, VC, CVC, CVCV, CVCVC, CVCVCV
- Diagnoses - CAS; Expressive language impairment; Receptive language impairment

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KARA

What program(s) may be appropriate for Kara at this time?

- ❑Dynamic Temporal and Tactile Cueing (DTTC)
- ❑Integrated Phonological Awareness Intervention (IPA)
- ❑Prompts for Restructuring Oral Muscular Phonetic Targets (PROMPT)
- ❑Rapid Syllable Transitions (ReST)
- ❑Visual Biofeedback (Ultrasound and/or Electropalatography)
- ❑Babble Boot Camp (BBC)
- ❑Kaufman Speech to Language Protocol (K-SLP)

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CASE STUDY #3 - MATEO

Age: 5 years, 9 months

- Receptive Language – Mildly delayed
- Expressive Language – Moderately delayed
- Social Interaction – Very outgoing; has some close friends in school and in community
- Phoneme Repertoire - Produces all vowels except rhotics; Stimulable for all consonants with the exception of /r, ʧ, ʤ, θ, ð/
- Syllable Shapes - Can produce complex syllable shapes and multisyllabic words, but needs to be focused and relies on cueing
- Errors – Primarily omissions (cluster reduction, syllable deletion) and substitutions
- Intelligibility - Moderately impaired
- Prosody – Improving, but choppy in longer utterances and multisyllabic words
- Academics - Delayed development of phonological and phonemic awareness skills

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MATEO

What program(s) may be appropriate for Mateo at this time?

❑Dynamic Temporal and Tactile Cueing (DTTC)

❑Integrated Phonological Awareness Intervention (IPA)

❑Prompts for Restructuring Oral Muscular Phonetic Targets (PROMPT)

❑Rapid Syllable Transitions (ReST)

❑Visual Biofeedback (Ultrasound and/or Electropalatography)

❑Babble Boot Camp (BBC)

❑Kaufman Speech to Language Protocol (K-SLP)

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Case Study #4 – Henry
Age 10 years, 2 months

- Receptive Language – Moderately delayed
- Expressive Language – Moderately - severely delayed; speaks in shorter sentences; limited use of complex sentences; limited marking of morphological units
- Diagnoses - learning disabilities, receptive and expressive language impairment, CAS
- Phoneme Repertoire - Complete phoneme repertoire, however… **Frequent errors** in production of the following phonemes (omissions and substitutions): **/k, g, ch, j, l, r/** (pre- and post-vocalic); **/s, z/** (post-vocalic)

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Henry

Other speech findings:

- Errors - Increased errors with:
  - increased word shape complexity
  - increased utterance length
  - increased rate of speech
  - decreased structure and cueing
- Prosody - Incorrect stress assignment and specific difficulty with iambic stress patterns; often omits weak syllables; Robotic-sounding with syllable gaps when trying to increase intelligibility (this is beneficial for increased intelligibility, but odd sounding)
- Spontaneous language - Limited use of strategies to improve intelligibility without being cued to do so

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Henry

What program(s) may be appropriate for Henry at this time?

❑Dynamic Temporal and Tactile Cueing (DTTC)

❑Integrated Phonological Awareness Intervention (IPA)

❑Prompts for Restructuring Oral Muscular Phonetic Targets (PROMPT)

❑Rapid Syllable Transitions (ReST)

❑Visual Biofeedback (Ultrasound and/or Electropalatography)

❑Babble Boot Camp (BBC)

❑Kaufman Speech to Language Protocol (K-SLP)

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PHONOLOGICAL INTERVENTIONS

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PHONOLOGICAL INTERVENTIONS

- Minimal Pairs Intervention (with Perception Training)
- Cycles Approach
- Complexity Approach
- Multiple Oppositions Intervention
- Integrated Phonological Awareness (IPA)

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MINIMAL PAIRS APPROACH

- Incorporates **word pairs** that differ by one phoneme
  - Typically, targets include the **target phoneme** and the child's **substitution error**
    - Backing (go/dough; can/tan)
  - Targets may include the target **omission errors**
    - Final consonant deletion (bow/boat; me/mean)
    - Cluster reduction (boo/blue; gas/grass; wheat/sweet)
- **Perception training** often incorporated into treatment
- **Major Tenet - Pragmatic distinctions** made during treatment (verbally or nonverbally) support learning to make phoneme distinctions
- Appropriate for **mild or mild-moderate** phonological disorders
- More severe children better served by other phonological approaches

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CYCLES APPROACH

- Appropriate for children with **severe to profound** expressive phonological impairment
- **Intelligibility below 20%**
- Each appropriate **target pattern** (a frequent pattern for which the child is stimulable) is targeted over a **cycle** of 10-15 weeks (depending on the number of patterns being addressed and number of phonemes within each pattern being addressed)
- **Each phoneme** in the pattern (e.g., /s/ for stopping; /g/ for fronting) is **targeted for 60 minutes per cycle**
- **Major tenet** – children make better progress when they **practice targets for which they are stimulable** with assistance
- Shown to also be successful with children with otitis media, hearing loss, cochlear implants, cognitive impairment
- **Dosage** – one 1-hour session per week; there 20-minute session per week; two 30-minute sessions per week

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COMPLEXITY APPROACH

- Studies have shown it to be appropriate for children **ages 3- to 8-years** with functional phonological impairment
- Children scoring **at least one standard deviation below the mean** on standardized articulation test and **at least 6 phonemes in error**
- Goal – to **improve intelligibility** by promoting **system-wide gains** in the sound system
- **Major tenet** – choosing the **most complex phonemes** will **promote widest gains** in child's sound system – chosen targets should be…
  - Phonetically complex
  - *Non-stimulable (for most targets)
  - Later-developing
- Complexity approach is **not based on contrast pairs**

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COMPLEXITY APPROACH

SELECTING TARGETS

- Complex targets induce more efficient change in the sound system
- Look at implied relationships between classes of sounds – That is… If a language contains… X … there is an implication that it must contain … Y …
- In the English language, we note these implications…
  - **Affricates** imply fricatives
  - **Fricatives** imply stops
  - **Voiced obstruents** (stops, fricatives, affricates) imply voiceless obstruents
  - **Liquids** imply nasals
  - **Velars** imply coronals
- Cluster implications…
  - **Clusters** imply singletons
  - **Clusters** imply affricates
  - **Fricative + liquid clusters** imply Stop + liquid clusters
  - **Three-element clusters** imply two-element /s/ clusters

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COMPLEXITY APPROACH

Three-element clusters: /str, spr, skr, spl, skw/

- Choose one of these to target if child is able to produce both phonemes #2 and #3 in at least two words (as singletons)

Two-element clusters:

- Choose a 2-element cluster if child does not qualify for working on 3-element clusters
- Good 2-element clusters to target: /sl, fl, fr, θr, ʃr/ (only if child is not stimulable for either of element of the cluster)

Singleton phonemes:

- Choose phoneme that is most marked (most challenging/later developing)
- Choose target for which child is not stimulable
- Use singleton stimuli only if child has acquired most cluster combinations

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MULTIPLE OPPOSITIONS INTERVENTION

- Appropriate for **children ages 3- to 8-years** with **multiple sound errors**; **limited** phoneme **inventories**, restricted distribution of sounds across word positions (e.g., /du/ produced for *do, two, Sue, shoe, coo, goo, chew, true, stew, drew*)
- **At least six sounds in error** across three different manner classes of sound production resulting in **moderate to profound impairment** of speech intelligibility
- Goal – to **improve intelligibility by reducing homonymy**
- **Major tenets** – phonemes are **contrastive** to signal **differences in meaning**; treatment targets are **maximally distinct** from each other in **place/manner/voicing**
- Practice contrastive **word sets**
  - do, shoe, coo, stew
  - dop, shop, cop, stop
  - day, Shea, K, stay

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CASE STUDIES

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CASE STUDY #1

GENERAL INFORMATION - Male

- 3 years, 10 months
- Diagnostic Evaluation of Articulation and Phonology (DEAP) Phonology Score: Scaled score 3
- PCC-38% (Profoundly impaired)
- PVC-93% (full vowel repertoire except for rhotics)
- Consonant repertoire - /p, b, t, d, m, n, w, j, h, s/
- Restricted sound distribution: /s/ only in syllable final position; /p, b, t, d, m/ only in syllable initial position; /n/ in initial and final positions
- Phonemes absent from repertoire /k, g, f, v, z, ʃ, tʃ, dʒ, l, r, ð, θ/

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CASE STUDY #1

PATTERNS OBSERVED

- Fronting of velars
  - /t/ for /k/ and /d/ for /g/
- Stopping
  - /t/ for /s, ʃ, tʃ, θ/
  - /d/ for /z, ʒ, dʒ, ð /
  - /p/ for /f/
  - /b/ for /v/
- FCD – 52%
- Cluster reduction – one 2-element /tw/, and no 3-element clusters
- Liquid gliding and vowelization of /l/ and /r/
- Final /s/ for /s, ʃ, tʃ, f, θ/
- Final /n/ for /n, ŋ, m/
- High degree of homonymy
- Significant phoneme collapse

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TREATMENTS THAT MAY BE APPROPRIATE

- ❑Minimal pairs
- ❑Cycles approach
- ❑Complexity approach
- ❑Multiple oppositions approach
- ❑Integrated phonological awareness

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POTENTIAL TARGETS BASED ON TREATMENT APPROACH

CYCLES APPROACH	COMPLEXITY APPROACH	MULTIPLE OPPOSITIONS APPROACH
CYCLE 1 Which targets would you address in the first cycle?	Can we address 3-element clusters? If not, can we address 2-element clusters? If not, which singleton(s) is most *marked*?	What set of targets can we address?

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CASE STUDY #2

GENERAL INFORMATION

Female

- 4 years, 9 months
- Diagnostic Evaluation of Articulation and Phonology (DEAP) Phonology Score:
- PCC- 65% (moderately severe)
- PVC-98% (full vowel repertoire except for rhotics)
- Consonant repertoire - /p, b, t, d, m, n, w, j, h, s, z, f, ŋ, ʃ/
- Phonemes absent from repertoire - /k, g, v, tʃ, dʒ, l, r, ð, θ/
- Restricted sound distribution: /s/ and /ʃ/ only in syllable final position; /p, b, t, d, m/ only in syllable initial position; /n/ in initial and final positions

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CASE STUDY #2

PATTERNS OBSERVED

- Fronting of velars (stimulable for /k/ in isolation)
  - /t/ for /k/ and /d/ for /g/
- Deaffrication (stimulable for /tʃ/ in isolation)
  - /ʃ/ for /tʃ/
  - /z/ for /dʒ/
- Final consonant deletion (stimulable)
- Liquid gliding and vowelization of /l/ and /r/ (not stimulable)
- /f/ for /θ/ initial; /d/ for /ð/ (not stimulable)
- Cluster reduction
  - omission of /s/ for initial /s/ clusters (stimulable for some clusters)
  - omission of /l/ and /r/ for all /l/ and /r/ clusters (stimulable for adding /w/ to cluster, as in /bwack/ for *black*; /gween/ for *green*

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TREATMENTS THAT MAY BE APPROPRIATE

- ❑Minimal pairs
- ❑Cycles approach
- ❑Complexity approach
- ❑Multiple oppositions approach
- ❑Integrated phonological awareness

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POTENTIAL TARGETS BASED ON TREATMENT APPROACH

MINIMAL PAIRS	CYCLES APPROACH	COMPLEXITY APPROACH
Which contrast pairs can we address?	Cycle 1 Which patterns should we address first?	Can we address 3-element clusters? If not, can we address 2-element clusters? If not, which singleton(s) is most *marked*?

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CASE STUDY #3

GENERAL INFORMATION

- Male
- 5 years, 2 months
- Diagnostic Evaluation of Articulation and Phonology (DEAP) Phonology Score:
- PCC-79% (mild-moderate level of severity)
- PVC-84% (distortion of some lax vowels /ɪ/ and /ɛ/ and simplification of diphthongs /aɪ/ and /ɔɪ/)
- Consonant repertoire - /p, b, t, d, k, g, m, n, ŋ, w, j, h, s, z, f, v, l/
- Phonemes absent from repertoire - /ʃ, tʃ, dʒ, r, ð, θ/

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CASE STUDY #3

PATTERNS OBSERVED

- Fronting (stimulable for /k/ and /ʃ/, but not for /g/)
  - /t/ for /k/ and /d/ for /g/
  - /s/ for /ʃ/
- Deaffrication (stimulable)
  - /t/ for /tʃ/
  - /d/ for /dʒ/
- Liquid gliding and vowelization of /l/ and /r/ (not stimulable)
- /f/ for /θ/; /d/ for /ð/ (not stimulable)
- Cluster reduction
  - inconsistent production of 2-element /s/ clusters
  - 2-element /l/ and /r/ clusters produced with /w/ (“bwue” for blue; “dween” for green)

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TREATMENTS THAT MAY BE APPROPRIATE

- ❑Minimal pairs
- ❑Cycles approach
- ❑Complexity approach
- ❑Multiple oppositions approach
- ❑Integrated phonological awareness

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POTENTIAL TARGETS BASED ON TREATMENT APPROACH

MINIMAL PAIRS	CYCLES APPROACH w/ Integrated Phonological Awareness	COMPLEXITY APPROACH
Which pairs could be addressed?	Which patterns would be addressed in initial cycle?	Can we address 3-element clusters? If not, can we address 2-element clusters? If not, which singleton(s) is most *marked?*

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QUESTIONS AND ANSWERS

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