Working with bilingual children who have childhood apraxia of speech

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Disclosures:

- I am Associate Professor and Chair in Speech and Hearing Sciences at Portland State University in Oregon.
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WEBINAR OUTLINE

- Characteristics of CAS in the Bilingual
- Bilingual Assessment of CAS
- Treatment of CAS in bilinguals
- Questions

Bilingual Speech Development

- Same as monolinguals
  - Phonological systems
    - Function & Constraints of sounds/word shapes
  - Articulatory aspects necessary
    - Motor Planning
    - Motor Execution
- Child's language(s) superimposed on these developing abilities

A bilingual child's phonological system is

- Two languages that are
  - separate
  - but nonautonomous

Bilingual Children

- Reach developmental milestones at same time as monolinguals
- Develop two languages at different rates
- May look slower in early development than monolingual peers because
  - Error rates slightly higher
  - Accuracy rates slightly lower
- BUT if compare to monolinguals
  - Only looking at half of child's speech
  - Language-specific speech development differs

Understanding Bilingual

- Look at overall/composite development to understand whole phonology
  - May have different skills in each language
- Phonology of each language matters
  - If more complex consonant system, may take longer to master
  - Initially
    - Shorter words may be more intelligible
    - Simple syllable shapes may be more accurate
    - Vowels may be mastered sooner if language has few vowels

Childhood Apraxia of Speech (CAS)

- Core impairment in
  - planning or programming speech movements
- 3 Subtypes
  - Idiopathic
  - Neurological Etiologies
  - Subcomponent of Complex Neurobehavioral Disorders

ASHA (2007). ASHA Position Statement on CAS.

Key Differential Signs

1. Segmental Errors
   - ❑ Inconsistent consonant and vowel errors in repeated productions of words;
     - Independent motor planning of words
     - For vowels, not only developmental errors
2. Syllable- or Word-Level Errors
   - ❑ Lengthened and disrupted articulatory transitions
     - Difficulty with articulatory sequencing
     - Difficulty with words as they get longer
     - Breaks between consonants & vowels
3. Suprasegmental Errors
   - ❑ Excess equal stress
   - ❑ Monotone
   - ❑ Difficulties regulating rate, nasality, loudness, pitch

Other Reported Signs of CAS

- Phonetic inventory > than phonemic inventory
  - Produces sounds that doesn't use correctly.
- Uneven development of phonetic inventory
- Increased errors on longer utterances
- Difficulty imitating
- Diadochokinetic tasks slow/fast/irregular
- High incidence of vowel errors

Note: based on English monolinguals

Davis, Jakielski, & Marquardt, 1998

Differential Signs in Bilinguals?

- Still
  - Segmental, Syllable-Level, Suprasegmental
- Caution
  - Characteristics of CAS have English phonology as prototype
- External presentation of CAS depends on language properties

Example: CAS in Spanish

- Compared to English, Spanish Phonology has
  - Fewer vowels
  - Simpler syllable shapes
    - fewer final consonants and consonant clusters
  - Longer words
  - Different consonants (fewer fricatives)
- Possible differences in CAS presentation
  - Vowel errors lesser impact
  - Excess equal stress present
  - Syllable & utterance-level errors largest impact
    - Motor planning errors
    - Inconsistent and incomplete obstruction of consonants

Unique to Bilingual with CAS

- Difficulty with generalization within and across languages
  - During development
  - During treatment
  - Lack of metaphonological skills
    - Transfer across languages

Assessment

Differential Diagnosis: Speech Sound Disorder vs. CAS

- Both groups have
  - Consonant, Vowel, Word Shape Errors
  - Low intelligibility
- Children with CAS:
  - Accuracy doesn't match phonetic inventory
  - Vowel errors (beyond developmental)
  - Suprasegmental errors
  - Difficulty with the motor plan
  - Inconsistent, unpredictable errors

Possible CAS Assessment Protocol

- Single-word articulation test or sample
  - Word repeated 3 times (NOT in a row)
  - DEAP, GFTA, etc.
- Connected speech sample
  - Productions of multisyllabic words that are said more than once (eg., *dinosaur*, *animal*)
    - Look for in consistency
- Speech mechanism evaluation
- Diadochokinesis testing (Maximum Performance Protocol *(Rvachew, Hodge, Ohberg, 2005)*
  - *CAS may have arrhythmic productions or inability to sustain movement over longer periods*
- Syllable repetition task *(Shriberg & Lohmeier, 2008).*

Bilingual CAS Assessment Protocol

- In Both Languages
  - Repeated production of single words (3x)
  - Connected speech sample.

CAS Factors Checklist Both Languages

- ❑ Contrast stress, intonation patterns. Volitional control of
  - ❑ Intonation
  - ❑ Stress variation
  - ❑ Loudness
  - ❑ Rate
  - ❑ Pitch
- ❑ Compare words and sounds in words that increase in complexity
  - ❑ Phonetic
  - ❑ Word length

Bilingual CAS Assessment Protocol

- In Preferred Language:
  - Parent Interview/Background
    - Proficiency & Use of Each Language
  - Oral Mechanism Evaluation
  - Syllable Repetition Task *(Shriberg & Lohmeier, 2008)*
  - Maximum Performance Protocol *(Rvachew, Hodge, Ohberg, 2005)*

If SLP Doesn't Speak L1

- Still need to assess both
- Research speech characteristics of 2nd language
  - Phonemes, phonotactics
  - Child's dialect
- Consider how phonology of home language (L1)
  - Differs from 2nd language (L2)
  - Could affect presentation of CAS

If SLP Doesn't Speak L1

- Train & work closely with interpreter
  - Interpreter will interact directly in L1
  - SLP will advise
  - Explain how CAS presents, where you think characteristics of CAS may manifest in L1
- Goals
  - Understand CAS presentation in both languages
  - Explore overall inventory
    - What overall speech skills does the child have?
      - Phonemes, Word shapes, Word length
  - Compare shared/unshared phonemes

Additional Review Information

- Language development in both languages
  - Rule out/understand concomitant expressive/receptive language disorder
- Hearing testing
- Cognitive testing
- Functional communication

CAS Factors Checklist

- ❑ What do repetition of multisyllabic words look like?
- ❑ Stimulability
  - ❑ Can child produce difficult sounds with cues?
    - ❑ Tactile
    - ❑ Visual
    - ❑ Auditory
    - ❑ Kinesthetic
  - ❑ Can child produce longer words with cues?
    - ❑ Tactile
    - ❑ Visual
    - ❑ Auditory
    - ❑ Kinesthetic

Analysis: Complete:

- ❑ How accurate is /pʌtʌkʌ/
- ❑ Across Languages & Composite
  - ❑ Inventory
    - ❑ Sounds & word shapes child produces
  - ❑ Accuracy
    - ❑ Do they use sounds & word shapes accurately?
  - ❑ Are errors consistent
  - ❑ Comparisons multisyllabic words

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To Avoid in Assessment

- Monolingual assessment of bilinguals
- No mention of language in reports
  - Of assessment
  - Of family
- One-language view for individuals with disorder

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Bilingual Assessment Provides

- A full understanding of child's strengths & weaknesses
- More information for Intervention choices
- Knowledge of whether sounds exist in one language and not the other
  - Possibly transfer to second

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Intervention

Intervention for Speech Sound Disorders

- Limited research on intervention for speech sound disorders
- Even less on bilingual children
- Next to none on bilinguals with CAS

Intervention for SSD

- Monolingual & Bilingual children need individualized
  - Treatment approach
  - Plan for language(s) of intervention
- Heterogeneous nature of bilinguals
  - Who speak languages with
  - Proficiency
  - Use

Bilingual SSDs & Intervention

- Disorder and cause of disorder is the same as in monolingual
  - Framework for treatment of CAS doesn't change
  - Need to consider specific language needs, socio-cultural framework
  - Add metaphonological treatment

Why Bilingual Therapy

- Comprehensible to child
- Facilitate learning of both languages (interrelated)
- Child with impairment may have more difficulty transferring new skills to L2.
  - Less known in research

Treatment in L1

- Can use L1 to strengthen L2 (English)
- Learn new information in stronger language, transfer to second language

(Kerper Mora, 2005)

Treatment for CAS includes

- Support for need of 3-5 sessions per week of intense treatment when severity of involvement high
- AAC devices may be used to increase functional communication
- Non-speech oral motor therapy not necessary nor sufficient for improved speech
- Individual rather than group therapy
- Naturalistic environment
  - Support carryover and generalization
- *(ASHA, 2007)*

Treatment for Bilingual CAS

- Children with Speech and/or Language Disorder
  - Need as rich a communication environment as possible
    - Impoverished internal child factors
    - Need for enriched external factors
- Bilingual children with CAS need intense therapy in both languages.
  - At greatest risk of losing L1

(c.f., Kohnert, 2012)

Myths about Bilingualism and CAS

- Need to pick one language because it's CAS
- Parents can choose to speak a language they don't speak
- English is more important
  - Because the SLP can speak it
  - Because the child will need to speak it for school, to be successful
  - Because child is "choosing" English
    - Picking the shorter word is not a conscious language choice

Bilingual CAS Intervention

- Effective for improvement in both languages
  - May be more efficient than monolingual treatment
- Bilingual child
  - Same prognosis for success as monolingual
    - When each child receives best treatment for their needs

Research on Intervention Approaches

- If treat in more L1 than L2
  - High degree of transfer

    (Gildersleeve-Neumann & Goldstein, 2014)
- Treatment for both languages eventually needed
  - Core CAS deficit – generalizability
    - Some treatment won't transfer
    - Specific instruction if linguistic differences across languages.

Considerations

- Elective vs. Circumstantial Bilingual
- Languages families speak
- Current language environment of child
- Who the family interacts with
  - Daily/Annually/Occasionally
- Value of language for
  - Family
  - Child

Bilingual SLP Intervention

- Treat in both languages
  - Determine ratio of therapy to child's current communication needs
    - Ratio will change over time
- Consider functional communication
  - Key words in both languages
  - *Functional parent communication questionnaire – English & Spanish*

    (Wilson & Gildersleeve-Neumann, 2014)

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Bilingual SLP Intervention

- Teach metaphonological transfer
  - *"We said words with /s/ in phrases today. What are /s/ words in Spanish? Let's say them!"*
- Think of language properties in one language as treat other.
  - Longer phrases in English prepare for longer words in Spanish.
- Ratio of English to L2 will differ dependent on child's current need

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How to treat if you don't speak the other language

- Learn the phonological and articulatory properties of L1.
  - And relationship to L2
- Find out important words and phrases in both languages (e.g., FCPQ)

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How to treat if you don't speak the other language

- Train assistant
  - Train this aide in CAS, motor learning, cueing strategies
- Have L1 assistant observe you in L2
- Have assistant provide treatment in L1 with your input & assistance
- You provide meta-transfer tasks

In CAS typically start with

- Shared phonemes
  - Phonemes existing in both languages
  - Overall effect
  - Generalizability

Types of Treatment for CAS

- Focusing on production of speech
  - Integral stimulation/DTTC*
  - Nuffield dyspraxia programme
  - Rapid syllable transition
  - PROMPT
  - Biofeedback

  (see Maas, Gildersleeve-Neumann, Jakielski, Stoeckel, 2014 for review)
- Consider motor learning principles in your treatment

Motor Learning Principles

- #1 – Precursors to motor learning
  - Includes motivation, focused attention, support
  - Critical for Bilingual CAS
- #2 – Therapy Conditions - Generalization
  - Drill to Natural Setting
  - Variability
  - Frequency & length of sessions
  - Language(s) of bilingual sessions
- *#3 – Feedback*
- *#4 - Rate*

Also Important

- **100s of responses per session!**
  - Repetition of sound patterns in meaningful contexts
    - Both languages
  - Functional phrases & settings
- Randomization
  - More learning if vary/not purely hierarchical in complexity *(Skelton, 2004)*
  - Can practice across languages

SLP Decision-Making

- If child has CAS, should the family raise them bilingually?
  - Complex Question
  - Unique Answers
- Experience with many bilingual children with CAS suggest YES

A: Shift in Language Use & Intervention

- Time 1: 3;9, Spanish preschool (2 years)
  - Intervention – Spanish only
    - Early /Shared Phonemes
    - Articulatory sequencing
      - Longer words in Spanish
      - Future multi-word English

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A: Shift in Language Use & Intervention

- Time 2
  - Kindergarten
    - Treatment in English (at school with English-only SLP)
    - Not effective – SLP sought bilingual services

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A: Shift in Language Use & Intervention

- Time 3: First grade
  - Collaborative model
    - School SLP – English,
    - Bilingual SLP - Spanish & English
  - Target phonological properties that transfer
    - Longer word shapes
    - Reduce /s/ distortion
    - Increase multisyllabic word and cluster-level accuracy
  - Academic skills in Spanish for depth of learning

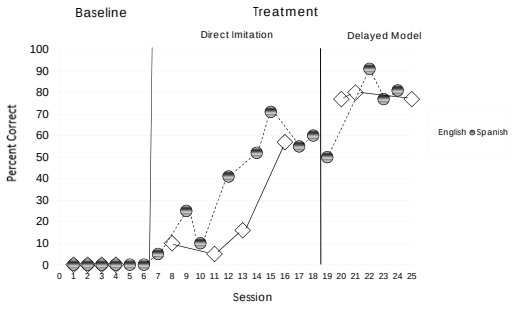
A: Summary

- Early treatment in Spanish-only
  - Strengthen phonological foundation
  - More articulatory practice possibilities
  - Meaningful practice at home
  - Easier to transfer from stronger (L1) to weaker (L2) language
- Bilingual treatment later to match educational setting

B: Effectiveness of Biingual CAS Treatment

- B 5-year-old severe CAS
  - Home 90% Spanish, Preschool 75% English
  - DTTC + phonological strategies
  - Baseline across behaviors treatment design
    - Two targets in both languages
  - Treatment 2-3 times per week for 8 weeks. 50 minute sessions
    - Spanish:English 2:1 Ratio
- *(Gildersleeve-Neumann & Goldstein, 2014)*

Progress: /s/ in words



Pre/Post Test Comparisons

	Speech			
	Pre	Post	Pre	Post
Percentage Measures				
Percent Consonants Correct	40.2	47.8	39.6	54.6
Percent Vowels Correct	82.2	91.5	70.6	83.9
Index of Phonetic Complexity	1.08	1.3	1.3	1.8
Percent Initial Consonants Correct	49.3	66.2	63.9	76.5
Percent Medial Consonants Correct	39.2	42.2	46.8	45.8
Percent Final Consonants Correct	11.1	22.6	22.1	52.3
Error Ratios				
/s/	100.0	88.5	100.0	84.1
Stopping	35.5	21.1	15.9	12.1
Final Consonant Deletion	77.8	71.0	48.8	32.6
Initial Cluster Reduction	86.7	84.2	86.7	69.0
Medial Cluster Reduction	66.7	56.9	47.5	38.9

B: Summary

- Speech improved in both languages
- Treatment focused more on Spanish than English
  - Children's skills stronger in Spanish
  - Parents could aid with practice – words, phrases
  - Children could discuss and apply information from Spanish to English
    - Assistance in generalization through application
- Parent & Teachers Note Importance of Spanish Therapy

L: Change in Needs

- Spanish/English education
- Speech-language therapy in Spanish/English
- Improved in both languages
- Moved back to Mexico

H: Previous Monolingual Decision

- Background
  - Moderate-to-severe CAS identified at 2
  - Parents told
    - CAS too difficult for bilingual
    - Teach English (more important)
  - Treatment in English
  - Home environment Spanish, accept English-only from H
    - Parents don't speak English

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H: Current Bilingual Decision

- At 8
  - Receptive Spanish
  - Expressive English
  - Concerns
    - Academic
    - Behavioral
    - Communication
- Try therapy in Spanish/English
  - Needs both for communication

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“Elective” Bilingual: J

- Moderate apraxia
- 4
  - Maternal family French/English
  - Father English, some French
  - Siblings French/English
  - SLP advised to speak English-only
- Parent decision
  - Continue bilingual

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“Elective” Bilingual: J

- 2 years later
  - In bilingual kindergarten
  - Therapy in English, home application in French
  - Better in English, basic French
    - Same languages as sibling
    - Communicate with extended family
    - Full family participant in language situations
      - As bilingual with CAS

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Elective Bilingual: K

- Background:
  - 4 years old, moderate CAS
  - Family L1 – English
  - Siblings in Spanish-immersion school
  - Place in bilingual school?
- Family factors
  - Same experience as siblings
  - Advantages in overall language learning
  - Many Spanish-speakers in community
  - Bilingual SLP
- Decide immersion

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Elective bilingual at 7: K

- Therapy 2 hours/week in English, ½ hour per week in Spanish
- Improvement in both languages
  - Increase from 65% to 85% intelilgibility in English
  - Late developing consonants not accurate in both languages yet
- Other kids learning Spanish, too!
  - Everyone gets corrected in Spanish (used to be only her in English)
  - Confidence increase
- Better at English sounds in Spanish
  - Simpler syllable shapes?
- Still has CAS
  - Struggles in both
  - Resorts to gestures at times

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Summary

- Bilingual children have CAS
- CAS will not go away or get better if you are (or try to become) monolingual
  - Monolingualism means you can't talk to a lot of people in your world
    - Isolating
    - Lack of generalization
- Bilingual children with CAS need us
  - They need bilingual assessment
  - They need bilingual intervention
  - So they can improve both languages
- Much to learn!

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Thank you

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