

Treating Children with Inconsistent Speech Sound Errors

Susan Rvachew, Ph.D., S-LP(C), ASHA Fellow
Professor, SCSD, McGill University

Tanya Matthews, M.A., CCC-SLP
Doctoral Candidate, SCSD, McGill University

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INTRODUCTION TO THE DIAGNOSTIC CHALLENGE

Childhood Apraxia of Speech
Inconsistent Errors; Do they always indicate CAS?
Psycholinguistic Model of Speech Processing
Potential Levels of Breakdown in SSDs

Case Study 8-4

- **Preschool (CA = 5;4)**

- **First Grade (CA = 7;4)**

Elevator
/ɛləvətəː/

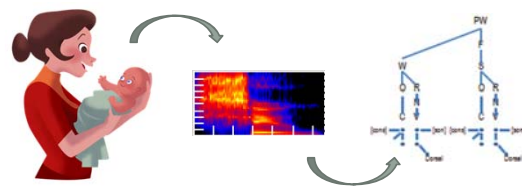
1. [ægəgəʔə]
2. [wægehə]
3. [ʌgoketə]

- Error Phonemes:
[f t l dʒ θ v s z ð]
- Clusters reduced

- SAILS: z = -2.11
- GFTA-2: <1st percentile
- PCC: 53%, -8.6
- PPVT: SS = 95
- MLU: 2.95
- TOWRE: 91sw vs 81nw
- Error Phonemes:
[g t f tʃ l ɹ dʒ θ v s z ð]
- Clusters reduced

Encoding Processes

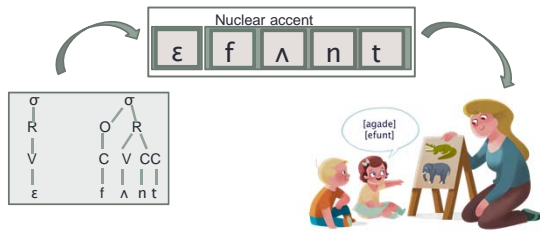
• “Auditory-perceptual *encoding* processes that transform auditory input into phonemic, sublexical, and lexical representations;”



Shriberg, L. D., Lohmeier, H. L., Strand, E. A., & Jakelski, K. J. (2012). Encoding, memorial and transcoding deficits in Childhood Apraxia of Speech. *Clinical Linguistics & Phonetics*, 26, 445-482. (p. 447)

Memory Processes

• *memory* processes that store and retrieve these [phonemic, sublexical, and lexical] representations;”



Shriberg, L. D., Lohmeier, H. L., Strand, E. A., & Jakelski, K. J. (2012). Encoding, memorial and transcoding deficits in Childhood Apraxia of Speech. *Clinical Linguistics & Phonetics*, 26, 445-482. (p. 447)

Transcoding

• “transcoding processes that plan and programme the representations for the motoric gestures of manifest speech...”

Shriberg, L. D., Lohmeier, H. L., Strand, E. A., & Jakkelski, K. J. (2012). Encoding, memorial and transcoding deficits in Childhood Apraxia of Speech. *Clinical Linguistics & Phonetics*, 25, 445-482. (p. 447)

ASSESSMENT TOOLS AND DIAGNOSTIC CRITERIA

Diagnostic Evaluation of Articulation and Phonology
 DEAP-Word Inconsistency Assessment
 Syllable Repetition Test
 Maximum Performance Tests/Oral Peripheral Examination

DEAP Phonology Assessment

Phonological Planning Case TASC21 Fronting Items	Motor Planning Case TASC23 Fronting Items
<ul style="list-style-type: none"> Pig [bɪk] Crab [kɹæts] Snake [seɪk] Gloves [gɹʌs] Helicopter [heləʊgəʊ] Duck [dʌk] Basket [pɛkes] Egg [ɛg] Square [kʌs] Queen [kɪn] Frog [fɹɔg] 	<ul style="list-style-type: none"> Pig [eX] Crab [tʌb] Snake [seɪX] Gloves [tʌp] Helicopter [heitə] Duck [dʌX] Basket [bæXtɛt] Egg [ɛX] Square [stou] Queen [tin] Frog [fɹaX]

DEAP Inconsistency Assessment

Phonological Planning Case TASC21 88% Inconsistency	Motor Planning Case TASC23 64% Inconsistency
<ul style="list-style-type: none"> Elephant [ʊfont] [ɛfəs] [gɹonæs] 	<ul style="list-style-type: none"> Elephant [ɛntæ] [entent] [entænt]
<ul style="list-style-type: none"> Fish [ʃɪt] [ʃus] [ʃuf] 	<ul style="list-style-type: none"> Fish [fɛs] [fɛs] [fɛs]

Syllable Repetition Task

1 bada
2 dabada
3 bama
4 madada
5 naba
6 dabada
7 nada
8 maba
9 bamana
10 dabama
11 madaba
12 nabada
13 babada
14 manaba
15 bamadana
16 dababama
17 manabada
18 nadamaba

Shriberg, L. D., Lohmeier, H. L., Campbell, T. F., Dollaghan, C. A., Green, J. R., & Moore, C. A. (2009). A nonword repetition task for speakers with misarticulations: The syllable repetition task. *Journal of Speech, Language and Hearing Research*, 52, 1189-1212.

SRT: Memory Profile

TASC21	
3 bama bama	
8 maba bama	
10 dabama bamaba	
13 banada badana	
11 nadamaba badadama	

- Competency Score = -4.89
- Memory Score = -2.69
- 2 syllable items = 50%✓
- 3 syllable items = 28%✓
- 4 syllable items = 31%✓
- Addition errors = 1

SRT: Transcoding Profile

TASC23

1	bada	ada
4	mada	pada
11	madaba	nadbana
15	bamadana	patadadata
17	manabada	padanka

- Competency Score = -7.28
- Memory Score = 1.79
- 2 syllable items = 19%✓
- 3 syllable items = 28%✓
- 4 syllable items = 19%✓
- Addition errors = 5

Maximum Performance Tasks

Phonological Planning Case TASC21

- Unable to repeat "pataka"
- Fluent repetition of four sequences of [pəkek]
- No difficulty sequencing nonspeech movements

Motor Planning Case TASC23

- Slow single syllable repetition rates with groping and difficulty transitioning between C & V and between syllables, e.g., mmmmmamamamma
- Unable to repeat "pataka"
- Jaw sliding when moving tongue from side to side

Summary

Phonological Planning

- More atypical and less predictable error types
- Greater inconsistency upon repetition of same word
- Lower competency and memory scores on SRT
- Fluent repetitions during DKR testing
- Less difficulty with sequencing of nonspeech movements

Motor Planning

- More predictable error types
- Less inconsistency upon repetition of the same word
- Low competency on SRT with many addition errors
- Transcoding errors during DKR testing
- Difficulty with sequencing nonspeech movements

INTERVENTION PROCEDURES

Sessions Structure

- Pre-Practice for Phonological Planning
- Pre-Practice for Motor Planning
- High Intensity Practice

Session Structure

- PrePractice
 - Low intensity procedures to identify right level of practice
 - Provide child with strategies to ensure success during practice
 - Use strategies that are individualized to diagnosed profile
 - Provide knowledge of performance feedback
- Practice
 - High intensity practice for all cases (e.g., at least 100 trials in a 10-15 minute period)
 - Practice at the challenge point (average about 80% correct)
 - Adjust level of support provided using the integral stimulation hierarchy
 - Adjust feedback provided as needed but try to use delayed knowledge of results feedback as much as possible

Phonological Planning Intervention

• Focus on Phonological Memory and Planning

- Prepractice:
 - Provide visual cues (pictographs, letters, gestures) to represent phonemes in each target word
 - Provide visual cues (pictographs, letters, gestures) to represent words in each sentence
 - Practice segments in isolation and then chain together
 - Models for imitation are allowed during prepractice as needed
 - Knowledge of performance feedback is allowed during prepractice as needed
- Practice
 - Aim for high response rate
 - Avoid imitative models
 - Encourage child to use visual cues to remember target if necessary
 - Modulate use of feedback to maintain accuracy at challenge point
 - Modulate target length/complexity while practicing at challenge point

TASC26 Intake Assessment

- Age 58 months (4 years; 10 months)
- Kaufman Brief Intelligence Test (Nonverbal): SS = 100
- Peabody Picture Vocabulary Test: SS = 70
- Mean Length of Utterance: 3.17
- Speech Perception (SAILS): z = -4.78
- Implicit Phonological Awareness: z = -1.20
- Oral Motor Score: below expectations for age
 - Incorrect but fluent repetitions of [pataka]
 - Passed Isolated movements but failed sequenced nonspeech movements
 - Slow mono- and trisyllable repetition rates but difficulty following the instructions for MPTs

TASC26 DEAP Results

- Articulation Test
 - PCC = 55
 - PVC = 86
 - Phonology Test
 - Gliding 52%
 - Vocalization/Liquids 11%
 - Deaffrication 40%
 - Cluster reduction 44%
 - Fronting 39%
 - WSD 21%
 - Stopping 6%
 - PVdeVoicing 42%
 - Inconsistency 52%(72%)
 - Helicopter
 - [kwatə]
 - [takə]
 - [hʌtətə]
- Symptoms of phonological planning deficit:
Vowel errors
Inconsistency upon word repetition
Spontaneous worse than imitative productions
Poor maintenance of phonotactic structure

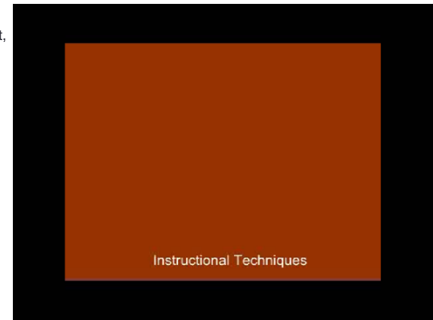
TASC26 SRT Results

1	bada	bada
2	dama	danda
3	bama	mama
4	mada	mama
5	naba	mama
6	daba	danga
7	nada	nana
8	maba	mama
9	bamana	bamama
10	dabana	dadaba
11	madaba	babama
12	nabada	mamaba
13	banada	bababa
14	manada	mamaba
15	bamadana	dabadai
16	dababana	dababa
17	manabada	mamababa
18	nadamaba	mamababa

- 2 syllable items: 50%
- 3 syllable items: 33%
- 4 syllable items: 38%
- 26/58 = 44% within manner class substitutions
- 2 additions

TASC26 PMP PrePractice

Target: /s/ clusters in onset, alien flower scenario



Motor Planning Effective Intervention

- Focus on Auditory-Motor Integration
 - Prepractice:
 - Provide exposure to intense varied exposure to auditory versions of target words
 - Encourage child to make judgements about accuracy of word productions in other's and own speech
 - Auditory bombardment
 - Error detection tasks
 - Focused stimulation with recasts and expansions
 - Practice
 - Aim for high response rate
 - Integral stimulation hierarchy-provide imitative models when necessary to stimulate correct responses
 - Encourage self monitoring and self correction
 - Modulate use of feedback to maintain accuracy at challenge point
 - Leave time after child's response for him/her to integrate and evaluation internal feedback
 - Modulate target length/complexity while practicing at challenge point

Motor Planning PrePractice

Target: voiceless "th"

- "Thor"
Dog 1
- "Thooter"
Dog toy
- "Toth"
Dog 2
- "Peether"
Dog toy
- "Thinkles"
Dog booties



Practice: Maintain response intensity

Target is /sp/


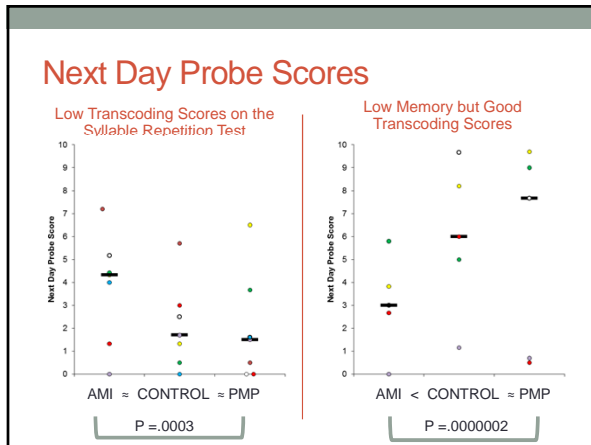
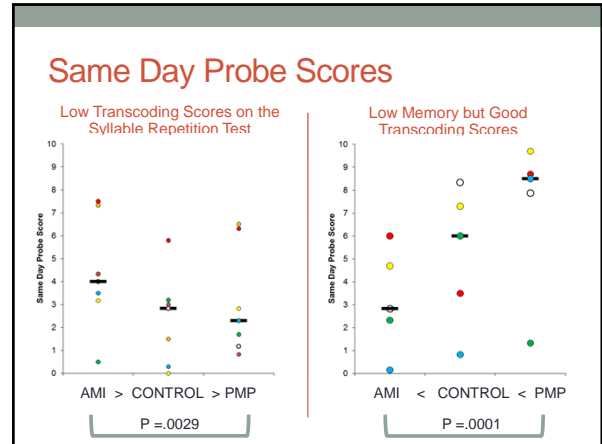
1 min 53 seconds

18 attempts

Would make 300 trials in 30 minute sessions

This is 10 times the average intensity

Notice modulation of feedback from direct to delayed

- ### Summary
- Transcoding Profile
 - Target auditory-motor integration
 - Phonological Memory Profile
 - Target phonological planning
 - Encoding Profile
 - Coherent focus on acoustic-phonetic OR articulatory-phonetic representations. (see Rvachew & Brosseau-Lapr e, 2015, AJSLP)

CONTACT US:

Susan.rvachew@mcgill.ca
 @profrvach
Tanya.matthews@mail.mcgill.ca
www.medicine.mcgill.ca/srvachew