

# **Using Concurrent Treatment for Childhood Apraxia of Speech**

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# Background

- ASHA (2007) has defined CAS as “a neurological childhood (pediatric) speech sound disorder in which the precision and consistency of movements underlying speech are impaired in the absence of neuromuscular deficits (e.g., abnormal reflexes, abnormal tone)” p.3.
- A motor-learning treatment has been recommended for children with Childhood Apraxia of Speech (Ruscello, 2008). Speech tasks should include variation of syllable and movement contexts across a variety of response levels (Bernthal & Bankson, 2009).

- *Concurrent Treatment* (Skelton, 2004) has been developed based on motor-learning principles of variable practice tasks that are randomly sequenced. Randomized variable practice is beneficial for long-term retention of motor skills (Schmidt & Lee, 2005). These tasks vary a range of response lengths (from syllables to connected speech). Studies demonstrated Concurrent Treatment as an effective and efficient approach to treating articulation and phonological disorders (Skelton, 2004; Skelton & Funk, 2004; Skelton & Kerber, 2005; Skelton & Resciniti, 2009). However, to date, Concurrent Treatment has not been experimentally evaluated with children presenting CAS.

# Research Questions, Design, and Variables

- What modifications will need to be made to use concurrent treatment with CAS?
- A Multiple Baseline Across Subjects design was used to demonstrate any treatment effects.
- ***Dependent Variables (target speech sounds):*** /s, z, f, v/.
- ***Independent Variable:*** Teaching target sounds with Concurrent Treatment, which includes randomized variable sequence of practice tasks.

# Methods & Results

## Participants

**Table 1. Participant characteristics**

Qualifying Information	Participant 1	Participant 2	Participant 3
Age	4 yrs., 0 mos.	5 yrs., 6 mos.	6 yrs., 1 mos.
Gender	Male	Male	Female
<b>Goldman-Fristoe (SS)</b>	84	40	<40
<b>TELD = 3</b> Receptive	74%tile	84%tile	74%tile
Expressive	27%tile	8%tile	1%tile
<b>VMPAC</b> General Motor	100%	100%	100%
Focal Motor	70%	69%	61%
Sequencing	52%	74%	50%
Connected Speech	53%	40%	4%
Speech Characteristics	56%	43%	57%

**Table 2. Characteristics of CAS**

<u>Characteristics</u>	<u>Participant 1</u>	<u>Participant 2</u>	<u>Participant 3</u>
• Inconsistent errors	X	X	X
• Vowel/diphthong errors	X	X	X
• Increased errors on longer Sequences/multisyllabic words	X	X	
• Groping		X	X
• Reduced DDK rates	X	X	X
• Lengthened and disrupted coarticulatory transitions between sounds or syllables	X	X	X
• Inappropriate prosody or stress	X	X	X
• Difficulty imitating	X	X	X
• Evidence of nonverbal oral apraxia			
• The use of simple syllable shapes	X		X

*Note.* Characteristics based on E. Strand (personal communication, July 25, 2009).

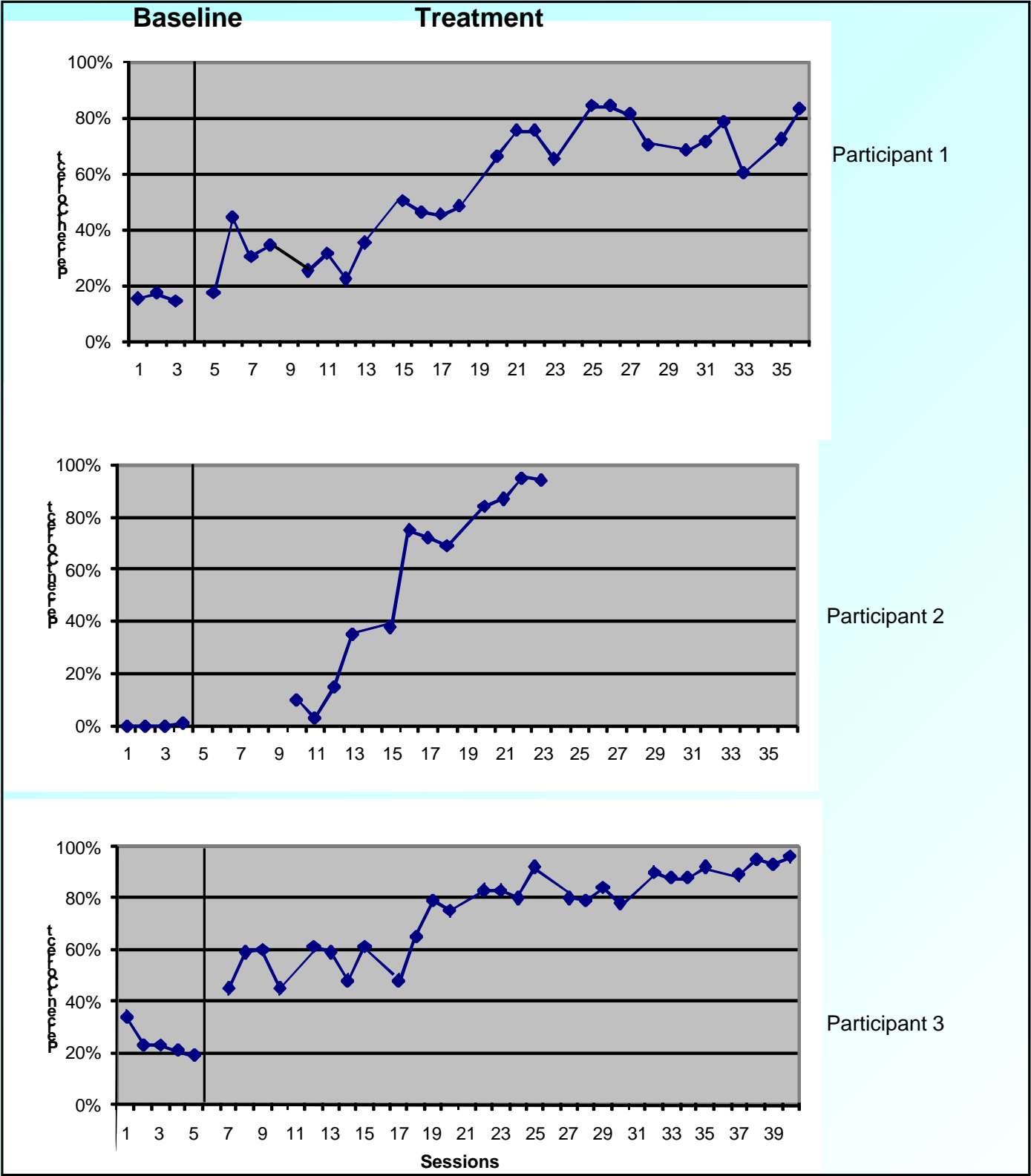
# ***Concurrent Treatment***

- *Establishment* of each target sound in a correct per word
- *Randomized-variable practice* of the four target sounds in syllable, one-word, two-word, and three-word tasks to 80% correct across 3 treatment sessions.
- *Probes of generalization* of the target sounds to untaught one-word and three-word tasks on every fifth session.
- ***Sessions:*** Two 30-minute sessions twice a week.
- ***Token reinforcement of correct productions*** earned a child-selected backup reinforcer.
- ***Error Correction Sequence:*** 1. ask to repeat task, 2. model-imitation practice of task, 3. clinician mimes task as child practices it, 4 simultaneous imitation of task.

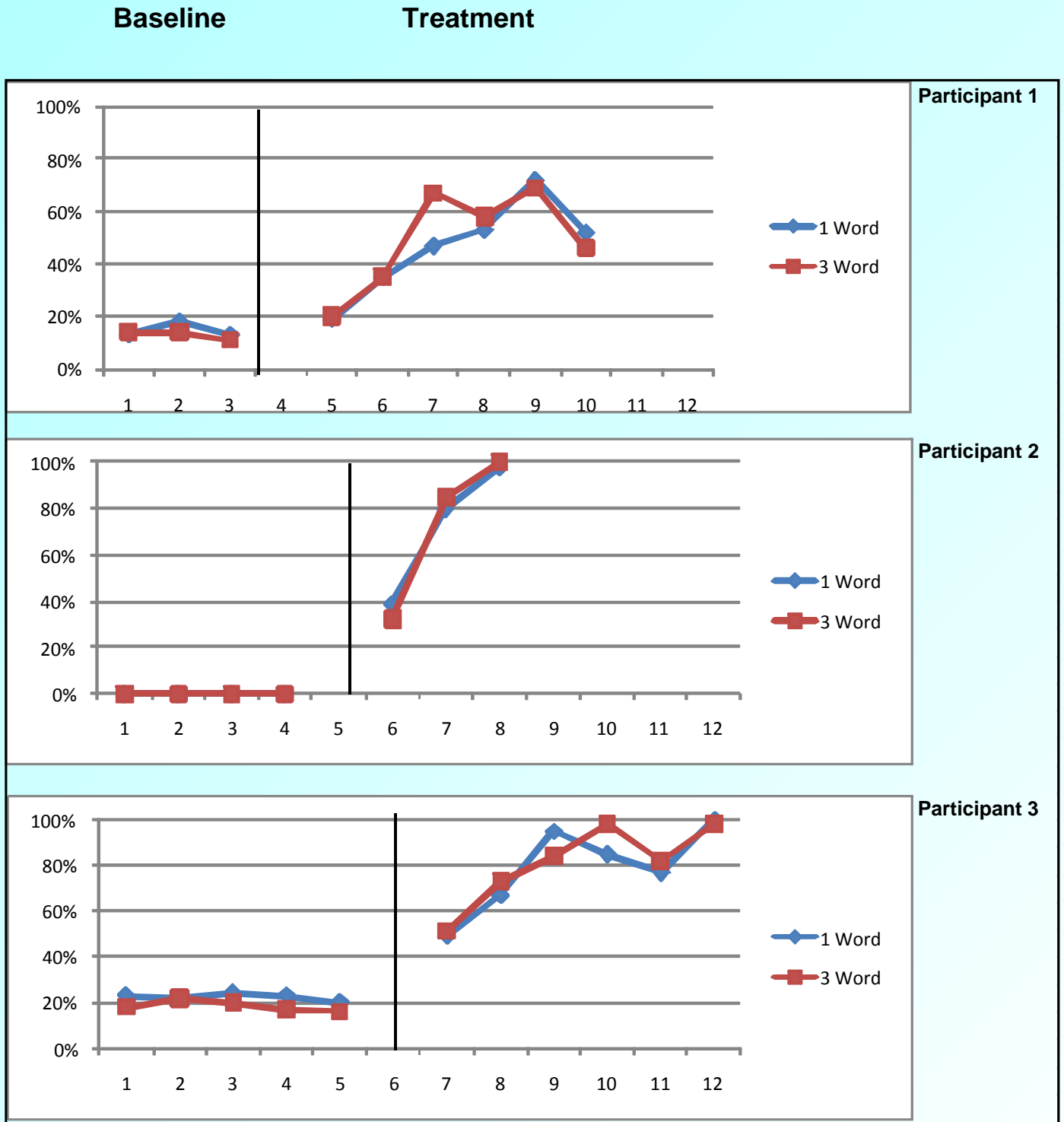
## ***Practice tasks***

- ***Syllable imitated*** (e.g., “say /b /”)
- ***One word imitated*** (e.g., picture with “say, ‘bed’”)
- ***One word evoked*** (e.g., picture with stimulus “I sleep in a \_\_\_\_\_” and participant says “bed.”)
- ***Two words imitated*** (e.g., picture with “say, ‘the bed’”)
- ***Two words evoked*** (e.g., picture with stimulus “First I sleep on the floor then I sleep on \_\_\_\_\_” and participant says “the bed.”)
- ***Three word imitated*** (e.g., picture with “say, ‘in the bed’”)
- ***Three word evoked*** (e.g., picture with stimulus “First I sleep on the floor then I sleep \_\_\_\_\_” and participant says “on the bed.”)
  - ▶ ***These practice tasks were randomized each session using a spreadsheet program on a laptop computer.***

**Figure 1. Percent correct of all target sounds per participant.**



# Figure 2. All target sounds on untaught task probes



# Conclusions

- Concurrent treatment was effective in teaching the target sounds to these 3 participants. Concurrent treatment may be an efficient means of treating misarticulations secondary to CAS.
- Concurrent treatment can be adapted to be used with children with more severe disorders. Demonstrates the versatility of concurrent treatment. Bernthal and Bankson (2004) recommended that CAS treatment include “a variety of speech. . . activities . . . to practice transitions and timing movements required in the dynamic process of ongoing speech” (p. 338). Concurrent treatment provides these types of practice activities and tasks.

# References

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