



Variable Practice Core Vocabulary Treatment in Phonological Disorders or Childhood Apraxia of Speech



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INTRODUCTION

- Childhood Apraxia of Speech (CAS) is a neurological pediatric speech sound disorder characterized by inconsistent production of consonants and vowels (ASHA, 2007).
- Recent investigation revealed that children with CAS benefit from a treatment that pairs stimulability training (ST; Powell, 1996) with a phonologically modified core vocabulary treatment (mCVT; Iuzzini & Forrest, 2010).
 - In that study, 4 participants who underwent 20 sessions of ST+mCVT demonstrated the following improvements:
 - Increased percent consonants correct (PCC; Shriberg & Kwiatkowski, 1982) by an average of 17%;
 - Decreased error inconsistency by an average of 6%; and
 - Expanded phonemic inventory by an average of 4 sounds.
 - The previous protocol held treatment stimuli constant until a performance criterion was met.
 - Principles of motor learning suggest that variable practice contexts promote generalization and retention better than multiple productions of the same stimuli.
- The current treatment protocol adapted mCVT to test the effects of variable practice contexts (vpCVT) on phonetic and phonemic inventories of four children with speech acquisition disorders.
- Specific research questions included:
 - How will ST+vpCVT impact learning of phonological targets?
 - Will introduction of ST+vpCVT impact the phonemic inventory, inconsistency, and PCC of children with CAS or phonological disorders (PD)?

METHODS

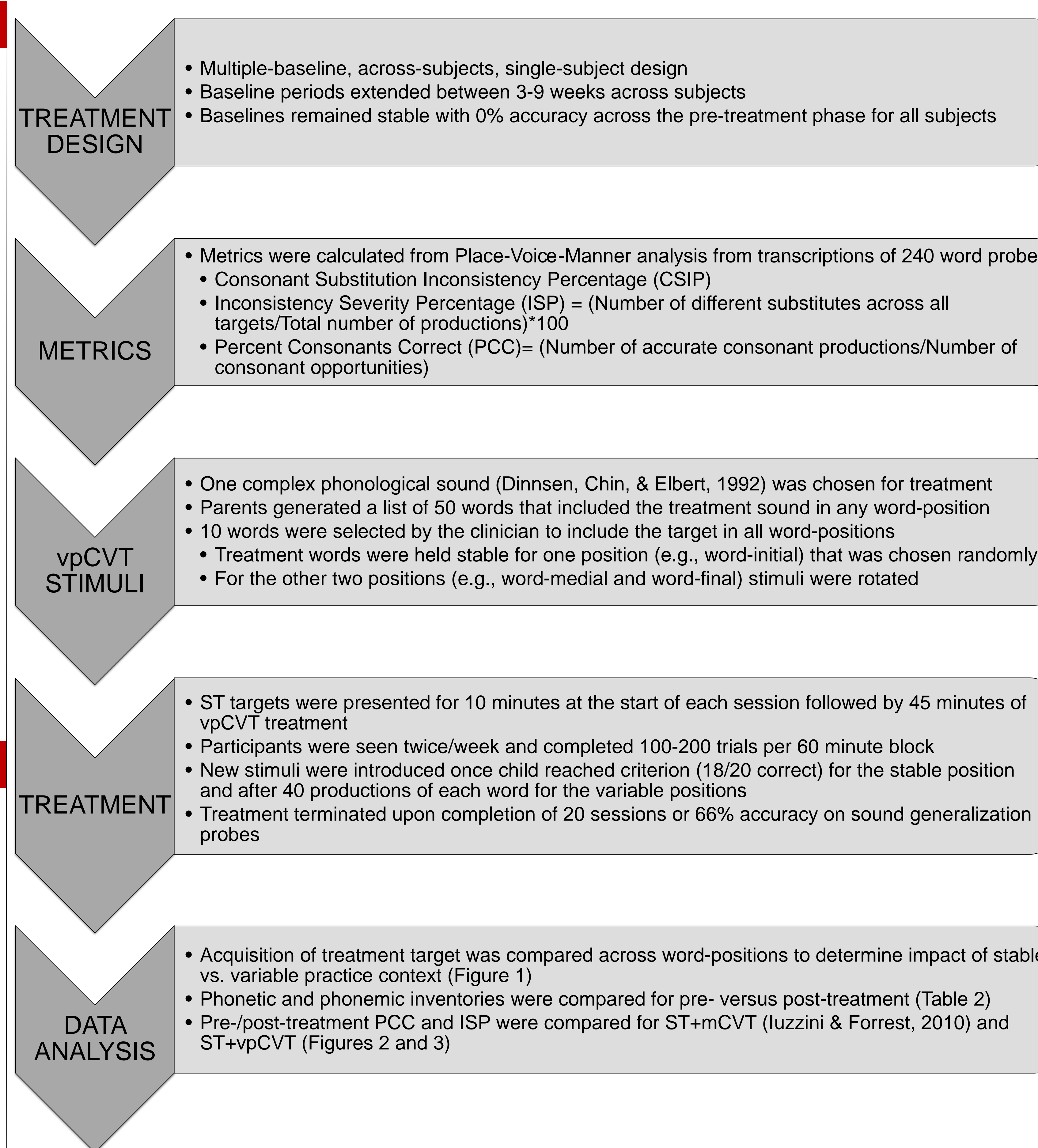
PARTICIPANTS

- Four children between the ages of 3;4-4;4 (years; months) with CAS or PD participated (Table 1).
 - All children had normal hearing and receptive vocabulary (PPVT-3) and standard scores below 85 on the GFTA-2.
- Participants were considered to have CAS or PD based on their Consonant Substitution Inconsistency Percentage (CSIP; Iuzzini & Forrest, 2010).
 - CSIP = (Number of different substitutes across all targets/Number of non-target productions)*100
 - CSIP ≥ 25 were assigned to CAS group (2 participants)
 - CSIP ≤ 21 were assigned to PD group (1 participant)
 - CSIP scores between 21-25% were considered borderline (PD/CAS) (1 participant)

Table 1: Participant summary. GFTA-2 SS (Goldman-Fristoe-2nd Edition Standard Score); PPVT-3 (Peabody Picture Vocabulary Test – 3rd Edition Standard Score); PCC (Percent Consonants Correct); CSIP (Consonant Substitution Inconsistency Percentage); ISP (Inconsistency Severity Percentage)

P	Age (yrs; mo.)	Sex	GFTA-2 SS	PPVT-3 SS	Pre PCC (%)	Pre CSIP (%)	Pre ISP (%)
A1-PD/CAS	3;4	M	68	106	38.5	22.99	14.15
A2*-CAS	4;2	F	53	92	33.5	30	19.9
A3-CAS	4;3	F	73	105	59	25.78	10
A4-PD	4;4	M	57	103	33.7	17.8	11.8

*Participant has a history of epilepsy; symptoms are controlled by medication.



RESULTS

Table 2: Pre- and post-treatment phonemic and phonetic inventories

P	Pre-treatment Inventory	Treatment Target	Sounds Added Post-treatment
A1	/m n p b t d k g l r w j h/	ɔ̃	/ŋ ə ð f v s z ʃ ʒ/
A2	/m n p b t d e ð f v j ʃ l w j/ [ɜ]	k	/k g ʃ ɔ̃ h/
A3	/m n ŋ p b t d k g ð f v s z ʃ ʃ ɔ̃ w j h/ [ə]	ə	/l ə/
A4	/m n p b t d s z ɔ̃ w j h/ [ʃ ɜ]	r	/ŋ ʃ/

/c/= sound occurs in phonemic inventory, [c]= sound occurs in phonetic inventory only

Figure 1: Accuracy of treatment target by word-position based on generalization probe

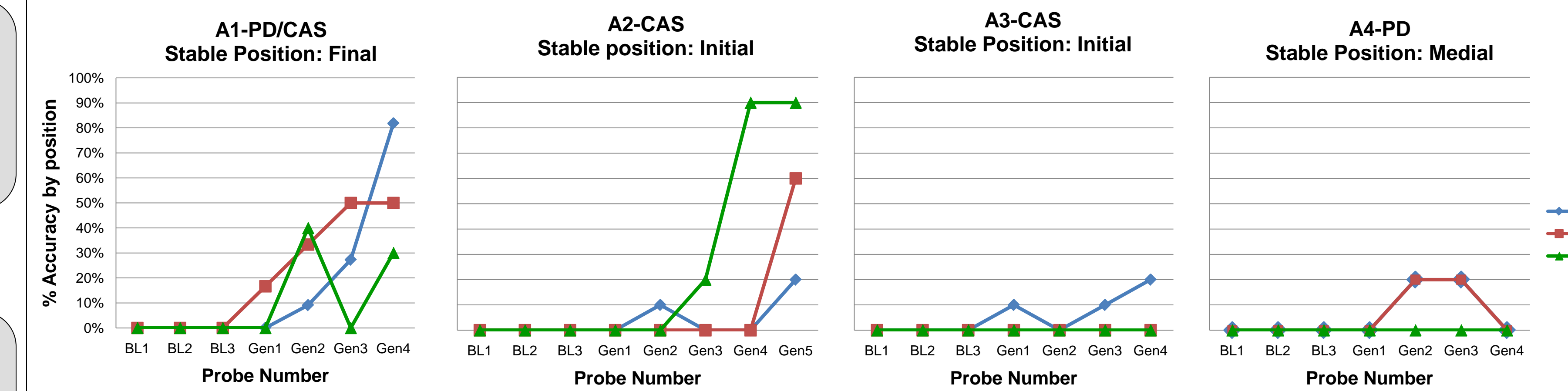


Figure 2: Comparison of ISP change

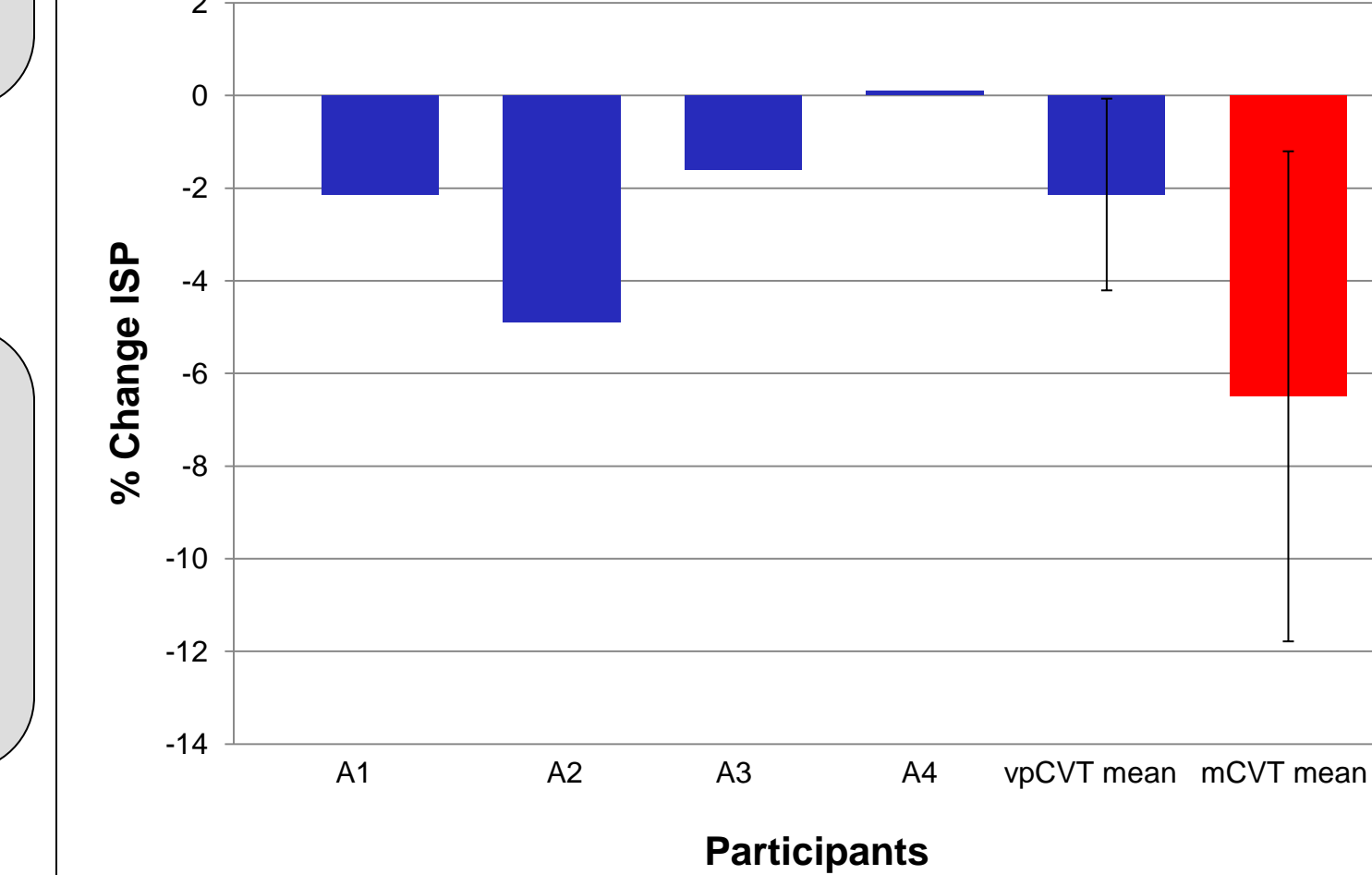
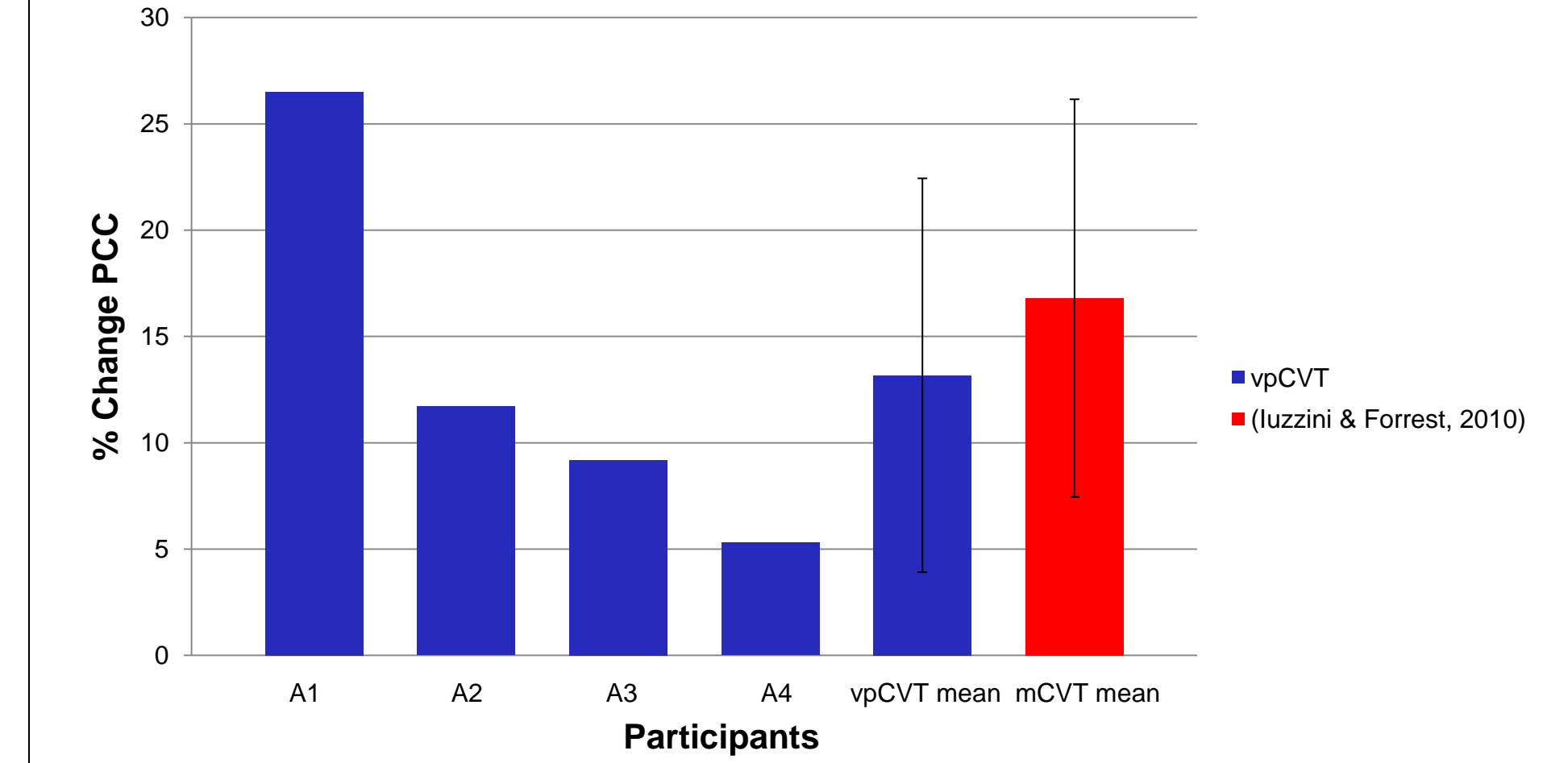


Figure 3: Comparison of PCC change



DISCUSSION & CONCLUSIONS

- On average, ST+vpCVT increased PCC, expanded phonemic and phonetic inventories, and minimally decreased inconsistency in participants.
 - Consistent with principles of motor learning, two participants (A1 and A2) exhibited greater generalization for the positions trained with variable context than for those treated to a criterion level.
 - Two participants (A3 and A4) did not show an advantage for the variable context because:
 - The core items provided by the participants' parents may not have been sufficiently high frequency to facilitate learning (Morrisette & Gierut, 2002).
 - Frequent changing of stimuli may have increased the cognitive load for these participants and interfered with their ability to attend to the critical information in the stimuli (Pick, 1984).
 - Although the core words all contained a complex phonological target, ST+vpCVT may not be an appropriate treatment for speakers with PD.
- Compared with ST+mCVT (Iuzzini & Forrest, 2010), no advantage for the variable practice condition was found in the current study.
 - The independent impact of ST in both treatments needs further evaluation.

- Preliminary evidence suggests that ST+mCVT promotes greater improvements to PCC and consistency in children with CAS than ST+vpCVT.
 - ST+mCVT requires less preparation time for the clinician than ST+vpCVT.
 - ST+mCVT necessitates fewer treatment words than ST+vpCVT.
 - Therefore, training items in ST+mCVT are likely to be high frequency for the participants whereas the larger corpus of training items in ST+vpCVT may require the use of words which are lower frequency.

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