

# Intervention of Vowel Errors: A Case Study Using Multiple Oppositions

(Session code: 7831)

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## ABSTRACT

This case study describes a vowel intervention for a school-age child using the multiple oppositions approach. Treatment outcomes were significant as measured by percentage of vowels correct (PVC). Clinical implications are discussed with regard to identification of vowel error patterns and general principles of vowel intervention

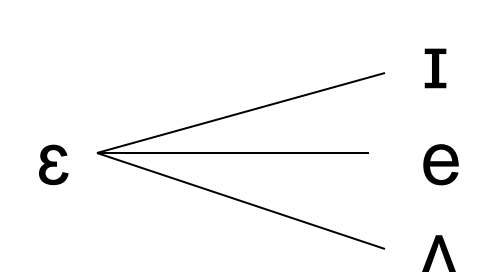
## INTRODUCTION

The incidence of vowel errors is high in the speech of children with CAS and children with moderate and severe phonological disorders (Flipsen, 2009). Studies have reported that as many as 50% of children with these diagnoses have at least some vowel errors (Pollock & Berni, 2003). Vowel errors are significant because they are considered to be a potential diagnostic marker for CAS (Davis, Jakielski & Marquardt, 1998). Further, vowel errors significantly impact speech intelligibility. Yet, the incidence and significance of vowel errors are in stark contrast to the literature available about intervention approaches. Speech-language pathologists tend to focus primarily on identifying and treating consonant errors rather than vowels in working with children with speech sound disorders (SSD). In fact, a commonly held view by many speech-language pathologists is that if you work on the consonants, the vowels will take care of themselves. There is available evidence, however, that does not support this belief (Gibbon, 2009; Hall, Jordan, & Robin, 1993). The purpose of this case study is to describe an intervention program that targeted vowels using a multiple oppositions approach.

## PARTICIPANT

EB, age 7;0 at the beginning of intervention, was seen at a university clinic for individual 50 minute sessions once weekly. She achieved a standard score of 91 on the *GFTA-2*, which placed her at the 11<sup>th</sup> percentile for her chronological age.

Analysis of EB's single word responses on the *GFTA-2* revealed gliding of consonantal /r/, vowelization of vocalic /ɜ:/ and rhotic vowels, as well as errors on the vowels /ɪ, e, ʌ/. Specifically, for the nonrhotic vowels, EB collapsed them to the front mid lax vowel, /ɛ/, as diagrammed below:



Based on this one-to-many correspondence in her vowel repertoire, a multiple oppositions approach was designed to induce a phonemic split for these three target vowels.

## DISCLOSURE

Marie Johnson has no relevant financial or non-financial relationships to disclose. Andrea Jarrett has no relevant financial or non-financial relationships to disclose. Lynn Williams developed the *SCIP* software program and receives royalty payments.

## PROCEDURE

A generalization probe of 10 untrained words that contained each of the targeted vowels was administered prior to intervention as a baseline measure and then after every fourth intervention session.

For the multiple oppositions, five sets of contrastive word pairs for /ɛ/ ~ /ɪ, e, ʌ/ were developed. Examples of contrastive pairs include the following:

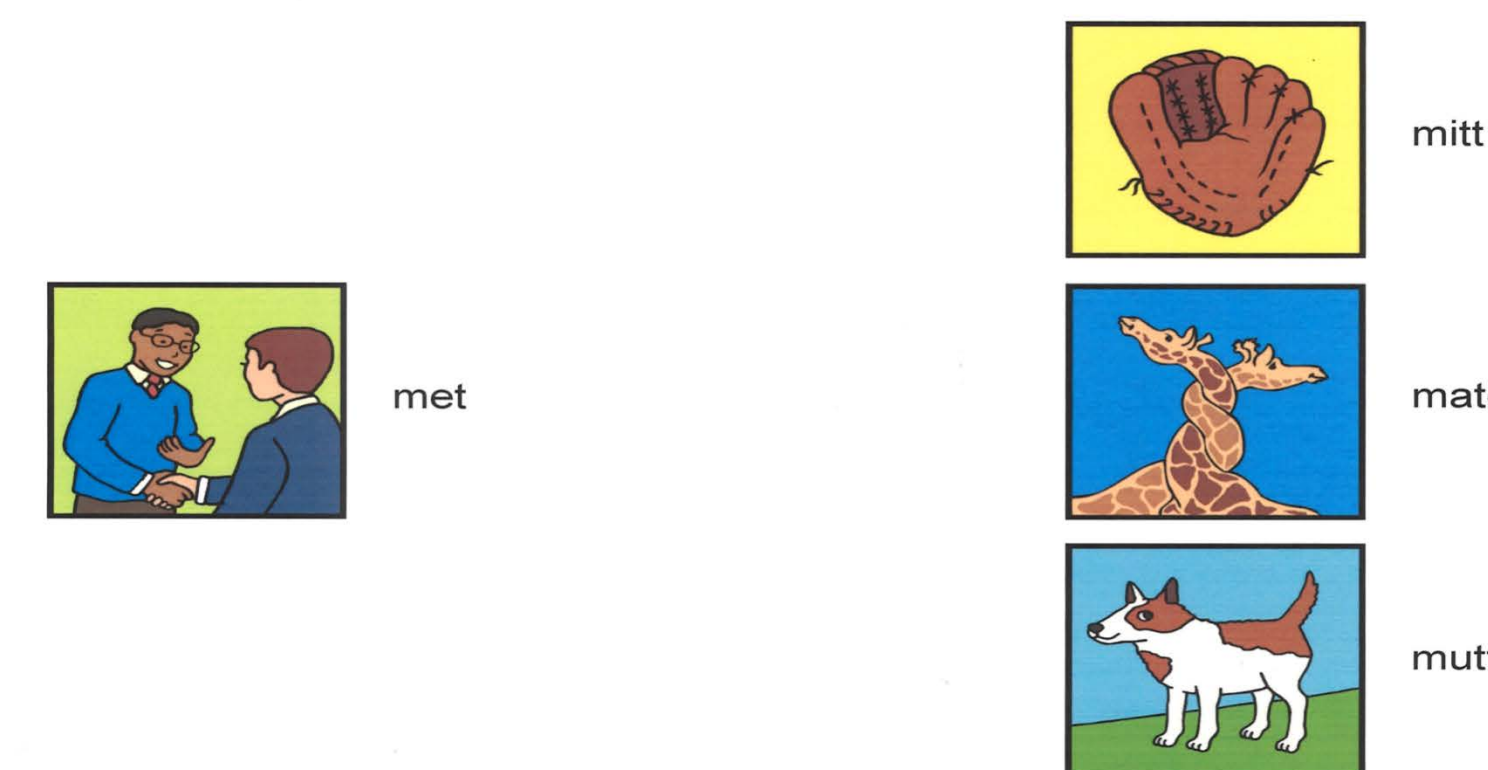
met ~ mitt, mate, mutt

den ~ din, Dane, done

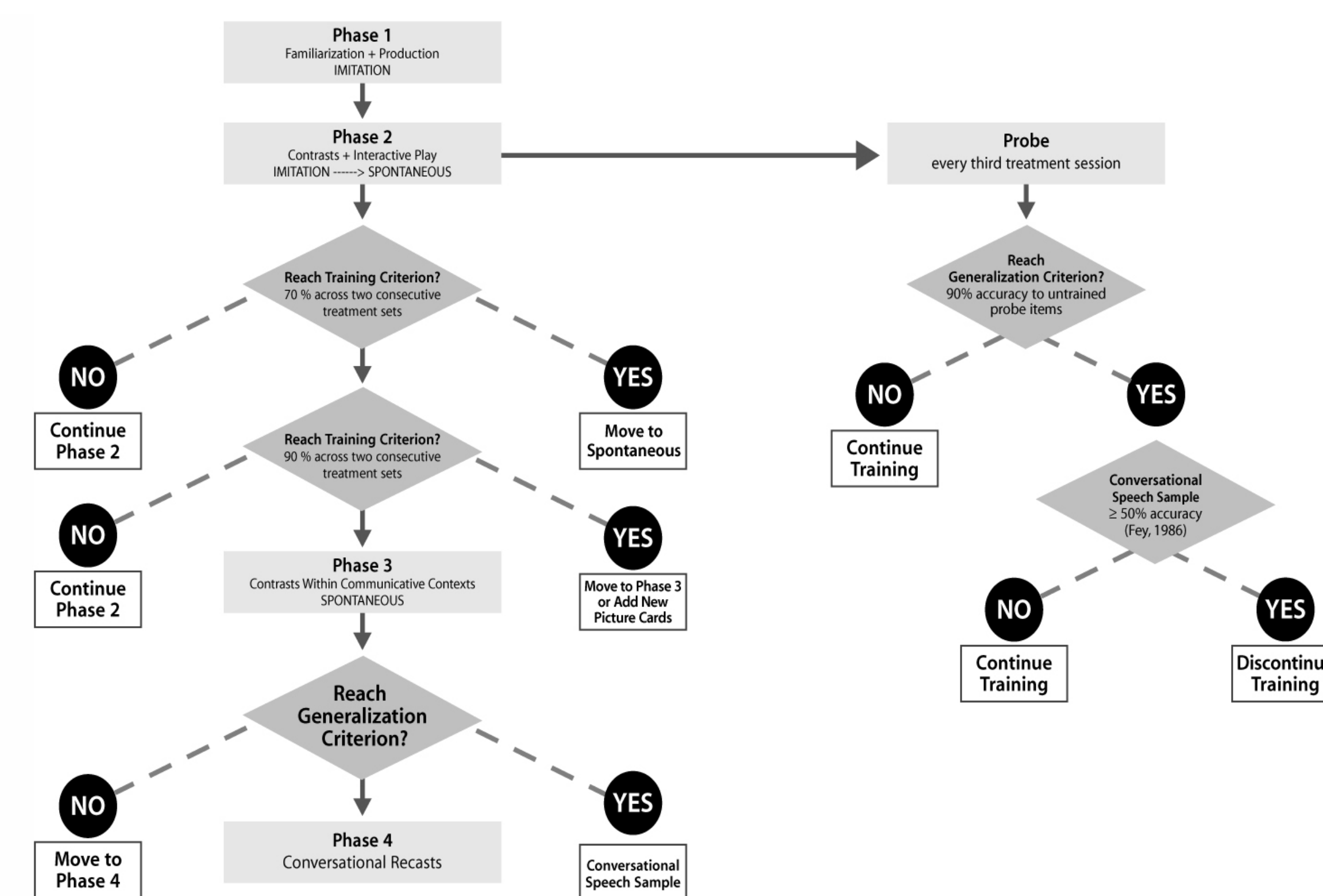
when ~ win, wane, won

mess ~ miss, mace, muss

tech ~ tick, take, tuck



A treatment paradigm (Williams, 2000; Williams, 2003; Williams, 2010) was followed for implementing the multiple oppositions approach. The treatment phases are illustrated below followed by a brief description:



- Phase 1 involves familiarization of the rule, sounds, and vocabulary of the treatment exemplars and lasts for one session
- Phases 2 and 3 are data-based with specified criteria for matriculation from imitative to spontaneous response levels
  - Phase 2: 70% accuracy across two consecutive treatment sets and from focused practice with naturalistic "bridging" activities to production of the contrasts within communicative contexts
  - Phase 3: 90% accuracy across two consecutive treatment sets
- Phase 4 addresses production during conversational recast activities if the treatment criteria for Phase 3 is achieved, but the generalization criteria has not been achieved.

Suggested dose frequency is a minimum of 60 responses during focused practice and 20 responses during naturalistic activities.

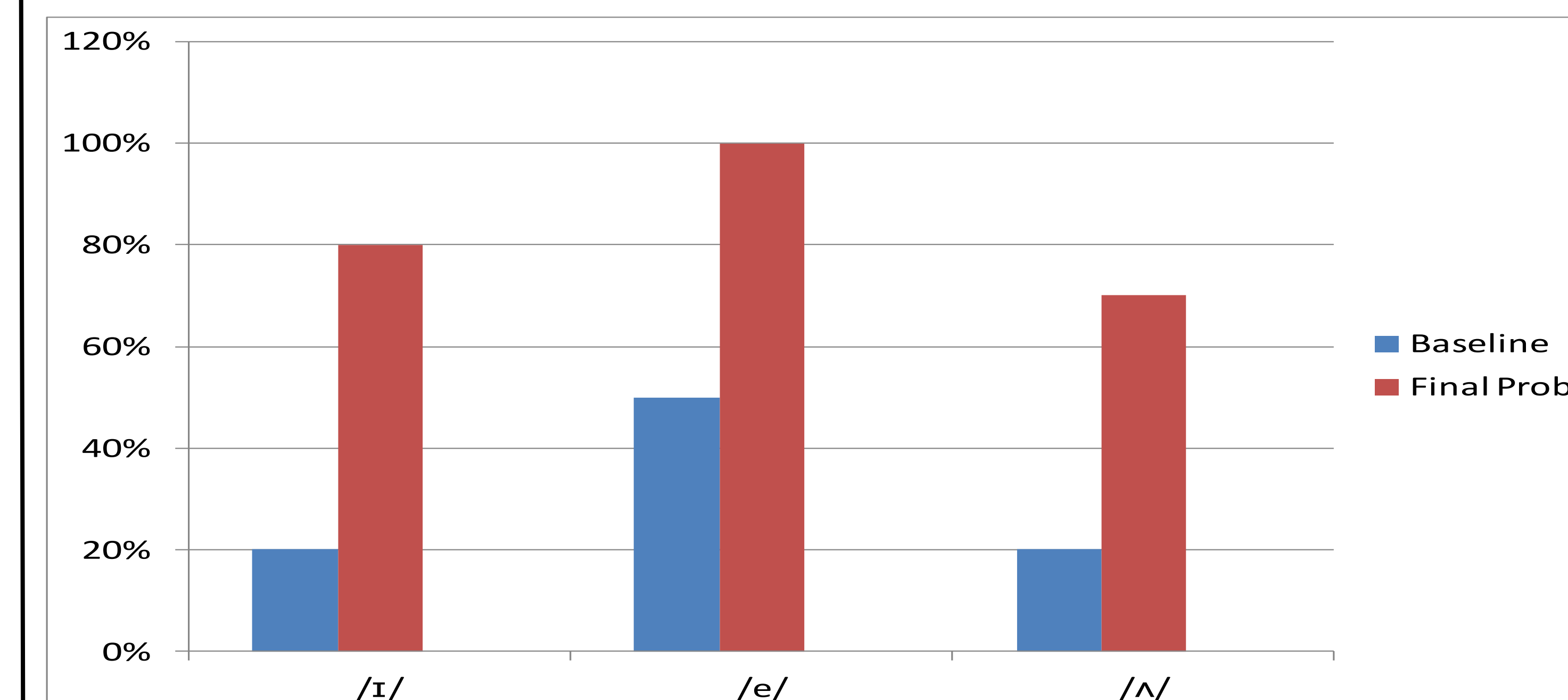
Due to travel distance, EB was only seen once weekly for 50 minute individual sessions. There were also frequent absences, which resulted in her completing a total of 25 intervention sessions over a 12 month period.

## RESULTS

EB reached Phase 3 spontaneous production on all three targeted vowels and met the generalization criterion to discontinue intervention on /e/ after 12 sessions.

A comparison of EB's baseline and final probe performance indicated improvement on all three targeted vowels, as shown in the following graph.

### Generalization Probe Performance

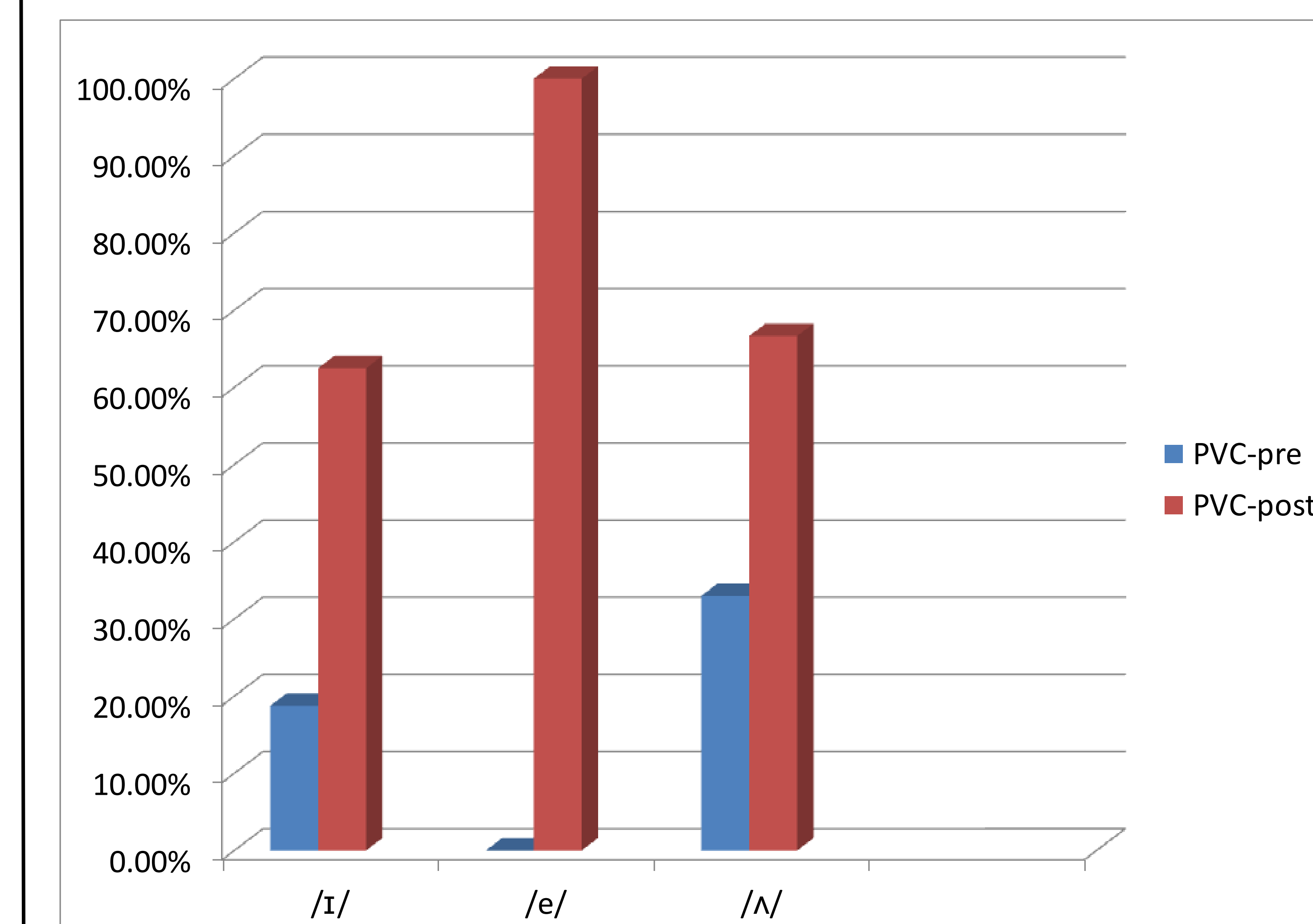


### Pre-Post GFTA-2 Performance

With regard to performance on the *GFTA-2*, only minimal change was observed from her pre-treatment test score. Specifically, EB's initial standard score was 91 with a percentile of 11, compared to a standard score of 92 and 10<sup>th</sup> percentile on the final *GFTA-2*. This reflects the fact that EB's errors were primarily on vowels rather than consonants.

### Percentage Vowels Correct (PVC)

However, percentage of vowels correct (PVC; Shriberg, Austin, Lewis, McSweeney, & Wilson, 1997) revealed a 129% increase in vowel accuracy from the initial to final *GFTA-2* administrations. EB's pre-treatment PVC was 54.88% compared to a PVC of 70.73% post-treatment. She continued to produce errors on rhotic vowels, which accounted for the majority of her errors. EB's production of the targeted vowels pre- and post-treatment is illustrated below:



## CLINICAL IMPLICATIONS

Clinical implications from this case study include:

- The need to assess vowel production in children, especially those with moderate to severe phonological disorders or CAS for vowel errors.
  - Requires whole-word transcription
  - Importance of incorporating a pattern analysis of vowel errors, such as phonological processes (i.e., lowering/raising, fronting/backing, tensing/laxing) or in terms of phoneme collapses in identifying vowel error patterns and for designing intervention
  - Specific measures of vowel accuracy, such as PVC, to determine vowel accuracy
  - Construct a vowel inventory
  - Specific vowel assessment (*Clinical Assessment of Vowels – English Systems: CAV-ES*; Bates & Watson, 2012)
- Children with vowel errors may benefit from a linguistically-based intervention approach
  - Contrastive approaches, such as multiple oppositions or minimal pairs
  - Available software program for vowel contrasts (e.g., *SCIP*)
- Prerequisite for effective treatment is for SLPs to have good perceptual skills to analyze vowels

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