

CASE 2: TREATING SEVERE SPEECH DELAY WITH A PHONETIC-BASED APPROACH

Elissa Jones & Joan Kwiatkowski, University of Wisconsin-Madison

PROBLEM

How do you treat speech sound production in a child who has cognitive and language delays, and who has:

- ◆ limited capability for vowel and consonant production
- ◆ made minimal progress after more than 2 years of treatment that included
 - experimentation with a variety of speech-language approaches, signing, and AAC devices
 - intermittent emphasis on non-speech oral motor exercises when a speech-language approach was ineffective

PROPOSED SOLUTION

A Phonetic-Based Approach

Includes a two-phase practice sequence for each targeted consonant:

Phase I

- ◆ Drills to shape production, beginning at the sound level, and moving to the CV and VC syllable levels and then to words in imitation, built on each successful syllable as the child's developing skills permit.
- ◆ During drill, child earns footprints for correct or best production; following the drill, footprints are placed on the floor in the direction of a bag that contains the materials for a keyword activity, and the child walks on the footprints to obtain the bag.

Phase II

- ◆ Keyword practice in which a single word with the target sound is used repeatedly to communicate a need or desire in the context of a meaningful activity. Each keyword is targeted for one week (two treatment sessions).
- ◆ If the child is unable to produce the target sound in the keyword, the keyword activity is used to shape the keyword from the sound to the syllable level as in the drill, but with the SLP identifying that the sound the child is producing is in the keyword.

Description of key components of the phonetic-based treatment program:

- ◆ Using parents' inputs to inform decisions regarding treatment targets and levels, because parents can provide insights into the child's developing skills and learning potentials
- ◆ Addressing child's unique learning challenges through individualized strategies
- ◆ Manipulating stimulus level, dropping down to lower linguistic levels when the child cannot succeed at higher levels, but continuing to challenge the child to produce at the higher linguistic level, being careful to avoid frustrating the child
- ◆ Encouraging the child to attend to auditory (e.g., "Did you hear the [target]?") and motor-kinesthetic feedback (e.g., "Did you feel the [target]?") during production
- ◆ Programming for consistency, by rewarding only consistent use of correct or best production (if correct cannot be achieved). Over time, continuing to work to shape best production into correct production. Providing encouraging feedback for productions that are not correct or the child's best.
- ◆ Programming for generalization from the beginning of treatment by:
 - Targeting several speech sounds that represent different sound classes
 - Working for short, easy, and natural production of targeted sounds and smooth transitions between sounds for word production
 - Having parents create contexts for the child's meaningful use of targeted keywords at home

EFFICACY OF A PHONETIC-BASED APPROACH

CASE STUDY 2

Subject

- ◆ 4;2 year old male
- ◆ Seen twice weekly for treatment at a university clinic; study covered two university semesters
- ◆ Delayed onset and development of speech and language
- ◆ Hearing within normal limits

Pre-Study Profile

Strengths

- ◆ Good contextual comprehension for familiar activities and routines
- ◆ Ability to understand simple directions
- ◆ Communicative intent demonstrated through non-speech vocalizations
- ◆ Social interest in participating in treatment tasks

Challenges

- ◆ > 1 year delay in cognitive development
- ◆ > 1 year delay in receptive language
- ◆ > 2 year delay in expressive language
- ◆ Communication was limited and included:
 - Primarily non-speech vocalizations
 - Occasional single consonant or CV syllable to mark a word when an adult manipulated the communication context
 - Occasional spontaneous use of imprecise forms of several signs from American Sign Language
 - Occasional use of an augmentative communication device (Vantage) when an adult manipulated the communication context
- ◆ Limited skills for consonant and vowel production
 - Diagnosis of childhood apraxia of speech
 - Vowel inventory: inconsistent production of /ɪ/, /æ/, /ʌ/, and /ɑ/ in CV sequences; all other vowels/diphthongs were centralized
 - Consonant inventory: /m/, /w/, /j/, /p/, /b/, /d/, and /k/ in a small set of words
 - Stimulability only for consonants and vowels already produced; production was inconsistent
- ◆ Consistent with diagnosis of Joubert Syndrome (1) at age 2:
 - Significant gross and fine motor delays
 - Hypotonia
 - Ocular motor problems affecting lateral eye movement; visual acuity was normal

CASE STUDY 2 (continued)

Treatment Program

Objective

- ◆ Production of /m/, /p/, /b/, /k/, /g/, /h/, /f/, and /ʃ/ in syllables and words. Later, production of these consonants in two-word phrases was added.
- ◆ Use of targeted keywords and phrases to communicate with parent at the end of the session.

Structure of the Practice

- ◆ Use of the Phonetic-Based Approach.
- ◆ Later, the keyword practice was expanded so what began as a keyword activity (e.g., SLP asked, "Where does the person need to go?" to elicit "Home") was modified to require a two-word utterance (e.g., SLP now asked, "What does the person need to do?" to elicit "Go home.")
- ◆ At the end of each session, the child engaged in a "show and tell" with his parent; the task materials and the SLP's comments supported his responses.

Parental Input that Informed Treatment Decisions

- ◆ When parents reported the child's production of his teacher's name (Tamar), a two-syllable unit, during Week 8 of the first semester, two-syllable words were then introduced into the keyword practice.
- ◆ When parents reported the production of /ʃ/ in a friend's name during Week 9 of the first semester, /ʃ/ was then added as a target.
- ◆ When parents reported occasional production of what was perceived as /f/ in the word "four" during Week 1 of the second semester, /f/ was then added as a target.
- ◆ When parents reported using "Tamar" to teach the word "tomorrow," a three-syllable unit, during Week 2 of the second semester, keyword practice (e.g., "money") was then expanded to two-word utterances (e.g., "more money").

Learning Challenges and Effective Strategies

- ◆ Inconsistency in production
Strategy. Explicit feedback distinguished between correct production (or best production when correct could not be achieved) and all other responses, with only the correct or best production receiving the reinforcer.
- ◆ Pausing of up to 5 seconds between sounds when producing syllables and words
Strategy. SLP cued child to "smooth it out" by modeling linked sounds while running her index finger down her extended arm. Then she and the child joined hands and in unison reproduced the finger cue while producing the syllable or word.
- ◆ Failure to include all the sounds, syllables, or words in two-word phrases
Strategy. SLP raised a finger, first to mark each of the needed sounds, syllables, or words, and then lowered a finger as each sound, syllable, or word was produced.
- ◆ Variations in loudness and pitch
Strategy. SLP distinguished between acceptable and unacceptable loudness and pitch by labeling the unacceptable as "silly." She also cued the child for his acceptable voice by saying, "Use your (child's name) voice" and reminded him that "silly" would not get the reinforcer.
- ◆ Equal and even stress during two-syllable words and two-word utterances
Strategy. Not addressed.

CASE STUDY 2 (continued)

Treatment Outcomes

- ◆ Targeted consonants (with the exception of /f/, which could not be reliably evoked) were produced consistently in imitation during sound, syllable, and word drills, and spontaneously in the keywords and two-word phrases. Generalization of correct production was also evident in the child's non-task spontaneous utterances.
- ◆ The child only occasionally produced the targeted /f/ when the SLP positioned his lower lip; most of his productions were what is best described as a fricated /w/-like /f/.
- ◆ Non-targeted consonants that the child was capable of producing (i.e., /w/, /j/, /t/, /d/) were inconsistently produced at the sound and syllable levels and were sometimes produced correctly only in a small set of words.
- ◆ Non-targeted consonants that the child was not capable of producing (i.e., /n/, /s/, /z/, /tʃ/, /dʒ/, /l/, /r/) were not produced.
- ◆ Targeted consonants were used as replacement sounds for the ineffectively targeted /f/ (i.e., h/f) and the non-targeted /s/ (i.e., ʃ/s). Vowel/diphthong production shifted with improvements in consonant production. Finally, only /i/, /ʌ/, /oʊ/, and /ɑ/ were inconsistently produced; all other vowels/diphthongs were centralized.
- ◆ Syllable shapes were limited to targeted CV, VC, CVC, VCVC, CVCV, CVVC, and CVCVCV sequences.
- ◆ Two-word spontaneous utterances were primarily targeted in the context of meaningful activities, as shown in Table 1 below.
- ◆ Parents reported increased spontaneous verbal communication at home and at school.

Table 1. Two-word phrases that were targeted and used spontaneously during treatment tasks. Consonant and vowel production was not accurate in all cases. Phrases that were not targeted, but were used spontaneously during the treatment sessions, are marked with an asterisk.

Tie shoe	Kick ball	Me make	Find shoe	Find animal*
Make pie	Bunny hop	On here	Get puzzle	Too hard*
More money	In car	Mash play-doh	Pick puzzle	Move car*
In cup	On shoe	Summer coat	Match picture	Car go*
Gimme hug	Push cart	Hit bowl	Glue candy	Match card*
Big puzzle	More mail	Shave beard	In half	Two blocks*
Want clown	Shake cup	Turn page	Go car	Mom purse*
Hat please	More bubbles	In hoop	Move truck	My head*
Shake please	Come here	Shake more	On dish	Airplane puzzle*
In pool	Go home	Shoot ball	In bus	More airplane*
Bug magnet	Sail ship	Monkey hurt	Come here	Pop sound*
Make cookie	Pop more	Cut picture	Right here	Go home*

REFERENCES

(1) Joubert Syndrome is a rare brain formation characterized by the absence or underdevelopment of the cerebellum vermis—an area of the brain that controls balance and coordination. The most common features include hypotonia, inability to coordinate voluntary muscle movements, mild to moderate mental retardation, developmental delays in language and motor areas, and ocular motor difficulties affecting lateral eye movement (Joubert Syndrome Foundation Corp <<http://www.joubertsyndrome.org>>; National Institute of Neurological Disorders and Stroke (NINDS), Joubert Syndrome Information Page <http://www.ninds.nih.gov/health_and_medical/disorders/joubert.htm>).

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