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Childhood Apraxia of Speech:
The K-SLP Methods & Behavioral
Strategies to Build Successful
Vocal Communication

K•SLP

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Disclosure

The Kaufman Children's Center for Speech, Language, Sensory-Motor, & Social Connections, Inc. is owned and operated by Nancy Kaufman, MA, CCC-SLP. Nancy has developed a speech praxis treatment program known as the Kaufman Speech to Language Protocol (K-SLP). She is the author of the K-SLP Treatment Kits for Children, the K-SLP Workout Book, the Kaufman Mutt Family Total Language Builder, the K-SLP Instructional DVD, and the Kaufman Speech Praxis Test. Nancy is the co-author, with Tamara S. Kasper, MS, CCC-SLP, BCBA, of the K&K Sign to Talk Nouns & Verbs program. She benefits from the sales of these products, published by Northern Speech Services.

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K•SLP

The Kaufman Speech to Language Protocol

A method of practicing syllable shape gestures and word approximations toward target vocabulary to be moved directly into functional expressive language.

Slide 4

Typical developing toddlers who are just learning to speak rarely begin to speak using whole words. For example, the word <u>bottle</u> might be produced in this sequence:

ba

baba

bado

bottle

Slide 5

Children who struggle to speak do not go through this process or may be stuck on approximations much lower than their capability.

Continuously asking them to repeat whole words is setting them up for failure!

Slide 6

The **K•SLP** helps children who struggle to combine consonants and vowels to:

- Practice combining the consonants and vowels within their repertoire to form syllable shapes of VV, CV, VC, CVCV, CV1CV2, CVC, C1V1C2V2, etc. using real words.

- Practice simple nouns to spontaneously name them, developing vocabulary, and to eventually add a verb for a two-word utterance (eat apple).

- Practice functional requests (mands): on, off, out, open, come, go, watch, don't, help, etc.

The K•SLP helps children who struggle to combine consonants and vowels to:

- Practice successive approximations toward "favorites" and high-frequency words for requesting and commenting.
- Practice pivot (carrier) phrases to implement for expressive language formulation.
- Practice building syntax, morphology, and general expressive formulation to social language development.

The K•SLP was established with roots in...

- Applied behavior analysis (ABA), and in particular applied verbal behavior (AVB)
- Phonology/phonological processes
- Acquired apraxia of speech (literature and research) especially the use of melody and gestures to facilitate communication
- Sensory integration and praxis
- Current neuroscience
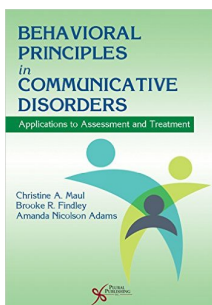- Current research in childhood apraxia of speech, especially principles of motor learning

Applied Verbal Behavior & the K•SLP

- Though ABA is known to teach skills to those with autism spectrum disorders, it has a far-reaching capacity to teach any skills/behaviors.
- The behavior term in ABA is often associated with extinguishing negative behaviors that can be interfering to the learning and social process.

Applied Verbal Behavior & the K•SLP

- However, ABA principles are excellent and highly researched teaching strategies to establish or improve upon behaviors.
- In this case, the behaviors we wish to establish or improve upon are that of speech-motor and expressive language (and language processing/receptive language).
- Applied verbal behavior (AVB) would be a more specific approach, especially when teaching the behavior of communication.

Applied Verbal Behavior & the K•SLP

BEHAVIORAL PRINCIPLES in COMMUNICATIVE DISORDERS
Applications to Assessment and Treatment

Christine A. Maul
Brooke R. Findley
Amanda Nicolson Adams

Here is a new book on this very subject!

Why Should SLPs Learn the Principles of Behaviorism and How to Apply Them?

Direct excerpt from *Behavioral Principles in Communicative Disorders: Applications to Assessment and Treatment* (Maul, Findlay, Adams)

Speech-language pathologists (SLPs) are in the business of changing communicative behaviors in the clients they serve. SLPs seek to establish new communicative behaviors in their clients, rehabilitate communicative behaviors that may have been lost, strengthen and maintain existing behaviors, and, often simultaneously, decrease communicative behaviors that are undesirable.

Why Should SLPs Learn the Principles of Behaviorism and How to Apply Them?

...The well researched principles of behaviorism, therefore, are highly relevant to the field of speech-language pathology because it is a science that has resulted in an evidence-based, systematic set of methods applied to modify the behaviors of others.

Applied Verbal Behavior & the K-SLP

- As SLPs, we would need an additional master's degree to fully understand AVB, with many hours of supervised instruction. Though this would be a wonderful idea, it would not be feasible for most of us.
- Therefore, a general understanding of some teaching strategies of ABA, and specifically verbal behavior (AVB) would help us to be better clinicians.
- Here are 8 AVB teaching strategies to implement for CAS (or other speech and language behaviors).

8 Teaching Strategies

1. Pairing & establishing motivation
2. Defining the behavior & data collection
3. Implementing shaping techniques
4. Errorless teaching
5. Implementing and fading cues
6. Differential reinforcement and error correction
7. Practice schedules for the new behavior
8. Practicing new skills in the natural environment (coaching parents)

Teaching Strategy 1 — Pairing & Establishing Motivation

- We should never underestimate the power of motivation!
- Determine the child's highly preferred toys, activities, themes, characters, places (or foods/drinks if unmotivated by the others), and have them readily available.
- A favorites list can be obtained from parents and caregivers.
- If the child has unusual interests, round these up (examples: surgical gloves, eyeglasses, phones).

Pair Yourself

- Pair yourself with the child's highly preferred items and activities by being "the Giver of Good Things."
- Give those items or provide those activities freely without expectation of performance.
- Gradually begin to ask for a simple performance task, such as a gross-motor imitation, or placing a puzzle in one available opening.
- If the child understands the task of imitation, attempt to gain simple gross-motor movements or simple vowels/consonants.

Pair Items & Activities

- Pair the child's highly preferred items and activities with therapy materials or stimulus items
- When they come out, so do their favorites

When there is an absence of imitation skills, consider:

- Rapid Motor Imitation Antecedent Training

- Sign to Talk (Kasper & Kaufman)

- Tamara Kasper's e-course, "Progressive and Systematic Speech and Language Training for children on the Autism Spectrum" (northernspeech.com) provides the specifics about implementing the K-SLP with special populations like ASD.

Teaching Strategy **2** ➤ Defining the Behavior

- Define the behavior to be established, improved upon, or extinguished and replaced.

- In CAS, the initial behavior is that of speech-motor planning and programming and eventually expressive language development.

- This is done through testing and observation.

Definition of CAS per the American Speech Language Hearing Association's (ASHA) Ad Hoc Committee on Childhood Apraxia of Speech (2007):

Childhood apraxia of speech (CAS) is 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). CAS may occur as a result of known neurological impairment, in association with complex neurobehavioral disorders of known or unknown origin, or as an idiopathic neurogenic speech sound disorder. The core impairment in planning and/or programming spatiotemporal parameters of movement sequences results in errors in speech sound production and prosody.

Childhood apraxia of speech **can** and often does co-exist with other speech and language challenges. We need to consider the nature of the **primary** interfering factor to successful vocal language development.

Signs & Symptoms of Apraxia of Speech

Source: CASANA/Apraxia-Kids.org

- Limited repertoire of vowels; less differentiation between vowel productions; and vowel errors, especially distortions.

- Variability of errors (inconsistent errors on repeated trials).

- Unusual, idiosyncratic error patterns (sometimes defying transcription).

- Errors increase with length or complexity of utterances, such as in multi-syllabic or phonetically challenging words.

Signs & Symptoms of Apraxia of Speech

Source: CASANA/Apraxia-Kids.org

- Depending on level of severity, a child may be able to accurately produce the target utterance in one context but is unable to produce the same target accurately in a different context.

- More difficulty with volitional, self-initiated utterances as compared to over-learned, automatic, or modeled utterances.

Signs & Symptoms of Apraxia of Speech
Source: CASANA/Apraxia-Kids.org

- Impaired rate/accuracy on diadochokinetic tasks (alternating movement accuracy or maximum repetition rate of same sequences such as /pa/, /pa/, /pa/ and multiple phoneme sequences such as "puh tuh kuh")

  "Differential Diagnosis of Children with Suspected Childhood Apraxia of Speech." (Murray, McCabe, Heard, & Ballard, 2015)

Signs & Symptoms of Apraxia of Speech
Source: CASANA/Apraxia-Kids.org

- Disturbances of prosody including overall slow rate; timing deficits in duration of sounds and pauses between and within syllables contributing to the perception of excess and/or equal stress, "choppy" and monotone speech.

- At some point in time, groping or observable physical struggle for articulatory position may be observed (possibly not present on evaluation, but observable at some point in treatment).

- May also demonstrate impaired volitional non-speech movements (oral apraxia).

Signs & Symptoms of Apraxia of Speech
Source: CASANA/Apraxia-Kids.org

Nancy's observation: Verbal motor perseveration: getting "stuck" on a previously uttered word, an automatic or overused word, or bringing speech-motor elements from a previous word into the next word uttered.

Signs & Symptoms of Apraxia of Speech
Source: CASANA/Apraxia-Kids.org

Other characteristics that may describe children with CAS, but are less likely to contribute to a differential diagnosis include:

- Poor speech intelligibility
- Delayed onset of speech
- Limited babbling as an infant
- Restricted sound inventory
- Loss of apparently previously spoken words

Early speech sound characteristics of CAS:
"Volubility, consonant, and syllable characteristics in infants and toddlers later diagnosed with childhood apraxia of speech: A pilot study." (Overby & Caspari, 2015).

The Kaufman Speech Praxis Test

- The Kaufman Speech Praxis Test (K-SPT) (Wayne State University Press, 1995) is a test that provides us with information about what vowels, consonants, and syllable shapes are within the child's repertoire, and if core CAS characteristics are observed in the child's responses.

- Observation would provide us with speech and language behaviors that may be idiosyncratic or habituated that would need to be extinguished and replaced.

The Kaufman Speech Praxis Test

Using the Kaufman Speech Praxis Test for Children (KSPT), we can determine at what level a child's speech-motor skills are compromised, and we can target those levels in treatment.

The KSPT hierarchy includes the following:

I. Gross oral-motor movements

II. Simple Level

1. Isolated vowels – / a, ɛ, ɔ, ɪ, ʌ, u, i/

2. Vowel to vowel movement –
   /aɪ, oʊ, eɪ, aʊ, ɔɪ/ (diphthongs)

3. C Simple – /m, b, p, t, d, n, h/

4. CVCV (reduplicated syllables) –
   mama, papa, dada

5. VCV – opa, ah-po, oh-bow

6. CV – da, me, bay, do

7. CV1CV2 (repetitive consonants with
   vowel change) – mommy, daddy, puppy

8. CVC (assimilated initial and final consonants) –
   pop, mom, bib

9. CVC CVC (initial and final consonant inclusion) –
   man, home

10. C1V1C2V2 (simple bisyllabics) –
    happy, tummy, bunny

11. CVCVCV (simple polysyllabics) –
    banana, potato, tomato

III. Complex Level

Complex C –
/k, g, f, s, z, l, r, w, v, j, ʃ, tʃ, dʒ, ɵ, ð/

CVC CVC – complex initial and final consonant inclusion

Complex bisyllabics – candle, chicken, machine

Consonant blends – / r , s , l /

f→b (t, d→k, g) and b→f (k, g→t, d) words
(alveolar to velar and velar to alveolar)

Length and complexity words: win, window,
windowsill

IV. Spontaneous Length and Complexity

▶ Alex: Evaluation (age 3.11)

Alex: Summary

- Gross oral movement intact.
- Aware of moisture around mouth.
- "Mommy" verbal perseveration (getting stuck on an automatic word)
- Deliberate production (evidence of early prosody issues).
- Needs bombardment cues for simple CV for accuracy.
- Overgeneralization of "y" endings when asked to imitate CVCV syllable shapes (baby, puppy, mommy, daddy). *This is why it is important to mix and vary our tasks.
- Oral groping to maintain positioning.
- Voicing errors.

Alex: Summary

- Can produce /ɛ/ and /i/ but cannot combine into diphthong /eɪ/ as in "day."
- VCV assimilation.
- Disintegration with extended syllabic length.
- Receptive language more advanced than expressive.
- Stimulable for reducing cues to oral postures.
- Distorted vowels in connected speech.
- Appears to be aware of his errors.

Tommy: KSPT Evaluation (age 4.10)

Tommy: Summary

- Gross oral motor skills are generally intact
- Additions (initial consonants prior to some isolated vowels, adding a /t/, /d/, /h/
- Diphthong reductions /ɔɪ/ as in *boy*
- Can produce simple consonants accurately (tense vowels are accurate, just have prevocalic additions) but struggles to combine these movements
- Vowel inaccuracies in context

Tommy: Summary

- Devoicing /b/ /z/
- Voicing initial /t/
- Deletion of initial consonants
- Deletion final consonants (inconsistent)
- Deletion medial consonants
- Replacements of medial and final consonants
- Some initial /h/ words intact
- Narrow repertoire of complex consonants in isolation
- Inaccuracy of complex consonants

Tommy: Summary

- Inconsistency on repeated trials
- Has some auto words intact
- Verbal motor perseveration (gets stuck on a previously successful word, "hot/hop")
- Difficulty with syllable length (even with CVCV)
- Unintelligible length of utterance
- Unusual phonological processes (devoicing, nasal replacements, initial consonant deletion)
- Receptive language superior to his speech-motor and expressive language skills

Tommy's Behaviors to Establish, Improve Upon, or Extinguish

Speech-Motor Behaviors

1. Syllable shapes (single words from K-SLP Kit 1) Needs all syllable shapes from CVCV to simple multisyllabics.
2. Name common nouns with best approximations to the target adult word forms.
3. Favorites list: best approximations toward target adult word forms.
4. High-frequency words to be established.
5. Produce simple manding (requesting) words: in, on, off, up, open, help, come, go, don't, etc.

Tommy's Behaviors to Establish, Improve Upon, or Extinguish

Expressive Language Behaviors

1. Use the above single words functionally.
2. Learn pivot words and phrases (to be discussed).
3. Name the function of objects with two and three-word combinations (subject-verb-object)
4. Name action with two and three-word combinations (S-V-O)
5. Re-script his spontaneous communicative attempts
6. Move ahead on grammatical skill acquisition.

▶ Tommy: Progress & Coaching Mom

▶ Amber: Evaluation (age 3.3)

▶ Amber: Summary

- Struggle (head nodding) on initiation of utterances.
- Oral groping, movement inside the oral cavity.
- /n/ in "no" as an automatic but unable to produce /n/ in other contexts.
- CVCV best skill even though she has Cs & Vs, can't combine.
- Unintelligible attempts at speaking.
- Initial consonant deletion and final consonant deletion.
- Distractible, needs to be in movement.
- Needs visual cues for success.

▶ Amber: Progress (age 3.6)

Candidates for the K●SLP

- Children who can produce consonants and vowels but struggle to combine them.
- Children who struggle to maintain articulatory accuracy when combining consonants and vowels in connected speech.
- Children who understand the task and can imitate vocal/verbal behavior.

Six Steps of the K●SLP

1. Determine which vowels, consonants and syllable shape gestures the child has in his/her repertoire via the Kaufman Speech Praxis Test for Children.
2. Establish first words (considering evaluation findings), and begin working on syllable shape gestures, and common nouns, simplifying the motor plans if necessary.
3. Establish a list of functional mands (requests) such as, *on, off, open, out, up, down,* and *help,* including a list of favorite foods, drinks, toys, activities, people/pet's names places, and high-frequency words, establishing best approximations for requesting and commenting.

Six Steps of the K•SLP

4. Help the child to combine words through pivot words and (carrier) phrases, as well as telegraphic language structures, to include scripting functional language. Move ahead on expressive language (combining words), and back up on speech-motor (clarity).

5. Refine and integrate complex consonants and syllable shape gestures. Continue to build expressive language by adding in syntax and morphology.

6. Establish a home program.

Teaching Strategy 3 → Shaping (B.F. Skinner)

- Shaping is a method of training a behavior by which successive approximations toward a target behavior are reinforced (Psychology Encyclopedia).

- Understanding the basics of *shaping*, we can narrow down the behavior of speech into component parts (simplify the behavior or motor plan) and build it back up by using cues, fading cues, and implementing reinforcement strategically.

How Do We Simplify the Motor Plans of Words?

We can implement natural phonological processes to help children simplify motor plans with best approximations…

A phonological process is defined as a simplifying device. It is the way that adult phonology is simplified, either linguistically or motorically, based on the principal of the least physiological effort. (Weiner, 1979)

As SLPs we can simplify words for temporary functional language by teaching natural phonological processes

- Children who struggle to speak may not follow natural phonological processes to simplify their own speaking attempts.

- A child may simplify the motor plan of a word much lower than their motoric capability.

- If only accepting the child's approximation, they won't progress toward target words.

- Exposure to good speech and language role models is not enough to help the child with CAS to succeed.
- Speech must be practiced to be mastered.
  (Strand, 2005; Maas, 2008)

Shaping Word Approximations
Clinical Implications

The SLP can implement phonological processes as a method of simplifying the motor plan of words on a motor basis closer to the adult form of the word gaining closer approximations just short of failure to successfully imitate.

Shaping Word Approximations
Clinical Implications

Each word taught can be simplified by reducing clusters, deleting final consonants, voicing devoiced consonants... (natural phonological processes employed above the level of the child's best approximation considering stimulability and coarticulation). We can continue to assist the children toward the adult form of the word as we progress in therapy.

The ultimate goal is the ability to produce words **perfectly**.

Teaching Successive Approximations to Simplify the Motor Plans of Words

Teaching successive approximations of words is only implemented when the child is not stimulable to accurately produce consonants, vowels, or syllables within words that are important to the child's communication.

Successive approximations are rooted in the behavioral process of SHAPING, original principles of B.F. Skinner from the 50's and 60's (Skinner, 1957).

Why Teach Approximations?
(Rather than to simply accept the child's attempt)

- When children are unable to accurately produce a sign, we often teach them an approximation as a temporary communication. This should hold true for speech as well.
- Think about how ANY motor skill is taught, such as how to play tennis or shoot a basket. Small steps are practiced until they can be coordinated into the entire skill.
- The child is likely capable of a better or closer approximation of a word than their own simplification.

- Approximations give the child the opportunity to use a word they would otherwise may not have attempted.
- The child may not be stimulable for the accuracy of a vowel, consonant, or syllable, no matter what techniques we have implemented. We therefore cannot afford to wait until the child is stimulable for production of a difficult phoneme to then work on words that contain them, especially for highly preferred item and activity vocabulary.

Word approximations are temporary and functional. As the child progresses through therapy, lesser approximations (motor plans) are replaced with higher approximations and ultimately perfection of words.

Any word can be broken down into a level that a child can imitate

Nancy	=	complex two-syllable word
Nan-tee	=	stopping the /s/
Nan-dee	=	stopping the /s/ (and voicing)
Nae-nee	=	repetitive consonants with vowel change
Nae-nae	=	reduplication
Nah-nah	=	vowel neutralization
Nae	=	syllabic reduction

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spaghetti

ss-puh-geh-ti
(segmenting syllables)

puh-geh-tee
(blend reduction)

puh-deh-tee
(fronting)

buh-deh-dee
(voicing)

__deh-dee
(syllabic reduction)

We can use our knowledge of phonological processes to help children with apraxia of speech simplify words into best approximations:

Final consonant deletion	ba *for* ball
Initial consonant deletion *May not be a natural process but still may serve to be the best approximation*	ine *for* mine
Medial consonant deletion	buh-ee *for* bunny
Cluster reduction	top *for* stop
Reduplication	wawa *for* water

Deaffrication	ticken *for* chicken
Vowel neutralization	nem *for* name
Stopping	tum *for* thumb
Devoicing	bik *for* big
Fronting	tootie *for* cookie
Voicing	doo *for* too

* Do not teach backing, as it is not a natural process.

Example:

water	=	complex bisyllabic
wa-tuh	=	simple bisyllabic
wa-duh	=	voicing and vowel neutralization
wa-wa	=	reduplication
wa	=	single syllable (CV)
oo-aw oo-aw	=	simplify the movement within a diphthong

Teaching word approximations or simplifying the motor plan helps children who struggle to speak to practice first words <u>without failure</u>. The goal is to continuously move approximations toward perfection.

Compensatory placements (simplifications) for isolated consonants of which they are not stimulable

- /t,d,n,l/ dentalize these consonants (tongue between teeth) as a more gross-motor and visible production

- /p,t,k,s/ or other voiceless consonants followed by vowels, allow erroneous voicing
  /t/ = /d/   /p/ = /b/   /k/ = /g/   /s/ = /z/   etc.

- /k,g/ (initial and medial) replace with /t,d/ fronting
  cut = tut

- /l/ (initial and medial) replace with /w/ or /j/
  look = wook

- /l/ (final) replace with /ou/ as in *bubbo/bubble*

/ɚ r/ (final) replace with /ɘ/ as in *watuh/water*			(vocalization)
/ʃ/ replace with /s/	shoe =	soo	(deaffrication)
/tʃ/ replace with /t/	chair =	tair	(deaffrication)
/dʒ/ replace with /d/	jump =	dump	(deaffrication)
/s/ replace with /t/ or /d/	soup =	toup	(stopping)
/z/ replace with /d/ or /s/	zoo =	doo	(stopping)
	=	soo	
/f/ replace with /p/	fun =	pun	(labialization)
/v/ replace with /b/	very =	bery	(labialization)

Once the child is stimulable for each vowel and consonant, extinguish the compensatory placement and replace with the accurate phonemes.

More Tips in Choosing Successive Word Approximations Toward Target Vocabulary

- Segment away final consonants if influencing an error on the initial consonant. This should be done without a vocal break, if possible. Prolong the vowel or use melody to avoid the vocal break.

- Avoid the addition of a *schwa* vowel, post final consonant.

- After emphasizing syllables to correct errors (making them louder), ensure that appropriate stress patterns are then practiced. (hap**py** for acquisition to **ha**ppy for retention)

- Continue to focus upon consonants, vowels, and syllable shapes that are in error by replacing lesser approximations with higher approximations toward perfection.

- Implementing cues, and fading cues, as well as errorless teaching methods (cueing before failure) are paramount to the **K-SLP** methods.

Learn More

Evaluation and Treatment of Childhood Apraxia of Speech – available in two formats:

- E-course (northernspeech.com)
- K-SLP Instructional DVD (kidspeech.com/dvd)

Eight Behavioral Teaching Strategies For Treating Childhood Apraxia Of Speech
(e-course, northernspeech.com)

Evidence-Based Practice

The Application of the K-SLP for CAS & ASD

- "Apraxia of speech in children and adolescents: Applications of neuroscience to differential diagnosis and intervention." (Burns, 2011)

- "Effect of tutor-modeled successive approximations versus tutor-modeled adult forms to improve topography of tacts." (Eldridge, Kasper & Goodwin, 2006)

- "Efficacy of the Kaufman Approach in Increasing Speech Output with a Low-Verbal Child with Autism Spectrum Disorder." (Holbrook & Pelayo, 2013)

- "Improving the speech production of children with autism." (Sweeney-Kerwin, Carbone, et al, 2006)

- "Improving vocal verbal behavior via tutor-modeled successive approximations." (Kasper & Goodwin, 2003)
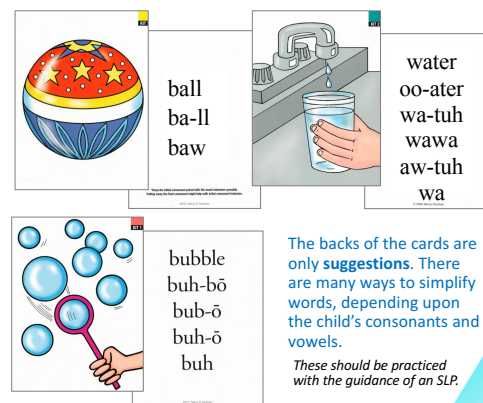
Evidence-Based Practice

The Application of the K-SLP for CAS & ASD

- "Increasing the vocal responses of children with autism and developmental disabilities using manual sign mand training and prompt delay." (Carbone et al, 2010)
- "Intensive CAS summer program: Boost or bust?" (Nancarrow, Kaufman, & Ficker, 2013)
- "Shaping word approximations for speech intelligibility: Effect on language." (Nancarrow, Kaufman, & Burns, 2009)
- **"Treating childhood apraxia of speech: Evaluating the Kaufman Speech to Language Protocol." (Gomez, et al, 2016)**

Kaufman Speech to Language Protocol Treatment Kits for Children: Basic Level (kit 1) and Advance Level (kit 2)

- The K-SLP kits provide us with stimulus pictures which are practiced through successive approximations toward perfect target vocabulary.
- Kit 1 follows the simple syllable shapes with the earliest and easiest consonant-vowel combinations. It includes /m, b, p, t, d, n, h, w/ with vowels to form simple syllable shapes which constitute whole words.

- Kit 2 helps with more complex consonant and vowel combinations and to work more specifically on phoneme synthesis (consonants that are produced accurately in isolation through replaced or deleted in connected speech).

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ball
ba-ll
baw

water
oo-ater
wa-tuh
wawa
aw-tuh
wa

bubble
buh-bō
bub-ō
buh-ō
buh

The backs of the cards are only **suggestions**. There are many ways to simplify words, depending upon the child's consonants and vowels.
These should be practiced with the guidance of an SLP.

About the Use of the K-SLP Kit Pictures…

- The K-SLP kits and Sign to Talk pictures are just one easy way to provide stimulus items rapidly for practice!
- Yes! Objects and natural environment training are ultimately how to practice and retain functional skills.
- But, pictures are initially more easily accessible and allow us to choose stimulus items efficiently.

- In addition to the use of pictures initially, there is always the element of play, and the words associated with the reinforcing toys and activities!
- The approximations on the backs of K-SLP kits are only meant to be suggestions and follow typical phonological development.
- Approximations are determined on the basis of what vowels and consonants are within a child's repertoire.

- They are simplifications of the motor plans of words or compensatory placements for difficult phonemes.
- If you are only using the kit pictures during a session, you are not implementing the K-SLP the way it is intended!
- Parents and caregivers should not be using kit pictures for home practice unless they are advised by their SLP as to best approximations and cues for that particular child, and that the pictures are paired with a highly preferred toy or activity!

Getting Started: Single-Word Lists

- The K-SLP kit pictures are just one of the five lists of single words to practice.
- Simultaneously, along with Kit 1 syllable shapes, other single words are focused upon.
  1. Simple syllable shapes
  2. Simple common nouns
  3. Simple mands (requesting words)
  4. Favorites
  5. High-frequency words

List 1: Syllable Shapes Practice Words

Syllable shapes for speech-motor coordination/planning (Kit 1)
CVCV, CV, VCV, CV1CV2, C1V1C2V2, etc.

For those with a limited vowel and consonant repertoire. Make a list of the vowels and consonants at the top of your page. Pull them down into simple words. Have visual references of the words.

Example of a child's limited repertoire:

If they only have *ah, uh, eh, m, b, t, n,* we can establish words such as:

mama	knob
baba	ten
nana =banana	ton
mop	net
knot	on

List 2: Simple Common Nouns

Common nouns of different categories that lend themselves to the ability to then name their function.

bubbles (blow)	apple (eat)
water (drink)	ball (throw, kick, bounce)
shoes (put on, wear)	bike (ride)

List 3: Functional Manding Words

Functional words which serve to manipulate the environment. These can be paired with a gesture. They are often referred to as "power words."

open	up	here	come
on	down	there/deh	mama
off	yes	this/dis	dada
in	no	that/dat	watch
out	don't	go	look
eat	catch	draw	read

Very often, the first words or signs SLPs and parents tend to teach are:

- more
- want
- please
- help
- (all) done
- again

Although these are initially effective, they begin to lose their power.

Words that become less effective single-word mands (requests) if overdone

- more
- want
- please
- help
- all done
- again

Unless they are a pivot word in a two-word phrase. Why?

**Once these words are taught, there may be less motivation to learn additional vocabulary

*** The child may only learn that when using these single words, good things will probably happen

---

List 4: Favorites for Manding Words

List of favorite foods, drinks, toys, activities, places, people and pets names, and favorite characters.

If colors, letters, or numbers are of high interest, add them to the favorites list.

This is where simplification of words is most necessary

List 5: High-Frequency Words

These are words that are often said but don't fit the other categories, such as:

please	get	bye
thank you	have	awesome
see	hi	wow

Descriptive words such as:
colors, numbers, size and shape

Small linking words such as articles or auxiliary verbs such as:
a, an, the, is, to, are, was

Teach Single Words Across All Operants

Listener Responding (LR) = Receptive Language
Show me an apple.
Show me something we eat.
Show me the stem of the apple.
Show me a fruit.

Echoic = Vocal imitation
Say apple.

Tact = Label
Name this: *apple.*

Mand = Request
Saying the word to gain access to it.

Intraverbal = Fill-ins, answering questions
Something we eat is an _____.
What is the fruit that grows on trees?

Literacy
Which word says apple? (point response)
What does this word say? (apple)

Treatment Tips for Establishing First Words Vocabulary

a. Get the consonant vowel patterns the child has spontaneously, upon imitation.

b. Make the consonants or vowels more gross-motor and visible by exaggerating them – dentalizing /t, d, n., l/ or gutteral, open mouthed /k/

c. Use the pictures in Kit 1 for establishing easy syllable shape gestures and for best word approximations to then become a visual referent for eventual spontaneous naming.

d. Use consonants and/or vowels that are already in the child's repertoire to form early vocabulary.

e. Reduplication is an early process and also does not include final consonants. If the child only produces a single syllable, bombard with more than two, and they might produce two:

mama	dada	papa
moomoo	baabaa	hoohoo
booboo	byebye	wawa
nono		

f. Final consonants are difficult. Choose words that do not have final consonants:

(CV patterns from Kit 1):

me	hi	bye	dough
two	bee	tea	pea
no	new	now	

CVCV, VCV, CV_1CV_2 and $C_1V_1C_2V_2$ also do not have final consonants. We can achieve a great deal of progress before even moving toward final consonant inclusion.

g. Initial consonants may be difficult, so choose words without them:

(VC of Kit 1):

up	on	in	out
oat	eat	ouch	arm

h. Assimilation is an easy simplification of many CVC or two-syllable words with bilabial to bilabial or tip alveolar to tip alveolar, so choose words like:

pop	mom	bib	dad
pup	toot	mop	map
boom	mob	tin	tan
knot	dot	den	teddy
puppy	peppy	dirty	nutty
whoa	wow		

i. It is easier to voice in the initial and medial positions and to devoice in the final position. So choose words that start with /b,d,g/ and end with /p,t,k/ (when in Kit 1)

j. Tense vowels and diphthongs are difficult especially if the child cannot produce /i/ as in eat or /u/ as in boo. We can neutralize these vowels in a word to help the child produce a word approximation.

Tense vowels: Can be replaced with:

/u/ as in boo   /ʊ/ as in book
/i/ as in eat   /ɪ/ as in bit

Diphthongs: Can be replaced with:

/oʊ/ as in oat   /ʌ/ as in nut
/aɪ/ as in high   /ɑ/ as in hot
/eɪ/ as in day   /ɛ/ as in bet
/ɔɪ/ as in boy   /ɔ/ as in bought
/j/ as in yes and   /i/ plus next vowel in word
/w/ as in want   /u/ plus next vowel in word

---

k. Consider co-articulation

/t,d/ co-articulate best with /i/ as in *tea* or *deep.*

/k,g/ co-articulate best with neutral vowels such as /ʌ, ə/ as in *cup, come, gum,* and *gut* or /ɑ/ as in *cob, cot,* or *gob.*

/m,p,b/ co-articulate best with /ʌ, ə/ or /ɑ/

---

l. Voiced, nasal continuants may be the easiest initial consonants to target as they can be prolonged before the vowel.

/m/

/n/

---

m. To help with initial consonant inclusion, keep the initial consonant paired with the vowel, prolong the vowel and segment away the final consonant by just a little bit.

if boot = doot, try boo-t

n. If both the initial and final consonant are voiceless consonants such as /p,t,k/, practice them without the vowel in the middle.

▶ Baeden: First Words

Baeden: Progress (age 2.9)

Baeden - 2 years, 9 months

Video: Knox's First Words

Here is a young child (age 2 years, 3 months) who has characteristics of CAS but no formal diagnosis.

The goal of starting the K-SLP is to gain imitation of vowels, consonants, or syllable shapes, and make it fun while continuing to evaluate for CAS.

* As you can see, no pictures are necessary.

Knox: First Words

Hannah: Favorites

Four Levels of Charting Syllable Shape Goals

1. Imitation plus cues (auditory, visual, and tactile cues if necessary)
2. Imitation only with minimal cues (visual only)
3. Spontaneous with minimal cues (visual only, such as oral postural or gestural)
4. Spontaneous

Setting Individual Education Planning (IEP) Goals

Example:

The child will be able to produce simple bisyllabics in such words as *happy, bunny, tuna,* with (90%) accuracy.

Sub goals:

a. Upon imitation with cues
b. Upon imitation with minimal cues (visual only)
c. Spontaneously with minimal cues(visual only)
d. Spontaneously

James: First Words (age 2.10)

James: Simple Bisyllabics (age 3.5)

James: Group Scripting

James: Expressive Language (age 3.8)

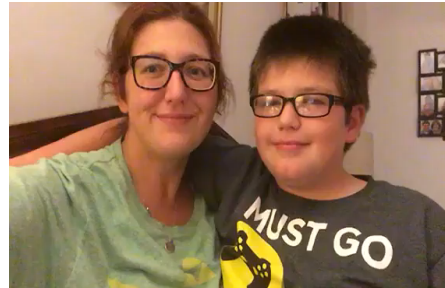James: Progress (age 5.3)

▶ James: Progress (age 8)

▶ James: Progress (age 11)

Teaching Strategy **4** ❯ Errorless Teaching/Learning

- Errorless teaching (or errorless learning) is a method of cueing before failure.
- Errorless teaching is a technique that helps children to emit successful responses on a given goal. There is an immediate prompt or cue that prevents the child from emitting a mistake or error, and thus helps them to practice correct responses rather than errors.
- Children will be more inclined to cooperate with errorless teaching.

Teaching Strategy **5** ❯ Implement Cues

While establishing a "core" vocabulary, cues will be necessary to remind the child of a new motor sequence for each word (picture). Use as many cues as necessary for the child to reach his/her best word approximation (or whole word), then reduce each cue systematically until the child can name the pictures spontaneously or mand for their favorites, using their best word approximation or whole target word.

1. Explanation cues
   "bite your lip and blow" (for /f/)
   "open your mouth" (for /k/ and /g/)

---

2. Visual/tactile phonetic hand cues for VOWELS
   (on or around the clinician's own mouth)

/ɑ/ "ah" Place your thumb and index finger on the sides of the jaw aligned with the lateral teeth and pull down.

/ɛ/ "eh" place your thumb and index finger below the corners of the mouth as pinching the chin.

/oʊ/ "oh" About an inch out from the corners of the mouth, cup your thumb on one side and fingers on the other near the cheeks, and gently squeeze inward toward the corners of the mouth.

/i/ "ee" Place your thumb near one corner of the upper lip and index finger near the other upper lip corner and push up into the gums.

Visual/tactile phonetic hand cues for VOWELS
(on or around the clinician's own mouth)

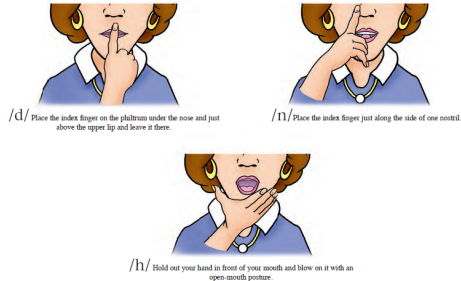/u/ "oo" Place your thumb and index finger at the corners of your mouth and gently squeeze.

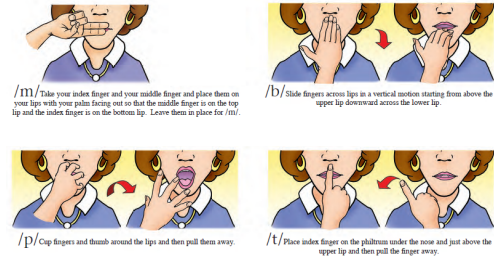/ɪ/ "ih" Place your thumb and index finger just above the corners of the lips.

/ə/ or /ʌ/ Pull down the chin with your index finger.

Visual/tactile phonetic hand cues for
SIMPLE CONSONANTS
(on or around the clinician's own mouth)

/d/ Place the index finger on the philtrum under the nose and just above the upper lip and leave it there.

/n/ Place the index finger just along the side of one nostril.

/h/ Hold out your hand in front of your mouth and blow on it with an open-mouth posture.

3. Visual/tactile phonetic hand cues for
SIMPLE CONSONANTS
(on or around the clinician's own mouth)

/m/ Take your index finger and your middle finger and place them on your lips with your palm facing out so that the middle finger is on the top lip and the index finger is on the bottom lip. Leave them in place for /m/.

/b/ Slide fingers across lips in a vertical motion starting from above the upper lip downward across the lower lip.

/p/ Cup fingers and thumb around the lips and then pull them away.

/t/ Place index finger on the philtrum under the nose and just above the upper lip and then pull the finger away.

For /k/: Place your thumb underneath your chin and make the motion of pushing up (as in pushing up under the tongue) with an open mouth position.

For /g/: Cup your hand just under your chin around the neck.

For /ʃ/: Place your index finger across the lips vertically to make the "be quiet" signal (shhhh) or pinch the lateral portion of the lips together (forcing the lips to pucker).

For /tʃ/: Place the thumb, forefinger, and middle finger above the upper lip.

For /dʒ/: Place the thumb, middle finger, and forefinger below the lower lip.

For /s/: Put teeth together and show them with opened lips while making the letter /s/ in the air.

For voicing: Place your hand on your throat (as in "feeling" the vibration of the vocal folds).

You can always create your own hand signals as long as they are consistent for the child.

(Carahaly, Speech-EZ)

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4. Concurrent cues
   Say the word together with the child.

5. Oral postural cues
   Placing your own articulators visibly for the initial, medial, or final consonant without voicing.

6. First consonant or syllable cues
   Say, whisper, or oral posture the first consonant or syllable of a word or subsequent words in a phrase sentence.

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7. Contextual cues
   "Fill ins" to songs, books, and rhymes.

   Fill in the blank: "I drive the _____."
   "The wheels on the _____."
   "Twinkle twinkle, little _____."

8. Touch cues
   Physically touching your body or the child's body for syllabic emphasis (knee to knee, hand to hand, etc.)

9. Alternate naming for verbal motor memory (breaking perseveration)
Using 2 new word approximations and having the child name them, alternating between one and another. Often, the words may be similar, and triggers perseveration. Alternating naming between them with cues may help, i.e. *butter* and *bunny*.

10. Pivot syllables

ny: bun<u>ny</u>, mo<u>ney</u>, ho<u>ney</u>, Bar<u>ney</u>, Win<u>nie</u>, Er<u>nie</u>, bea<u>nie</u>

ter: wa<u>ter</u>, bat<u>ter</u>, me<u>ter</u>, mat<u>ter</u>, Pe<u>ter</u>, but<u>ter</u>

dle=/do/: pud<u>dle</u>, nee<u>dle</u>, noo<u>dle</u>, poo<u>dle</u>, bee<u>tle</u>

ble: bub<u>ble</u>, mar<u>ble</u>, ta<u>ble</u>, hob<u>ble</u>, peb<u>ble</u>

dy: mud<u>dy</u>, bo<u>dy</u>, Dad<u>dy</u>, han<u>dy</u>, can<u>dy</u>, Hei<u>di</u>, Pad<u>dy</u>

ty: pot<u>ty</u>, par<u>ty</u>, beau<u>ty</u>, nut<u>ty</u>, put<u>ty</u>, Bet<u>ty</u>

* *ty* can be pronounced *dy*

11. Sign language/gestural cues
Use signs or universal gestures (Rosenbek, 1984)
Sign to Talk is a way to bridge sign language to vocal communication (Kasper & Kaufman, 2009)

12. Written cues
Highlighting errors so child can read cues.

13. Answer-first cues
Give the answer first.
"Look at her painting. What is she doing?"

14. Deletion of vowel in monosyllabic words
Moving from the initial consonant directly to the final consonant without the vowel, then adding the vowel back in.

15. Backward chaining on two and three-syllable words or "chunking" syllables
Imitating the last vowel or consonant-vowel of a word, and moving backward or forward little by little.

cookie	banana
ee	nana
kee	ba-nana
uh-kee	
cookie	

16. Pictoral cues
Real pictures or pictures which represent consonants, i.e. *clock* = t-t-t
Easy Does It For Apraxia (Strode & Chamberlain, 1994)

17. Intensity
Presenting the target (errored) syllable louder in intensity than the other syllable.

18. Melody
Using pitch variation or a "sing song" quality to the stimulus target word.
Melodic Intonation Therapy
(Sparks & Helm, 1978)

19. Auditory contrast cues
Example: *potty*
Child says, *teetee*
Clinician should ask the child to produce their error again on imitation: Say, "teetee."
Now tell the child to say *potty* while emphasizing the first syllable louder and with a different pitch to draw child's attention to the syllable in error.

20. Auditory bombardment cues
Say the syllable in error three times

21. Whisper cues
    Whisper the word while the child is attempting it.

22. Automatic/familiar context as a bridge (using a context already in the child's repertoire)
    If the child cannot say the word *down*, have him say, *dada* (or a word that starts with /d/ that is easily in their repertoire) then have him say, *down*.

23. Phonics cues (sounds/letter association)
    Show the alphabet letter of which the child has been taught the associated phonics Example: Show the letter S and the child knows to say, *sss*.

---

24. Visual hand cues
    Can be implemented for articles and auxiliary verbs. Examples: *a, the, to, is*

25. Breaking up diphthongs into component parts
    Examples: *bike* would be *bah-eek*
            name would be *neh-eem*
            home would be *ho-oom*
            house would be *ha-oose*
            boy would be *baw-ee*

    (Avoid making a vocal break by keeping voicing ongoing)

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26. TalkTools™ (Rosenfeld-Johnson, TalkTools.com)

27. PROMPT system (Hayden)

28. Speech-EZ (Carahaly)

29. Easy Does It for Apraxia and Motor Planning
    (Strode & Chamberlain)

Fading Cues

- Cues are essential for initial support, but… **THEY NEED TO BE FADED**.

- The very last utterance achieved should be the child's best approximation or whole word produced with the most minimal cues necessary, ideally with no cues at all… spontaneous productions! And they should be repeated a few times as well.

Examples of Fading Cues

1. Concurrent: Say the whole word or phrase with the child.

2. Whisper: Whisper the whole word or phrase with the child.

3. Provide oral postural cues with gestures.

4. Provide gestures only.

5. Say, "use your words."

Emma: First Words (age 4)

Emma: Fading Out Melody for Naming Skills

Emma: Summary

1. Emma was seated at the table for structural naming.

2. She then continued in our ABA program to learn more requesting in the natural environment (and receptive language as well)

3. Result: Handing a book to Dad and requesting, *read book.*

Group: Scripting Through Music

Treatment is a Collaborative Effort!

The incredible progress you see is due to the team effort between myself and each child's SLPs, parents, family members, and caregivers…as well as the child's **hard work!**

Olivia: The K-SLP Approach (age 6)

Olivia: Progress (age 8)

Jason: Bisyllabic & Expressive Language

Prosody

As defined by Amy Meredith, PhD. CCC-SLP (apraxia-kids.org)

"Prosody refers to intonation, stress pattern, loudness variations, pausing, and rhythm. We express prosody mainly by varying pitch, loudness, and duration. We also may use greater articulatory force to emphasize a word or phrase…"

- In the K-SLP and any CAS therapy, second syllables or final sounds often need to be emphasized.

- In Jason's case, he was making errors on second syllables.
- Once he was able to produce the simple bisyllabics such as, *muddy, table, happy,* it would be important to then change the emphasis to the first syllable where it belongs.
- So once he could say *tummy,* I should have gone back and had him produce those words with the proper syllable stress, ***tum***my
- As you can see on his progress video, his prosody issues are reduced, though could be improved.

Jason: Syntax & Morphology/Progress

Jordan: Down Syndrome (age 7.4)

Teaching Strategy 6 — Differential Reinforcement And Error Correction

Differential Reinforcement

- How reinforcement is provided also follows the principles of motor learning
  (Skinner, 1957; Cooper, Heron & Heward, 2007; Maas 2008)
- Have the child's highly preferred toys and activities available and ready to use.
- These might include less-ordinary items to gather (surgical gloves, eyeglasses, phones, stimulating items).

- The child's highly preferred toys and activities might include an easel for painting, play dough, trampoline, spray bottles, swing, slime, shaving cream, to be used for reinforcement.
- These might also include foods (supplied by parents due to diets and allergies)
- Praise may be all the child needs, but again, let's not underestimate the power of tangible reinforcement!

- For young children, feedback may be about how much or how little reinforcement is offered.
- For example, smaller amounts of food for smaller attempts at the task, larger for closer attempts or for gaining the target in full.
- For older children, feedback would be more explanation as to what was positive or negative regarding their attempt, and how to improve upon the desired target response.

Error Correction

- Child makes an error (no reinforcement)
- Provide cues and support for successful utterance (give a small amount of reinforcement for that utterance)
- Ask again, with faded cues that will likely result in the desired utterance (give more reinforcement)
- Gain the utterance one or two more times (give full reinforcement)

Make the reinforcement reflect the level of independence

▶ Josie: First Words & Unusual Reinforcers (age 4)

▶ Josie: Progress (age 7)

Combining Words

Moving into word combinations to vary in with speech tasks and preparing for functional practice.

- Combining words for functional expressive language is another goal of the K-SLP. Expressive language tasks can be mixed in with speech-motor tasks.
- Help the child to combine words through pivot words and phrases, as well as telegraphic language structures, to include scripting functional language.
- Move ahead on expressive language (combining words), and back up on speech-motor (clarity)

Pivot Words

Once the child has some consistent word approximations, add words for a two-word phrase, such as pivot words (words which remain constant):

my _____	move _____	draw/paint _____
open _____	more _____	tickle _____
help _____	hi _____	push _____
want _____	bye _____	take _____
no _____	red _____	wash _____
on _____	big _____	don't _____
tie _____	hold _____	eat _____

* Add a person's name before or after the phrase to engage them.
Mommy open.

Script Functional Language with Three-Word Pivot Phrases (or more)

I want _____.	Pick up _____.
I need _____.	Watch me _____.
I want to _____.	Draw a _____.
Can (may) I have _____?	Tickle my _____.
Let me _____.	Come _____ with me.
Put away _____.	Can I have a _____?
Put on _____.	Where is the _____?
Take off _____.	

▶ Sam: Pivot Phrases

▶ Sam: Progress

* with Nicole Devens, Carruth Center Houston, TX
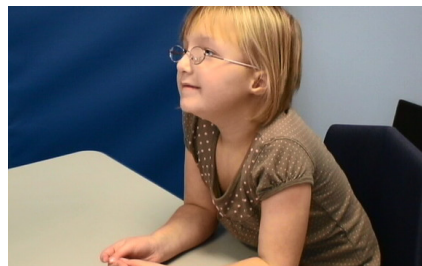
Telegraphic Naming of Function & Action

Naming function of objects (S-V-O)

For each consistent word approximation or whole word, ask…"what do you do with a…ball?" Help the child to respond "I throw ball." This may even be "/ɑ/ /to/ /bɔ/," each word being an approximation.

* For some children with autism spectrum disorders we would not work on naming function because it would not necessarily be a bridge to the use of this structure.

▶ Hannah: S-V-O Naming Function

Telegraphic Naming of Function & Action

Naming action (S-V-O)

Present an action verb picture and ask the child "what is the boy doing?" Pattern the response "boy eat apple." This may have to be "/bɔ/ /i/ /ɑpo/," each word being an approximation.

* Age-appropriate syntax and morphology will be built-in later (pronouns, function words).

▶ Kai: S-V-O Action

▶ Braden: S-V-O Puzzle (age 4.9)

▶ Alexine: Rescripting Pivot Phrases (age 3)

Alexine: Progress (age 10)
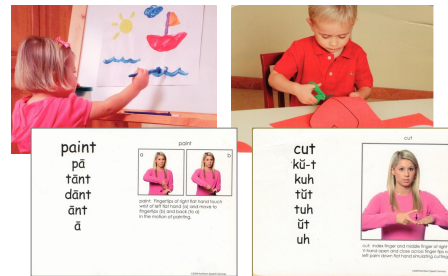
"Girl paint water"   "Boy cut paper"
K&K Sign to Talk – northernspeech.com

Simple Sequence Stories for S-V-O Structures

Present a simple 3-5 picture sequence story.
Assist the child with an S-V-O response for each:

"Paddy wake up"   "Paddy go potty"
"Paddy wash hands"   "Paddy brush teeth"
"Paddy put on clothes" "Paddy eat food"

- Again, each word of the S-V-O pattern may still have to be an approximation.

- Move ahead on expressive language while always working on extinguishing lower approximations and replacing with higher approximations toward perfect articulation.
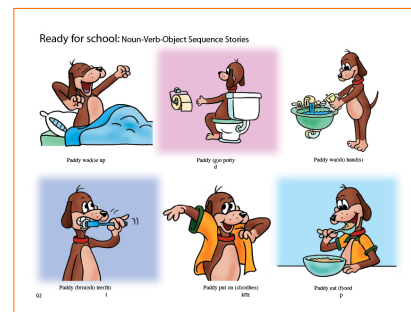
Kaufman Speech to Language Protocol Workout Book
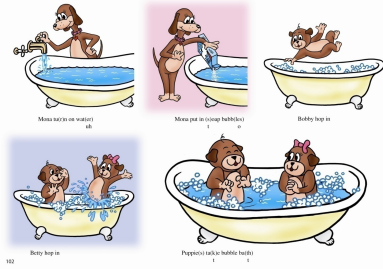
Kaufman Speech to Language Protocol Workout Book

Scripting Functional Language

Example: The child turns the doorknob and is unable to open the door.

Say: "Do you want me to open the door?"
        (use the answer words within your question)

Get best approximation for *yes*

Say: "Tell me you want to open the door."

Help the child to say:
"opuh do" <u>or</u> "I wa o-puh" <u>or</u> "o-puh peez" <u>or</u> "o"
(open door)   (I want open) (open please)   (open)

* Eventually fade cues

Helpful Tips for Scripting Language

Avoid asking open-ended questions such as:
What do you want?
What do you want to do?
What happened?
Can you use your words?

Helpful Tips for Scripting Language

Instead…

- Try to anticipate what your child might like to say and put the answer <u>in</u> your question: *Do you want to go outside? Tell me you want to go outside* (the child hears the answer twice).

- Help the child to produce best approximations and word combinations for the answer.

▶ Ethan: Rescripting

▶ Lizzie: Syllable Shapes

▶ Lizzie: Scripting

Refinement and integration
(back up on specific phoneme synthesis)

Begin to back up on specific phoneme synthesis, word initial, medial, or final. Once a new phoneme is produced successfully in synthesis at the word level, you will extinguish a temporary phoneme or approximation with this new correct pattern.

Jason: Syntax & Morphology/Progress

Tessa: Sequence Stories

Alexander: Targeting Speech & Expressive Language Goals with the "What's in Your Doghouse?" Therapy Tool

In advance of the game, know his goals:

- Final /s, z/ in plurals, auxiliary verbs (is, was) and possessive pronouns (his, hers), and in initial and final word positions (house, see)
- Velar to alveolar words (got, get)
- Initial /f/ (found)

Alexander: Targeting Speech & Expressive Language Goals with the "What's in Your Doghouse?" Therapy Tool

What About Children Who Are Not Yet Vocal Communicators?

Try:

- Rapid Motor Imitation Antecedent Training (Tsiouri, Paul, Simmons, Lewis, 2012)
- Sign to Talk (Kasper & Kaufman, 2009, 2012)

Rapid Motor Imitation Training

- Rooted in the principles of ABA, but extensive applications with speech-language pathology
- *Rapid Motor Imitation Antecedent* (Tsiouri, Paul, Simmons, Lewis, 2012)
- Focuses on establishing strong motor imitation skills (rapid, fluent and generalized) to improve attending, responding and behavioral momentum to get child imitating sounds and/or words to request preferred items
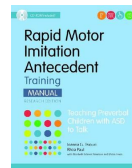
▶ Sophie: Rapid Motor Imitation to Vocal Imitation

▶ Sophie: Vocal Imitation

▶ Sophie: Mand *Go*

Sign to Talk (Kasper & Kaufman, 2009, 2012)

A method to bridge sign language to vocal/verbal communication (especially in ASD)

The following is a brief, summarized description. *Sign to Talk* takes a great deal of expertise and technique and is best done within an ABA verbal behavior program with the guidance of an SLP.

There is a full manual with the K&K Sign to Talk kits.

Sign to Talk (Kasper & Kaufman, 2009, 2012)

1. Follow the child's lead and discover their highly preferred items and activities.
2. While the child is showing motivation for the item or activity, playfully block them from obtaining it, and help to shape their hands to make the sign for it.
3. Say the word for the object or activity three times (in a natural voice).

4. Deliver a small quantity of the item (if possible) or allow for short access to the activity.
5. This may have to be done many times until your hands are coming toward the child to help them to sign and they produce the sign without help.
6. We would then provide more of the item or activity (i.e. a bigger chunk of cookie or more time to jump on the trampoline).

7. Eventually, if the child never attempts the word they have heard paired with the sign, stop reinforcing the sign only – the child must vocalize with the sign.

8. Shape the vocalization toward the word through successive approximations.

9. If the child does not vocalize, attempt Rapid Motor Imitation Antecedent Training.

Kasper, T. & Kaufman, N. (kits 2009, app 2012). *K&K Sign to Talk: Shaping Verbal Language for Individuals with Autism and Other Developmental Challenges.* Gaylord, MI: Northern Speech Services.

Some children struggle to produce isolated vowels and consonants. A combination of the following may be helpful:

- Oral Placement Therapy (OPT) (To include Renee Roy Hill's Apraxia Shapes)

- Tactile cues (PROMPT)

- Kaufman Speech to Language Protocol (K-SLP)

Establishing First Words with a Minimally Vocal Child with ASD

- First, sign language was taught so he could request highly preferred items and activities (Kasper & Kaufman, 2009).

- To gain isolated vowels and consonants, TalkTools™ were used. These are tools used inside the oral cavity to provide tactile/proprioceptive cues.
  - ✓ Mickey Mouse ears used for /m/.
  - ✓ Apraxia tactile tube for /ou/ as in "no" and smaller one for /u/ as in "boot" (Renee Roy Hill)
  - ✓ Bite sticks were used for /i/ as in "eat."

- These TalkTools™ were then faded so that the phonemes were performed with no assistance.

▶ TalkTools™ for /m/ and /i/

▶ Bite Sticks Faded for /i/ & Tactile Tube for /oʊ/
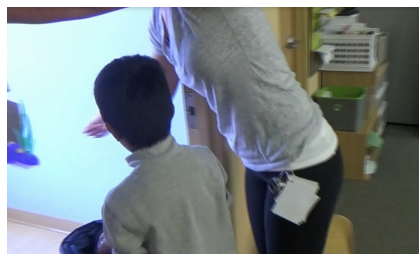

▶ Echoic to Tact Transfer (Imitation to Naming)

▶ **Prompted Mand**
(Request to *Read Book*)

▶ **Prompted Tact**
(Labeling His Own Action *Walk Baby*)

▶ Jayden: Sign to Talk

▶ Jayden: Sign to Talk

▶ Jayden: Vocal Skill Progress

More Information…

- K&K Sign to Talk: Shaping Verbal Language for Individuals with Autism and Other Developmental Challenges. (Kasper & Kaufman, 2009, 2011)

- Progressive and Systematic Speech and Language Training for Children on the Autism Spectrum. (Kasper, 2015)

- A Systematic Approach to Teaching Speech to Non-Vocal Individuals with Autism (Roy-Hill & Solomon)

- Rapid Motor Imitation Antecedent (Tsiouri, Paul, Simmons, Lewis, 2012)

Teaching Strategy **7** > **Practice Schedules**

- Understand how to provide feedback for retention to occur for those who understand language.
- Mix and vary tasks to avoid actually teaching over generalization.
- Understand the principles of motor learning.

Principles of motor learning teach us how to provide feedback so that:

- The child progresses rapidly in the acquisition stage of learning.
- The child retains the new motor (speech) skills.

More on motor learning principles:

"Demystifying the principles of motor learning in speech therapy." (Maas, 2013 - webinar)

"Principles of motor learning in treatment of motor speech disorders." (Maas, 2008)

The K•SLP & Motor Learning Principles

- Providing timely, powerful, and strategic reinforcement or feedback is important when attempting to change any given behavior. This is a core principle of ABA.
- Feedback involves providing learners with information about their responses.
- Reinforcement affects the tendency to make a specific response again. Use reinforcement especially if the child does not easily understand language (highly preferred toys or activities/motivators).

It is important to move from blocked practice to mixing and varying tasks to avoid teaching over generalization!

- Blocked practice is when a learner performs a single skill repetitiously.
- Random practice is working on a number of difficult skills in combination with each other...

  "So one's cognitive system must adapt, rethink, and solve the problem of choosing and executing appropriate motor patterns."
  (Dr. Allison Belger, athlete and PhD clinical psychologist)

After blocked practice, randomize the practice:

- Mix the order of one section of Kit pictures (shuffle the deck ☺)
- Vary in another section of Kit pictures (shuffle the decks together)
- Vary in other expressive language tasks

Generally for ACQUISITION

• More frequent trials

• More frequent reinforcement (may have to reinforce for each utterance)

• Keep stimulus items in predictable and consistent order (easy targets) with small increments toward different targets

• Provide as many cues/supports as necessary for success.

Generally for RETENTION

• Move to less frequent trials (more time in between)

• Less frequent reinforcement (more responses before reinforcement)

• Mix and vary stimulus items (less ordered, more random, unpredictable, mix easy and difficult)

• Minimal to no cues/support

Neuroplasticity

Gaining as much repetition on a goal as possible follows current neuroscience on **neuroplasticity**.

Neuroplasticity is the brain's amazing capacity to change and adapt. It refers to the physiological changes in the brain that happen as the result of our interactions with our environment. From the time the brain begins to develop in utero until the day we die, the connections among the cells in our brains reorganize in response to our changing needs. This dynamic process allows us to learn from and adapt to different experiences.

Huttenlocher (2002), Lomber & Eggermont (2006), Kadis, et al (2013), Sowell, et al (2004)

• **Repetition** is key for CAS.

• **Gain** as many responses as possible in a playful way with strategic reinforcement for retention skills.

Edeal, Gildersleeve-Neumann, 2011
Strand, 2005
Burns & Kaufman, 2013

Teaching Strategy **8** ❯

Natural Environment Training: Practicing New Skills in the Natural Environment & Coaching Parents

• NET = Natural Environment Teaching

• Be aware of the skill areas that have been focused upon in structure.

• List some of the core vocabulary single words, syllable shape words, specific phoneme synthesis goals, pivot phrases, and cues.

• Practice these through play.

▶ Kiara: Sea World Toy

Home Program Suggestions

• Personalized notebooks/binders, iPad apps

• The Kaufman Speech to Language Protocol Workout Book (can be duplicated)

• The K-SLP Mutt Family Practice Puzzle

• Script functional single-word mands (requests) or pivot phrases

• Can use pictures, books, magnetics

• And real-life experiences

Home Program Suggestions

- Can use real photos to tell a story about a child's experiences, example: going to the zoo. ("Pictello" iPad app works well for this.)

- iPad apps (see apraxia-kids.org)

Coaching Parents & Caregivers Through Play

- Start with making comments

- Ask questions with the answer embedded

- Script or re-script with cues and fading cues

- Slide back and forth between commenting (and being quiet) to questions

- Be fun, silly, and absurd

- Note in advance: speech & language goals. Make notes and focus on these with allowing other errors go unnoticed.

- Establish patterns: are/not, will/won't, do/don't, can/can't, does/doesn't or, why/because

- Possessives: She is wearing her dress. He is eating his cake.

Once children are able to first be responders, then to use vocal language functionally (pivot phrases), stop asking questions and simply make statements and…wait.

Maybe the *bunny* wants to *hop.*
I wonder if *the zebra is hungry.*
Look, this *lion* is *napping*.
Wow, this *cat* is *licking* the *bowl!*
Hey, there are no *hippos*.
Or, make an absurd comment like: **I wonder what would happen if** *the dog climbed on the table.*

* The child will now enjoy opportunities to create language and to chime in spontaneously!

▶ Jayden & Parents

When we can anticipate what a child is trying to convey (through their non-verbal or unintelligible attempts) :

- Help them to say it with their best single-word approximations, phrases, or full sentences!

- Don't forget to fade your cues, or the children will simply wait for each word and not move ahead toward spontaneous speech and language skills!

Pivot phrase narratives can be done using real-life activities!

- Getting ready for school
- Getting ready for bed
- Setting or clearing the table
- Taking out toys, playing with them, and putting them away
- Going grocery shopping and also back at home: taking each item out of the bag and putting away

Script the Language of:

- Games
- Playground
- School
- Holidays
- Birthday parties
- …and more!

Sanders & the Language of Games

- All family members can play together, promoting turn taking and good sportsmanship.
- Scripting the language of games.
- Practicing the /g/ in *go* and the /n/ in *no.*
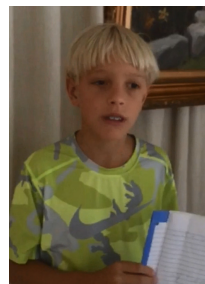- Vowel accuracy.
- Scripting negatives.

▶ Sanders: KSPT Evaluation

▶ Sanders: With Family

▶ Sanders: Progress

Common K-SLP Therapy Mistakes

- Continuously and tirelessly working on vocal imitation when it is unsuccessful (try rapid motor imitation antecedent training or sign language as a bridge).
- Not pairing yourself with pleasurable toys and activities.
- Bringing out Kit pictures without pairing them with pleasurable toys and activities.
- Using toys and materials that are not preferred by the child (but the SLP sure enjoys them)!

Common K-SLP Therapy Mistakes

- Not providing pleasurable motivators for children who are usually compliant without them (or for older children) who could all use a motivator!
- Not providing timely reinforcement for those who may need a motivator after each response.
- Having the child practice random words that are not within the lists of syllable shapes, functional words, or list of favorites.
- Accepting the child's approximation and moving on to another word without attempting to gain a better approximation, with continuous practice.

Common K-SLP Therapy Mistakes

- Sticking only with Kit pictures and not moving ahead on other pertinent vocabulary lists or functional expressive language.
- Giving full imitation and cues and not moving them a step further to gaining the last response to be as spontaneous as possible, with continuous practice.
- Forgetting to fade cues or scripting each and every word without fading to initial consonant cues, whispers, oral postures or gestures.
- Adding a schwa "uh" after a final consonant.

Common K-SLP Therapy Mistakes

- Forgetting to model correctly, but when helping the child to respond, gaining the best approximation.
- Promoting over generalization due to lack of mixing or varying tasks.
- Not gaining enough responses within a session for carryover to take place.
- Waiting for the child to have perfect articulation of a significant number of single words before assisting them to combine two and three-word phrases.

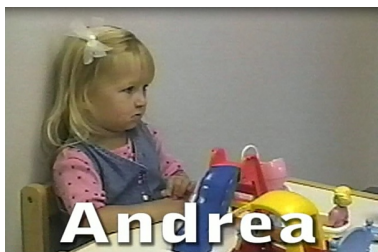## Common K-SLP Therapy Mistakes

- Scripting too many words (or high levels of syntax and morphology) before the child is ready.
- Segmenting initial consonants. Should keep them paired (glued) to the vowel if possible.

▶ Andrea: Pre (age 3)

▶ Andrea: Progress (age 13)

▶ Drew: Pre (age 3)

▶ Drew: Progress (age 4)

▶ Drew: Progress (age 10)

▶ Stephen: Pre (age 3)

Stephen: Post (age 18)

Praxis

Requires

Practice

Nancy's Favorites

K-SLP Kits 1 and 2, Workout Book, Mutt Family Practice Puzzle, K&K Sign to Talk,

Nancy's Favorites

- In addition to the K-SLP materials:
- Train sets with many large, easy pieces
- Wind ups, small and large
- Push-down or pull-back toys that shoot forward
- Large slide with a bucket ready to catch items
- Means-ends causality toys

Nancy's Favorites

- Bin of characters (stuffed animals preferred):
- Winnie, Barney, Minnie, Bugs Bunny, Ernie (ny pivot syllables)
- Sesame Street, Finding Nemo, Toy Story, Frozen, and Paw Patrol characters
- Family characters of different ethnic groups
- Animals, ocean characters

Nancy's Favorites

- Toy household furniture and playground equipment (slide, swing, chairs, tables, beds, potty, cars, etc)
- Books without words, or with a simple sequence story
- Musical toys that only play for a brief moment
- Magnetics, Colorforms or reusable stickers

Nancy's Favorites

- Stim Toys. (Koosh balls, wands that spin, squishy toys, play dough, light ups, fidgets)
- Blocks
- Simple board games
- DVD player with remote
- Puzzles that "talk"
- iPad
- Ball toys

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