Cueing motor-speech skills and scripting functional expressive language are specific treatment techniques for CAS and form the basis of the \[K-SLP\] methods.

First, what are evidence-based, quality methods to teach any new skill or to correct an erroneous skill?

We find one answer within the applied behavior analysis (ABA) verbal behavior literature, which is the concept of **SHAPING**. (B.F. Skinner, 1957)
SHAPING is defined as:

“…an experimental process used in operant conditioning by which successive approximations of a target behavior are reinforced.”

[B.F. Skinner, 1957]

Best Teaching Strategies for Shaping
(also for motor learning)

• Define a behavior (speech as a motor skill)
• Narrow the skill down into smaller units (vowels, consonants, syllables)
• Model correctly
• Build the units back into the “whole”

Best Teaching Strategies for Shaping
(also for motor learning)

Build the units back into the “whole” by:
• Implementing cues
• Fading cues
• Using powerful and strategic reinforcement (highly-preferred toys and activities; determination of how frequent and intense to apply reinforcement)
• Implement errorless teaching (cue the child before the error occurs)
• Mix and vary tasks to avoid over generalization.
• Rapid pace to gain many responses.
Motor Learning Theory

- We also find the answer in what are best practices to teach our specific goal of establishing the motor behavior of speech through motor learning theory.
- Motor learning is “a set of processes associated with practice or experience leading to relatively permanent changes in the capability for movement.”
  
  (Schmidt & Lee, 2005:302)

Motor Learning Theory

- Understanding the basics of MLT also gives us a road map of how to teach the motor skill of speech or to correct erroneous motor planning and programming of speech. In MLT we learn specifically about feedback (reinforcement) for both acquisition and for retention of new speech patterns.
- In order to acquire the skill of speech, we need to know how to implement cues, fade them, and utilize reinforcement (feedback) strategically.

Children with CAS require cues to assist them to accurately produce a phoneme, or to appropriately place a phoneme within a context (syllable as the smallest unit), coarticulating or planning and programming that movement (phoneme) with other movements (vowels, consonants, and syllables).
Synonyms for the word “cue”

• Signal
• Sign
• Indication
• Prompt
• Reminder

What first consonant and vowel combinations should we cue for single word success?

Four important single-word lists:

• Syllable shapes practice words
• Simple nouns
• Functional requesting words (mands)
• Favorites for single word requesting (manding)

Four Important Single-Word Lists

List 1 – Syllable Shapes Practice Words

Syllable shapes for motor-speech coordination practice (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
- baabaa (sheep)
- nana (banana)
- mop
- knot
- knob
- ten
- ton
- net
- on

Four Important Single-Word Lists

List 2 – Simple Nouns
Simple nouns of different categories which lend themselves to the ability to then name their function.

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

Four Important Single-Word Lists

List 3 – Functional Requesting Words (Mands)
Functional words which serve to manipulate the environment. These can be paired with a gesture.

- open
- out
- no
- this/dis
- come
- on
- up
- don’t
- that/dat
- mama
- off
- down
- here
- go
- dada
- in
- yes
- there/deh
- watch
- look

Least-effective single-word requests (mands) (but most effective for two-word combinations)

More   Want   Please   Help   All done

• Unless they are a pivot word in a two-word phrase
• 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

Four Important Single-Word Lists

List 4 – Favorites for Manding Words
List of favorite foods, drinks, toys, activities, people, and pets’ names (to include high-frequency words such as: hi, bye) or exclamations (wow, whee)

This is where simplification of words is most necessary.

Shaping Successive Approximations

• For each of the four word lists, many of the children are not yet stimulable to produce every vowel and consonant.
• Natural phonological processes can be implemented to simplify the words for functional communication. These simplifications are meant to be temporary and functional.
• By determining what vowels, or consonants are too difficult to master immediately, we would teach a “word shell” (Goff, 1970s) until the time that the child gains stimulability.
• We can then extinguish the simplified version and successively move toward articulatory perfection of whole words.
Shaping Successive Approximations

Example: cookie
• **cook-ee**
  (assimilation might be easier than coarticulation of /k/ with /i/)
• **tootie**
  (fronting the /k/ if it is not within the child's repertoire)
• **doodie**
  (voicing and fronting if the child cannot devoice prevocally)
• **teetee**
  (if the child does not have a /k/ in their repertoire and cannot change the vowel)
• **deedee**
  (if the child cannot change the vowel nor devoice)

Shaping Successive Approximations

Example: open
• **oben**
  (if the child cannot devoice prevocally)
• **op-en**
  (if the child cannot include final consonants without segmentation)
• **opuh**
  (if the child is not stimulable for final /n/)
• **obuh**
  (if the child cannot devoice prevocally and above)

Cueing Techniques

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)
• Reduce each cue systematically until the child can name the pictures spontaneously or request their favorites, using their best word approximation or whole target word.
Cueing Techniques

1. Explanation cues
   
   Explanation:
   “bite your lip and blow” (for /s/)
   “open your mouth” (for /k/ and /g/)

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

Visual/tactile hand signal cues for VOWELS
(on or around the clinician’s own mouth) - continued
3. Visual/tactile hand signal cues for SIMPLE CONSONANTS (on or around the clinician's own mouth)

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 /j/:  
Place your index finger across the lips vertically to make the "be quiet" signal (shhhhh) or pinch the lateral portion of the lips together (forcing the lips to pucker).
Visual/tactile hand signal cues for SIMPLE CONSONANTS – continued
(on or around the clinician's own mouth)

For /tʃ/: 
Place thumb, middle, and index fingers above the upper lip (on the maxilla).

For /dʒ/: 
Place thumb, middle, and index fingers below the lower lip (on the mandible).

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

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

For voicing:
Place your hand on your throat i.e. 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.

* If the child has more than one SLP, it is important for each to be implementing the same cues.

Cueing Techniques

4. Oral postural cues
Placing your own articulators visibly for the initial, medial, or final consonant, syllables, or full words/phrases.
Cueing Techniques

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

Cueing Techniques

6. Contextual cues
"Fill ins" to songs, books, and rhymes
- "I drive the ________"
- "The wheels on the ________."  
- "Twinkle, twinkle, little ________."  

Cueing Techniques

7. Touch cues
Physically touching your body or the child's body for syllabic emphasis, i.e. knee to knee, hand to hand, or block to block on the table.

Cueing Techniques

8. Alternate naming for verbal motor memory (breaking perseveration)
   • Using two 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 (butter, bunny, balloon).

9. Pivot syllables
   ny
   bunny, money, honey, Barney, Winnie, Ernie, beanie
   ter
   water, batter, meter, matter, Peter, butter
die/do/
   puddle, needle, noodle, pondle, beetle
   ble
   bubble, marble, table, hobble, pebble
dy
   muddy, buddy, body, Daddy, handy, candy, Heidi, Paddy
   ty
   potty, party, beauty, nutty, putty, Betty * ty can be pronounced dy

Cueing Techniques

10. Gestural
    Use signs or universal gestures

    (Rosenbeck, 1984)
Cueing Techniques

11. Written
Highlighting errors so the child can read cues.
Example: highlight all /r/’s in a written passage with red, /l/ yellow, /s/ green

12. Answer-first cues
(Giving the answer, then asking the question)
“Open door. What do you want me to do?”
“Look, the puppy is eating. What is the puppy doing?”

13. 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.
If put is produced as bud,
practice /p/ → /t/ without the vowel
Add the vowel back in
Cueing Techniques

14. Backward chaining on two and three syllable words and/or “chunking” syllables

Imitating the last vowel or consonant-vowel of a word, and moving backward or forward little by little

<table>
<thead>
<tr>
<th>Word</th>
<th>Syllable Representation</th>
</tr>
</thead>
<tbody>
<tr>
<td>cookie</td>
<td>banana:</td>
</tr>
<tr>
<td>ee</td>
<td>nana-nana-nana</td>
</tr>
<tr>
<td>kee</td>
<td>buh-nana</td>
</tr>
<tr>
<td>uhkee</td>
<td>cookie</td>
</tr>
</tbody>
</table>

Cueing Techniques

15. Pictoral

Real pictures or pictures which represent consonants

/ɔ/  = clock ticking picture
/d/  = water dripping picture
/k/  = angry cat picture

*Easy Does It For Apraxia* (Strode & Chamberlain)

Cueing Techniques

16. Intensity

Presenting the target (errored) syllable louder in intensity than the other syllable, which follows its prosodic pattern.
Cueing Techniques

17. Melody

Using pitch variation or a “sing song” quality to the stimulus target word(s).

Melodic Intonation Therapy
(Sparks & Helm, 1978)

18. Auditory contrast cues

For 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 the child’s attention to the syllable in error

19. Auditory bombardment cues

Say the syllable in error three times
Cueing Techniques

20. Simultaneous cues
   Say the word together with the child

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

22. Automatic/familiar words as a bridge to a novel phoneme or word
   (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 his repertoire) then have him say, down

Cueing Techniques

23. Breaking diphthongs into component parts

- bike → bah-eek
- name → neh-eem
- home → ho-oom
- house → ha-oose
- boy → baw-ee

(Avoid making a vocal break by keeping voicing ongoing)

Methods & Materials that Include Cueing & Scripting for CAS

(in alphabetical order)

- DTTC (Strand, 2006)
- K&K Sign to Talk (Kasper & Kaufman, 2009)
- Kaufman Speech to Language Protocol (Kaufman, 1988)
- PROMPT system (Hayden, 1985)
- SPEECH EZ (Carahaly, 2010)

Errorless Teaching (or Learning)

“Errorless teaching is an instructional strategy that ensures children always respond correctly. As each skill is taught, children are provided with a prompt or cue immediately following instruction. The immediate prompt prevents any chance for an incorrect response.”

(Example of a receptive ID task)

nathan.com/ldresources.htm
How can we implement errorless teaching for the act of speech?

- Cue for consonants or vowels that have a history of error such as a cue for /k/ before the child replaces with /t/.
- Cue for an accurate placement of a consonant that has been inaccurately produced.
- Cue for the first syllable in a word once giving the model for a two syllable word (so that the child does not go to the last syllable heard).
- Cue before assimilation occurs, usually for the medial consonant in a two syllable word or for the first vowel in a VCV word.

How can we implement errorless teaching for the act of speech?

- Cue for a final consonant before it is deleted (or for an initial or medial consonant that has a history of deletion).
- Cue for a small function word that has a history of deletion. (Provide a hand signal for each word such as for “is, the, to” for example).
- Cue for prosody (intensity or melody)
  ** the last response for words or word combinations should be as spontaneous as possible, repeated a few more times.

Fading Cues

1. Simultaneous: 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.
Olivia

Watch for:
- The four word lists for practice
- Cueing techniques
- Scripting telegraphic language (S-V-O)
- Scripting language through play with pivot phrases

Olivia

Just as those with CAS require cues to help them with consonant and vowel combinations, they also need some assistance to combine words to formulate functional and social expressive language.
Scripting is defined as:

- "To orchestrate behavior or an event... a plan."
- "A written version of a play or other dramatic composition, used in preparing for a performance."
- In our case, since many of our children with CAS may not yet be readers, struggle to combine words and remember the patterns, we can provide an **oral script**. In this case our performance is communication in everyday life.

**Pivot Words**

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

- my ________ move ________
- open ________ more ________
- help ________ hi ________
- want ________ bye ________
- no ________ red ________
- on ________ big ________
- tie ________

**Script Functional Language with Pivot Phrases**

- I want ________.
- I want to ________.
- Can (may) I have ______? Pick up ________.
- Let me ________.
- Put away ________.
- Help me ________.
- Put on ________.
- Take off ________.
- I don't want ________.
- I don't want to ________.
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?" Pattern the child to respond "I throw ball." This may even be "/a/ /to/ /bo/ /", 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).

* We would model correctly in our question and after we assist the child's best approximations.

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 "/bo/ /i/ /ap/", each word being an approximation. Age-appropriate syntax and morphology will be built-in later (i.e. pronouns, function words).

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, i.e.:
"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.
Scripting Functional Language

Situation
The child approaches you and points, grunts or only utters a single word or approximation.

If you can anticipate what a child is trying to convey, give them a script. (This includes re-scripting delayed or mitigated echolalia)

You can already assume what the child wants because you are familiar with their speech patterns and gestures. Let’s assume the child wants to go outside.

(continued)
Scripting Functional Language

You Say
“Oh, do you want to go outside?
Obtain a “yes” response
“Tell me you want to go outside.”
Always model with correct speech patterns.
(Cue) “I want to-” or best whole words or approximations. Model correctly again, say “you can go out.” Then let the child go out.

Scripting Functional Language

Consider appropriate vocal inflection and prosody when “scripting” or “re-scripting”

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 and obtain a “yes” response)
Get best approximation for yes
Say: “Tell me you want to open the door.”
Help the child to say:
“opuh do” or “I wa o-puh” or “o-puh peez” or “o”
(open door) (I want open) (open please) (open)
Model correctly once again.

* Eventually fade cues
Grammar

Begin to build in syntactic and morphologic structures:
- Begin with the present progressive: *ing* in describing action pictures, i.e. instead of “boy eat apple,” assist: “boy eating apple.” An approximation for *ing* might be *een* /iɛn/.
- Add *is*, i.e. assist “boy is eating apple.” Use a cue for the word *is*.
- Continue to add in syntactic and morphologic structures to negative and question formulation
- Add pronouns
- Add all function words last (articles, auxiliary verbs)
- Continue to back-up on improving word approximations toward target words

Scripting the Language of Games

- Want to play?
- You go first.
- My turn.
- Your turn.
- I need that one.
- I don’t need that one.
- Do you need that one?
- I got my wish.
- How many more?
- I will win.
- Here’s the _____.
- (spinner, dice, piece).
- I hope I get a ___.
- I need blue
- (other colors, etc).
- I need a _____.
- What do you need?

Also Consider the Language of:

- Playground
- School
- Birthday parties
- Church/synagogue
- Meals
- Stories/characters/favorite DVDs
- Random places (stores, airports, trips/vacations, nature, libraries, farms, circus, rodeos)
* Eventually just make comments and be silent waiting for the child’s spontaneous comments.
Sam, Lizzie, & Jake

Watch for:
• Cueing motor-speech and scripting functional language

Sam, Lizzie, & Jake

Praxis
Requires Practice

References & Bibliography
Childhood Apraxia of Speech Association of North America (CASANA) www.apraxia-kids.org
References & Bibliography


