

## Appendix A (p. 1 of 2)

### Phonomotor Treatment Procedures

<b>Treatment materials</b>	<ul style="list-style-type: none"><li>• Small mirror</li><li>• Line drawings of mouth postures, icons for voiced/voiceless consonants</li><li>• Letter tiles</li><li>• Wipe-off board with markers</li><li>• Small colored blocks</li></ul>
<b>Overview</b>	<p><b>Stage 1: Sounds in isolation</b></p> <p>The purpose of Stage 1 is to train sounds in <i>isolation</i> through multimodal instruction using tasks designed to engage distributed articulatory-motor, acoustic, tactile-kinesthetic, and orthographic representations.</p> <p><b>Consonant sounds</b> are introduced using mouth pictures and speech-language pathology model as cognate pairs by place/manner of articulation and grouped according to tactile-kinesthetic description (lip, tongue, air, nasal, wind). They are introduced in the following order: lip (<i>p/b, f/v</i>), tongue (<i>t/d, k/g, th/th</i>), air (<i>s/z, sh/zh, ch/j</i>), tongue (<i>l/r</i>), nasal (<i>m/n/ng</i>), and wind (<i>h/w/wh</i>). When mastery of a consonant pair is achieved (e.g., <i>p/b</i>) in perception and production (approximately 85% accuracy), the next sound pair is introduced (e.g., <i>t/d</i>). Once a sound pair is introduced, training continues on this pair in all subsequent sessions. Once a participant can perceive and produce all consonants in isolation, corresponding graphemes are introduced using the corresponding mouth picture.</p> <p><b>Vowel sounds</b> are trained according to lip and jaw placement via mouth pictures and letter tiles. Vowel sounds (<i>ee, o, oo</i>) are introduced with consonants to allow for minimal pair discrimination (e.g., <i>eep, op, oop</i>). The remaining vowels are trained after consonants.</p>
<b>Introduction of sounds and sound sequences</b>	<p>The participant observes the speech-language pathologist (SLP) producing a single sound (e.g., <i>/p/</i>). The SLP asks the participant what he or she observed (heard, saw) and, if needed, describes what articulators are moving and how they move. For the sound <i>/p/</i>, for example, “the lips come together and blow apart, the sound is ‘quiet’ so the voice is turned off, the tongue is not moving.” The participant is then shown the line drawing of the mouth posture corresponding to the sound.</p> <p>After looking at the mouth picture and hearing the SLP’s production, the participant is then asked to repeat the sound while looking in the mirror. The participant is also asked to place his or her hand on his or her throat in order to feel for vocal fold vibration (“quiet” vs. “noisy”). Following production, the SLP asks the participant what he or she saw and felt when the sound was made. Socratic questioning is used to enable the participant to “discover” the auditory, visual, articulatory, and tactile/kinesthetic attributes of the sound (e.g., “What do you feel when you make that sound? What moved? What did you see when you made that sound?”). Within therapy, progression for all levels is based on 85% accurate performance on task.</p>
	<p><b>Stage 2: Sounds in syllables</b></p> <p>The purpose of Stage 2 is to extend skills acquired in Stage 1 to <i>phoneme sequences</i>. Treatment tasks remain similar to Stage 1 tasks, with the exception that sounds will be produced in combinations rather than isolation. Training progresses from shorter, monosyllabic sequences to longer, multisyllabic (more complex) sequences (e.g., VC, CV, CVC, CCV, VCC, CCVC, CVCC, CCVCC, CVCV). Both real words and nonwords are trained using phonological tasks (in other words, only phonological features, <i>not</i> semantic features, are trained for real words). Nonword training is introduced before real word training to allow for emphasis on phonology; however, as treatment progresses, nonwords and real words are trained simultaneously.</p>
	<p>The process of “discovering” sounds primarily occurs in Stage 1; however, knowledge of the auditory, visual, articulatory, and tactile/kinesthetic attributes of sounds can also be used later in the program as a cueing technique to identify individual phonemes within a phoneme sequence. For example, if a participant had trouble parsing the initial sound in <i>peef</i>, the SLP would use Socratic questioning (e.g., “What do you feel when you make that first sound? What moved? Did your lips or tongue move when you made that sound?”) to help identify the initial sound <i>/p/</i>. Put differently, rather than give the participant a model and tell him or her what the initial sound is, the SLP assists the participant in self-awareness of errors and how to repair them.</p>

(table continues)

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<b>Perception tasks</b>	<p>Perception of sounds in isolation can be trained through various multimodal tasks. Examples:</p> <ul style="list-style-type: none"><li>• <b>Mouth pictures:</b> The SLP produces a sound (e.g., <i>p</i>) and asks the participant to choose that sound from an array of mouth pictures (e.g., <i>p, b, t, d</i>).</li><li>• <b>Colored blocks:</b> The SLP produces a string of individual sounds (e.g., <i>p, t, t, b</i>) and asks the participant to lay out blocks to demonstrate ability to discriminate sounds (e.g., blocks: red, blue, blue, green).</li><li>• <b>Verbal:</b> The SLP produces two sounds (e.g., <i>p, p</i> or <i>p, b</i>) and asks the participant “same or different.”</li><li>• <b>Letters:</b> The SLP produces a sound and asks the participant to point to the corresponding letter from an array of letters.</li></ul>	<p>The SLP produces a real or nonword sound combination and asks the participant to depict the target through various tasks:</p> <ul style="list-style-type: none"><li>• <b>Mouth pictures:</b> If the participant heard the CVC <i>peef</i>, he or she would select the pictures corresponding to <i>p, ee</i>, and <i>f</i>.</li><li>• <b>Colored blocks:</b> If the participant heard the CVCV <i>peefee</i>, he or she would select three differently colored blocks arranged in the following order: white, black, red, black.</li><li>• <b>Verbal:</b> If the participant heard the CCVCs <i>groom</i> and <i>gloom</i>, the SLP would ask “same or different?”</li><li>• <b>Letters:</b> If the participant heard <i>chootee</i>, he or she would select the corresponding letter tiles.</li></ul>
<b>Production tasks</b>	<p>Production of sounds in isolation can be trained through various tasks. Here are some examples:</p> <ul style="list-style-type: none"><li>• <b>Mouth pictures:</b> The SLP shows participant a mouth picture and asks the participant to produce that sound (e.g., <i>d</i>).</li><li>• <b>Motor description:</b> The SLP describes a sound (e.g., “Make the sound where your voice is noisy and your tongue quickly taps the roof of your mouth”) and asks the participant to say the sound.</li><li>• <b>Verbal:</b> The SLP asks the participant to repeat a sound <i>p</i> or a string of individual sounds <i>p, p, s, d</i>.</li><li>• <b>Letters:</b> The SLP shows the participant a letter to elicit production of the sound.</li></ul>	<p>The SLP elicits a real word or nonword sound combination by asking the participant to produce the target through various tasks:</p> <ul style="list-style-type: none"><li>• <b>Mouth pictures:</b> The SLP lays out a series of mouth pictures and asks the participant to “touch and say” each sound (<i>f-ee-p</i>) and then blend the sounds to produce the target (<i>feep</i>).</li><li>• <b>Verbal:</b> The SLP asks the participant to repeat a nonword <i>groom</i> and parse the word apart (<i>g-r-oo-k</i>).</li><li>• <b>Letters:</b> The SLP lays out letter tiles (or writes letters on dry-erase board). The participant parses out the sounds by underlining and verbalizing each grapheme and then blends the sounds to produce the target.</li></ul>

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*Note.* This appendix is adapted from the original, which was first published in Kendall et al. (2015), meant to provide an overview and quick reference for those already familiar with the phonomotor treatment program. Readers interested in implementing this program are encouraged to contact the first author of this paper for further information.

## Appendix B

### Semantic Feature Analysis (SFA) Treatment Procedures

#### Treatment materials

- Picture cards
- SFA chart (see image following this table)
- Wipe-off board with markers and eraser

#### Overview

Semantic feature analysis is a treatment that focuses on word retrieval of real words and, in this case, nouns.

The therapist focuses training by showing a picture (e.g., juice) and asking the participant a series of questions about the semantic features of that noun (e.g., What do you do with it? Where do you store it in your home?).

The goal is to strengthen semantic networks within several categories (e.g., food and beverages, household items) and ultimately improve naming ability. A select set of words within each category is trained every session.

#### Feature generation

The participant is first asked to verbally name a given picture. Regardless of accuracy, the participant then verbally produces the semantic features of the picture in the context of five categories (see below). The therapist writes the generated features on a whiteboard. Upon completion of the feature generation, the participant is asked to name the picture three times in a row. If named accurately, the therapist will then show a new picture and repeat the same procedures. However, if the participant fails to accurately name the target, the therapist verbalizes the target and asks the participant to repeat the target three times. The therapist then reviews the chart, repeating the target word and one previously generated feature (e.g., "juice belongs to the group *food and beverages*," "juice is a liquid"). Then, the participant is again asked to repeat the target three times. Regardless of accuracy at this stage, the speech-language pathologist (SLP) proceeds to the subsequent item.

#### The five categories

- Group
- Description
- Function
- Context
- Other/personal

The *group* is the semantic category being trained (e.g., *food and beverages*, *household items*). The SLP asks, "What group does this belong to?" The participant generates only one feature for this category.

The *description* category explores the inherent properties of the pictured item. The SLP probes, "Let's describe it." The participant is encouraged to explore the color, texture, size, shape, and other associated perceptual characteristics. The participant generates a minimum of two features for this category.

The *function* category presents an opportunity to identify the uses and actions associated to the item. The SLP asks, "What is this used for?" or "What does this do?" The participant generates a minimum of two features for this category.

The *context* category is used to elicit responses related to the location or scene relating to the item. The SLP asks, "Where do you find it?" and "What places or other items are often associated with it?" The participant generates a minimum of two features for this category.

The *other/personal* category encourages the participant to share their own thoughts and personal stories related to the item. The SLP asks, "What does this remind you of?" or "What does this make you think of?" Only one personal association is required for this category.

SFA Chart:

