Articulation IV: R, S, L, Th

Initial, Medial, and Final Sounds and Consonant Clusters
for Selected Consonants

by

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Objective

The client will see a picture, hear it labelled, record their imitation of the word, sounds, phrase, or sentences, and evaluate the accuracy of the production.

Quick Start

Choose a target phoneme from the *Main Menu*. The client will listen to the word as it is pronounced and try to imitate the word. The client may listen to the word again by clicking on the *Word* button. Use the recording buttons to record and play back their voice. Score their production using the *CDI* buttons (for Correct, Distorted, or Incorrect). Then click on the *Sound* button to hear the word segmented into individual phonemes. Listen to and imitate the sounds as they are pronounced. When there is accuracy at the phoneme and single word level, the client can use the *Phrase* button to hear the word used in a simple phrase. After listening carefully, the client will repeat the phrase. Then the client is ready to hear the word used in a sentence. There are three sentences of increasing complexity. The *Sentence 1* button has a simple sentence, *Sentence 2* has a more complex sentence, and *Sentence 3* has the most complex sentence. The client will repeat the sentences and may make up their own sentences using the target word and the picture for inspiration.

Choosing Words

The therapist will assist the client in choosing a sound to practice. The *Main Menu* has five options for choosing words. The *R* group has words with /r/ in the initial or medial position. Final /r/ words always have a vowel associated with them and so words with a final /r/ are included in the *Vowels + R* group. The *Vowels + R* group has eight vowel plus /r/ sounds in any position in the word. The *S/Z* group has the voiceless/voiced pair /s/ and /z/. The *L* group has words containing /l/. The *Th/Th* group has the voiceless/voiced pair /th/ and /th/. Many of the words in this game are in two or more groups. For example, "birthday" has a medial /th/ and an /er/. And "browser" has an initial /r/ cluster, an /er/, and a medial /z/.

The *Focus Menu* allows you to refine your word choice to include specific sounds. The default screen has none of the words selected. Add all of the words in a group by clicking on the checkbox next to the group name so that it has a checkmark in it. Remove sounds in a group by deselecting their checkboxes. You can add single sounds in a group by clicking on the box next to the sound. By clicking on the appropriate checkboxes you can construct word lists that cross groups, e.g. select words that have a final /l/ and a final /s/.

The *R Words* group has words containing the /r/ sound in the initial and medial position—either alone or in clusters. *Vowel + R* has the sounds /aer/, /air/, /ar/, /eer/, /er/, /ier/, /or, /our/, and /yer/ in any position in the word. *S/Z Words* has the voiceless/voiced pair /s/ and /z/ in the initial, medial, and final positions—alone and in clusters. *Th/Th* Words has the voiceless/voiced pair /th/ and /<u>th</u>/ in in the initial, medial, and final positions—alone and in clusters. The checkboxes next to the heading allow you to turn on/off all of the words in the group. You can refine your selection by either turning on all of the checkboxes for the group and then deselecting phonemes you don't want or turning off all of the checkboxes and selecting just the phonemes you want. At the bottom left corner of the screen there is a count of how many words have been selected. If you have no words selected the counter turns red and the *Play* button will be inactivated.

Notice that there are also checkboxes next to /s/, /z/, /th/, and /<u>th</u>/. Within the group you can choose just voiceless or just voiced targets.

A few words don't fall into any sound category and were included to round out the *Curriculum* groups e.g. June, Monday. We call these words *Exceptions*.

The *Focus Menu* also allows you to refine your word choice by selecting words with a specific *Difficulty* level, *Curriculum* type, and *Category*. By default all of the checkboxes are checked. Clicking on the checkbox deselects the words in the category. **Every picture has a difficulty level, so you must have at least one level selected in order to display any pictures.**

Difficulty Level: The determination of difficulty level was made based on clinical judgment and articulatory complexity.

> Level 1 has the placement of the target sound where it is typically thought to be easy for most children, e.g., bath, part. No complex consonant clusters.

> Level 2 is slightly complex and it can have clusters and two different targets, e.g., please, points.

> Level 3 is challenging. We know that this is a difficult word for most clients. It will usually be presented toward the end of therapy after they have had success and mastery with the easier level 1 and 2 words, e.g., player, Thursday.

Curriculum Words: Many of the words used as targets in this title are words that appear in the elementary school curriculum. They have been grouped into General (150 words), Measurement (123), and Computers and Technology (40). There are 177 words that have not been classified. Within General School Words there are eight sub-categories: People, Verbs, Feelings, Places, Conjunctions, Objects, Animals, and Other. The sub-categories of Measurement words are: Time, Months, Days, Numbers, Geometry/Math, Quantity/Quality/Size, and Comparison. **The classification is based solely on the word, not the picture content.**

Measurement Words: These words are used in all areas of the curriculum especially math, science, and history. Some children may have difficulty creating an image of a less tangible concept such as "after", "before", and "once". We chose to illustrate one way to think about the word and

create at least one mental image for the concept. There are multiple ways to picture these words and extension of the concept is encouraged. Children with language-learning disorders and articulation disorders may benefit from direct instruction on how to conceptualize time, days, months, numbers, quantity, quality, size, geometry, math, location, and distance.

General School Words: This category has words frequently used in the classroom or in reading materials. Since there are so many ways to picture a word, we chose just one image to help learn the vocabulary of these curriculum words. It is important to note that all the pictures were not taken in a classroom, or relate directly to a school. These words are used in several school subjects. The word "aims" for example can be used in math, physics, history, science etc. but the picture chosen is a more literal example of two jousting knights aiming lances at each other. A higher level vocabulary exercise would be to extend the literal concept of "aims" to a more figurative concept. You might ask the client, "What does the word 'aims' mean in the sentence, 'He aims to get an A on the next test.'?"

Computers and Technology Words: This category contains words that have more recently come into the everyday language of most school-aged children. Many of the words have multiple meanings. For example, "thumb" has always meant the first digit on the hand. Now it is commonly used with the word "drive" as in, "Did you bring the thumb drive to class today?" The purpose of including the words with specific technology related uses for children with articulation disorders is to provide practice in perhaps a new context with the word and encourage questions and discussions about old vocabulary words used in a new way. A child with an auditory processing and articulation disorder may be completely lost when listening to a direction to, "Plug it in to a USB port" because they have no way of thinking about what a USB port is. They may wonder why you are spelling words out in front of them. As an instructor, you might want to remember what it was like when you first heard all of the new computer vocabulary. It sounded like a foreign language and you got lost fairly quickly when someone rattled off directions to you. While these children are growing up with the vocabulary, we should not presume those with language-learning disabilities or articulation disorders do not need specific instruction in this area.

Category: The *Category* group allows the therapist to use the pictures as the starting point for generating all new questions. This alternate use of the pictures will keep the less flexible individuals from just memorizing the picture and the target sentences and parroting them back without generalizing the word to other contexts. You can turn off the initial sound prompt by selecting *None* as the *First Sound* on the *Options* screen.

The categories are: People (150 words), Food (38), Music (9), Body Parts (53), Verbs (268), Places-Inside (26), Transportation (52), Animals (79), Plants (30), Time (26), Emotions (104), Sports and Games (42), Places-Outside (185), and Color (131). There are 36 pictures that have not been classified. **Categories are based on the content of the picture and do not depend on the word or sentences—although there will frequently be overlap.**

When using the *Categories* it might be helpful to use Who, What, When, Where, Why type questions to elicit responses from your client. For example:

> *People*: Who is …?
>
> *Transportation*: What kind of vehicle is it? How do you use a …?
>
> *Places - Inside*: Where is …? Who is …? What is…? When do you go to…?
> Why do you go to…?
>
> *Places - Outside*: Where is …? Who is …? What is…? When do you go to…?
> Why do you go to…?
>
> *Food*: What is…? Who is eating…? When do you eat…? Where do you eat…?
> Why do you eat…? How do you eat…? Does ___ eat…?
>
> *Sports and Games*: Do you play…?
>
> *Emotion*: What is the mood of this scene? What would you feel if you were here?
>
> *Verb*: What is the movement in this scene? What is ____ doing? What are _____ doing?
>
> *Music*: Imagine what you would hear if you were in the scene. When do you hear ____?
>
> *Plants*: What is it? Where can you find ___?
>
> *Colors*: What colors do you see in the scene? Which color do you like most?

Selecting Words: Using the *Category* and *Curriculum* groupings to refine your picture/word selection can be a bit confusing at first. **To select words in a *Category* or *Curriculum* group, first make sure that all of the phoneme groups are selected and all of the Difficulty levels are checked.** Then turn off all of the *Category* and *Curriculum* selections by clicking on the checkboxes next to the *Category* and *Curriculum* headers. Notice that the bottom left corner of the screen says 0 Words Selected. Now select the sub-groups that you want to view. The picture count will go up. The list will include all of the words that are in each of the groups that you have selected. For example, if you select the *Category* group *Plants* the counter will show that there are 30 words. If you select just the *Curriculum* group *Places* the counter will indicate that there are 22 words. If you select both, you will get 48 words because 4 words are in both categories. If you want to practice just /r/ sounds with these words you can turn off the /s/, /l/, /th/, and exceptions phoneme groups and you will be left with 30 words. It's a bit confusing at first, but just keep in mind that the **checkboxes are additive—if you want more pictures click on the checkbox to add them in**. If you want fewer pictures, click on checkboxes to deselect pictures.

How to Play

Below the picture is a space that displays the current word—either alone or in context. Click on the *Word*, *Sounds*, *Phrase*, *Sentence 1*, *Sentence 2*, or *Sentence 3* label to hear the target word spoken alone or in context. You may also type the numbers 1, 2, 3, 4, 5, or 6 to hear the sound corresponding to the Word(1), Sounds(2), etc.

When you click on the *Sounds* label you will hear the sounds and see the word separated into its sounds. The sound segmentation is based on the *LocuTour Guide to Letters, Sounds, and Symbols*. Some letters are colored gray or red to indicate that something is different about the letter or sound. Letters that are colored gray are silent. For example, **'a ll'** has two l's—the second is silent. Letters that are red are 'notice me' combinations. In *broke* the *e* changes the sound of the *o*—**'b r o ke'**. In *care* the *are* is not pronounced as it would be if standing alone; it is colored red so that you notice it—**'c are'**.

When you are finished with a screen, click on the right arrow or use the right arrow key to move to the next screen. The left arrow allows you to repeat the previous screen.

Recording

There are three sets of recording buttons on the screen. Click on the round blue button to start recording. It turns red while recording is in progress. Click on the solid blue square to stop the recording. The sideways triangle will be filled in, indicating that there is a sound in that set of buttons that may be played back. Click on the triangle and it will turn green while the sound is played back. You can stop playback by clicking on the rectangle. You may record as many times as you wish with each of the three sets of recording buttons. One strategy is to use the first set for the client's initial production and the second set for practice. Listen to the first production and then the second to show improvement of the production during the session. You can use the third set of buttons for the therapist to record their voice. An alternate strategy with group sessions is to use one set of buttons for each of three clients.

You can use the keyboard to start, stop, and play recordings. Press the letter 'R' or 'r' to record, 'S' or 's' to stop the recording, and 'P' or 'p' to play back the what you have recorded. The keyboard will usually use the first set of recording buttons.

Transfer activities: Record and practice new phrases and sentences for the target word. These recordings cannot be saved but can be repeated while on the same screen.

Generalization: Record "spontaneous conversations" that have the target word used somewhere in the conversation. The record feature will allow many minutes of recording.

Scoring

The computer acts like a tape recorder and will record and play back your voice. It does not judge the accuracy of the production. In the beginning, the therapist should teach the client to discriminate between correct, incorrect, and distorted productions. Then use the *CDI* buttons or the 'C', 'D', 'I' (or 'E') keys to score the production. Score each production and the computer will tally the results for you and show them on the results screens. Many clients are able to score their own productions quite accurately with a little guidance from the therapist. To aid you in scoring, the letter 'C' flashes green when a Correct response is scored, 'D' flashes orange-yellow for a Distorted response, and 'I' flashes red for an Incorrect response.

Alternate between the model and the client's recorded words. Stress the importance of the concept that, "Contrast aids perception". Listen for the samenesses and differences between the two productions. Have the client monitor their own speech and determine accuracy using the *CDI* buttons. Compare the client's perception of accuracy with your own.

Word Choice

The word list contains words that are important for vocabulary development or that are commonly used but frequently mis-articulated. We included words that are used today in the classroom and words that reflect a child's experiences with computers, video games, texting, and slang. We also picked words that would make a difference to the child's everyday interactions when the child says the word correctly. For the most part, they are common words in the vernacular of six to twelve-year-olds. If there are unusual words, the word was chosen for consonant location and vocabulary development.

There are 475 words and photographs. Words may be in multiple phoneme groups. There are:

> 85 words in /r/
>
> 189 words in vowel controlled /r/
>
> 212 words in /s/, /z/
>
> 117 words in /l/
>
> 49 words in /th/, /<u>th</u>/;
>> and
> 5 exceptions.

Complexity Rules

Phrase: The phrase is usually two or three words and is the building block for the first sentence. The phrase uses the target sound once but can have other sounds that might be hard.

Sentences:

> Sentence 1 may add another of the same target
>
> Sentence 2 includes at least 2 of the same target sound and usually is a longer sentence.
>
> Sentence 3 likely has multiple target sounds (R, S, L, and/or Th) and will be
>> semantically complex.

Options

The *Options* screen lets you customize the presentation order and screen display to meet the needs of individual clients. Options are remembered from session to session.

Client and Therapist Name

Enter the client's and therapist's names and they will be printed on the results screens. If you are playing from *Client Manager*, these fields will already be populated.

Word Order

Random: Words and pictures appear in a random order within a group.

Alphabetical: The words will appear in the same order each time the group is played. They are ordered within a group from easy to hard using the *Difficulty* level and then alphabetically.

First Sound

Choose the first sound that plays when a new picture is displayed. You can also select *None* so that no word is played or displayed.

Autoplay

If *Autoplay* is selected, the word, sounds, phrase, and sentences automatically play, in sequence, when the new picture is displayed. *Autoplay* starts with the *First Sound* and plays to the end of the sounds. It does not loop back.

Visual Cue

Choose the *Hide Words* option to hide the text below the picture. 'H' will toggle between hiding and showing the text on the screen to allow auditory memory practice or decoding practice.

Background

If your clients are having trouble reading the screen, you can change the background color from white to a neutral color with less contrast or to yellow—with lots of contrast.

Font

Choose from one of four fonts for the text display: Helvetica, Georgia, Courier, and Snell Roundhand. The default font (Helvetica) is a sans serif font that is easily readable on computer screens. Some people may find it easier to read a monospaced font like Courier. You can change to a font normally found in print (Georgia) or to a more difficult to read script font (Snell Roundhand).

Reset Options

Click on *Reset* to restore the options to the defaults.

Documentation

The manual, word lists, and *Guide to Sounds* can be displayed in Adobe PDF format by clicking on the links in this section. On the Macintosh, the game will move to the background and .pdfs will open in a new window. Command-Tab to get back to the game or click on the *Articulation* icon. On Windows the .pdfs open in front of the game. Click on the game window to resume play.

Game Results

The *Quick Results* screen displays after each round of ten words. It shows the number of Correct, Distorted, and Incorrect responses for each word.

If you run out of words before you have reached ten words, you will be taken to the *Quick Results* screen. You can then view the final results for the session, go back to the menu and play the same words again, or choose new words.

The *Final Results* screen displays all of the words that have been played and the total Correct, Distorted, and Incorrect. It will also display the troublesome words—words that have at least one Distorted or Incorrect tally—along with the their *CDI* counts. The *Final Results* screen is arranged by word selection groups. Each time you change the word selection, either on the *Focus* screen or the *Menu* screen, there will be a break in the grouping of the results. So, if you start with a group of words and play 200 of them, there will be one group on the *Final Results* screen. On the other hand, if you select each of the four sections of the R-Words and then play them, there will be four groupings.

Click on the *Save Log* button to save the results to a plain text file for inclusion in reports. Click on the *Print* button to immediately print the results.

Rationale

This task requires the ability to attend to a series of complex auditory stimuli, analyze the sound segments, and imitate these sounds in sequence. It requires auditory processing at the sound, syllable, phrase, and sentence levels with imitative or spontaneous expressive articulatory production.

Pronunciation

Webster's New Collegiate Dictionary was used as the reference for pronunciation, and, in general, the most common pronunciation was chosen if there was more than one choice. There were exceptions to this general rule based on our knowledge of stimulating articulation. For example, "yel*low" is most effectively taught, as a three syllable word, "ee, el, oe" but is pronounced, "yellow" once learned. The syllable breaks do not necessarily coincide with the dictionary syllabification rules. Syllabification is based on ease of speech production. Therefore, most of the time, syllables will begin with a consonant, e.g., "so*fa". When dealing with /r/ and /l/ the most facilitative breaks were made for a particular word, e.g., "ca*mer*a" and "cal*en*dar".

Color Highlights

Usually in a doubled consonant, the first consonant is "grayed-out" and the second consonant is pronounced, e.g., "wal*let". If this was not done, it was decided that the alternative was easier to produce. Grayed-out letters meant that the sound is silent as in, kn, wr, gn, ight, mb, ll, ff, gg, ck, etc. Sounds that do not "play fair" or that need special notice are highlighted. We dubbed these, "notice me letters" and used the color red to highlight them, e.g., ate, ph, tch, dge, ce, ge, ti, ci,

si, eo, etc. If a vowel combination did "not play fair" as listed in the *LocuTour Guide to Letters, Sounds, and Symbols*, then the vowels are highlighted.

Alternative Uses for the Articulation Series (I, II, III, and IV)

Central Auditory Processing Disorder

Research indicates that phonemic processing is critical to auditory processing of connected speech. This software title allows for auditory processing of speech sounds at the phoneme level using the *Sounds* button. This slowing down and segmentation of the word allows the listener to process the phonemic units that make up the word, imitate the units, record their production, and play back their speech to self-monitor. Self-correction and self-monitoring are the first steps in automatic integrated auditory processing and accurate verbal expression.

Literacy Development and Dyslexia

This title is appropriate for children and adults learning to read or those with reading and spelling difficulty. The gray colored letters indicate the silent letters such as: kn, gh, mb, rh, mn, gn and ck. The "e" rule which allows the letter "e" to jump over one sound, (b, t, th, ch, sh, m, etc.) or one letter, (never tt, or bb, etc.) to make the vowel say its name, is highlighted in the color red. For example, the sound in the word says, "ae" but the spelling is, "cape". We teach that the, "e" jumps over and bops the "a" on the head to make him say his name. This single rule, the "e-rule" can make a huge difference in a person's ability to sound out new words. The other rules that can be taught are the "c and g - rules". Any spelling book has a description of these rules but in essence, "c" followed by i, e, or y says its sound /s/, otherwise, "c" says /k/. (Ice, pencil, bicycle, coat, cap, etc.). "g" followed by i, e, or y can say the sound /j/, (package, engine, gym), but doesn't have to. It can say its sound, /g/ , (give, got, etc). The /sh/ sound can be spelled many different ways, such as "ti" (carnation) or "ci" (musician). We use the red color to highlight what we call, "notice me" sounds. These are sounds that don't quite play fair and need to be noticed for spelling or pronunciation.

Refer to the *LocuTour Guide to Letters, Sounds, and Symbols* for more information about spelling and pronunciation rules. If the client copies the word from the computer screen to a word list, they are also developing shifting attention skills, visual perceptual, and motor sequencing skills.

Auditory Memory and Working Memory

Requiring forward and backward repetition of the words, phrases and sentences can help those with short term memory problems, sustained, and shifting attention difficulties. Use felts on the table to "anchor" the sounds in sequence. We have used this process of repetition to increase the amount of information a client can hold in working memory. The process of forward repetition can teach the compensatory strategy of "reauditorization". If you can develop your "internal tape recorder" you have a second chance to replay and thus comprehend auditory information. Reverse repetition is usually not recommended.

Aphasia Therapy

The pictures can be used to stimulate conversational speech, check auditory comprehension, and to practice repetition, naming, writing, and reading skills. Use the record features to make your own cueing strategies. The software is designed to present a speech model at the sound, word, phrase, and sentence levels. The record feature will allow several minutes of recording but will not save the recording when you move to the next screen.

Right Hemisphere Syndrome

The treatment of Right Hemisphere dysfunction will include visual scanning, reading, writing, speech intonation, perception of affect, comprehension of humor, idioms, metaphors, and logic. The pictures can be used as a launching point for describing the details of visual images such as, color, size, shape, number, smell, taste, sound, perspective, movement, mood, and background. The main idea of the picture can be identified to assist with focusing on relevant stimuli and ignoring irrelevant details. As an extension activity, have the client tell what could happen next. The client will need to understand the gestalt of the picture story before being able to make their own extension sentences or infer meaning from the picture. Questions such as, "What was the dog doing?" and, "Why do you think he might be feeling that way?" encourage them to tell brief stories. These can be recorded using the recording feature and played back to allow some processing of their own speech. The therapist can track topic maintenance or appropriateness of responses.

Traumatic Brain Injury

The communication deficits related to TBI often include dysarthria, auditory and reading comprehension problems, anomia, and pragmatic language disorders. In a small group setting, the software can be used to present a stimuli and allow the individuals to practice turn taking, appropriate conversation, and topic maintenance. It is possible to use the recording features for feedback and self-monitoring on perseverative responses, inappropriate laughter, swearing, and off task responses. Use of the *Alphabetical* word order option can allow the therapist to present the same stimuli each day. As the client progresses, you can increase the variability for responses using the *Random* option. Repeating the word, phrase, and sentences forward and backward at a level in which your client is successful 85% of the time, will develop working memory, short-term memory skills, and mental flexibility.

Apraxia

Auditory feedback is critical for self-monitoring of dysarthric speech. The pictures were chosen for content, phonemic complexity, and "picturability". The screen was designed to allow visual and/or auditory stimuli. An Apraxic client may prefer to have the words displayed and use the *Word* and *Phrase* buttons for self-paced imitative speech practice. Most clients can practice on their own or with an assistant. Use of the *CDI* button will allow the client to keep track of their perception of the accuracy of reproduction of the stimulus. The comparison of their perception of intelligibility and your perception of intelligibility can be insightful when planning therapy goals.

Keyboard shortcuts are available for most of the actions in this title. Some are available on all screens and some are only applicable on specific screens.

All Screens

> H or ? — Help
>
> M — Menu
>> (Switches between Main Menu and Focus Menu on a menu screen)
>
> O — Options

Game Screen

> Left Arrow — Previous Word
>
> Right Arrow — Next Word
>
> T — Hide/Show Text
>
> **Recording**
>
> R — Record
>
> S — Stop
>
> P — Playback
>
> **Scoring**
>
> C — Correct
>
> D — Distorted
>
> E or I — Incorrect
>
> **Play Sounds**
>
> 1-6 — 1 = Word, 2 = Sounds, etc.
>
> Q — Quit (Go to the Quick Results)

Focus Screen

> P or ENTER — Play Game
>
> Q — Quit (Go to the Final Results)

Options Screen

> Q — Quit (Go to the Final Results)

Quick Results

> C or ENTER — Continue
>
> Q — Quit (Go to the Final Results)

Final Results

> P — Print Results
>
> S — Save Log
>
> Q — Quit (Quit the game)