

REVITALIZING THE 'R': PRACTICAL TECHNIQUES FOR EFFECTIVE INTERVENTION

Discussion of 'r' elicitation / teaching techniques

Case studies of challenging clients with persistent 'r' errors

Presentation of ultrasound biofeedback information

After this course, participants will be able to:

- Describe recent research regarding developmental norms for speech sound production to advocate for early (earlier) intervention
- Identify and label various contexts of the 'r' phoneme in words
- Describe and demonstrate elicitation methods for the 'r' phoneme including the use of the ultrasound biofeedback
- Describe the concepts of establishing then generalizing production of the 'r' phoneme

The /r/ phoneme cannot, and should not, 'wait' for development to occur...

AJSLP

Review Article

Children's Consonant Acquisition in 27 Languages: A Cross-Linguistic Review

Sharynne McLeod^a and Kathryn Crowe^a

American Journal of Speech-Language Pathology • Vol. 27
• 1546–1571 • November 2018 • Copyright © 2018 The

By age 5 years, children produced at least 93% of consonants correctly

- At age 4 years, 75% of children had acquired the 'r'
- At age 5 years, 90% of children had acquired the 'r'
- By age 6 years, 90-100% of children had acquired all consonants

AJSLP

Review Article

Children's English Consonant Acquisition in the United States: A Review

Kathryn Crowe^{a,b}  and Sharynne McLeod^a 

American Journal of Speech-Language Pathology • Vol. 29 • 2155–2169 • November 2020 • Copyright © 2020 The Authors

Symbols

International Phonetic Alphabet = /ɹ/

Orthographic representation = 'r'

Usual 'shorthand' = /r/

Instruction of 'r' can start early!

- Auditory bombardment and awareness
 - Classroom
 - Parents
 - provide parents and teachers with easy methods for stimulation
 - Produce the 'r' sound and an age-appropriate label for it ('rr' sound, growly/lion/tiger sound, R sound, etc)
 - Emphasize the 'r' production when labeling key vocabulary words
- Sound play
 - Environmental sounds: trucks, sirens, roosters, pirate, etc....
 - And their 'sounds' are the 'rrrrrrr'
 - Avoid glottal sound effects

If /ɹ/ does not develop naturally...

- Therapy can also start early
- Incorporate explicit teaching into your current therapy plan
- Be specific with the instructions and the feedback!
- Consider quick, 10-minute visits to stimulate development

**LSHSS**

Research Article

Speech in Ten-Minute Sessions: A Pilot Randomized Controlled Trial of the Chaining SPLITS Service Delivery Model

Benedette M. Herbst,^a Molly Beiting,^a Martine Schultheiss,^a Nina R. Benway,^{a,b} and Jonathan L. Preston^a

^aCommunication Sciences and Disorders, Syracuse University, NY ^bElectrical and Computer Engineering, University of Maryland, College Park

Key Resources:

LSHSS

Tutorial

Tutorial: Motor-Based Treatment Strategies for /r/ Distortions

Jonathan L. Preston,^a Nina R. Benway,^a Megan C. Leece,^a
Elaine R. Hitchcock,^b and Tara McAllister^c

Language, Speech, and Hearing Services in Schools • Vol. 51 • 966–980 • October 2020 • Copyright © 2020 American Speech-Language-Hearing Association


Cues generally include:

- an **oral** constriction that requires some portion of the **front half** of the tongue raise
- a **pharyngeal** constriction that requires **tongue root to retract**
- **lowering of the midline** of the posterior tongue body
- **contact** of the sides of the tongue body **against the back teeth** or gums
- slight lip rounding

However...

- **numerous tongue shapes can result in an accurate /r/**
- tongue shapes do **not** directly match 'retroflex' or 'bunch' positions
- all do include the tongue tip, blade/anterior body of the tongue raised toward the hard palate/alveolar ridge
 - (Boyce, 2015; Espy-Wilson et al., 2000; Tiede et al., 2004).

ASHA On-Demand Webinar



Syracuse University
College of Arts & Sciences
Speech Production Lab

Treating /r/ Errors: Evidence- Based Cueing and Practice Strategies

Jonathan Preston
Associate Professor

Megan C. Leece
Research SLP

ASHA
Professional Development

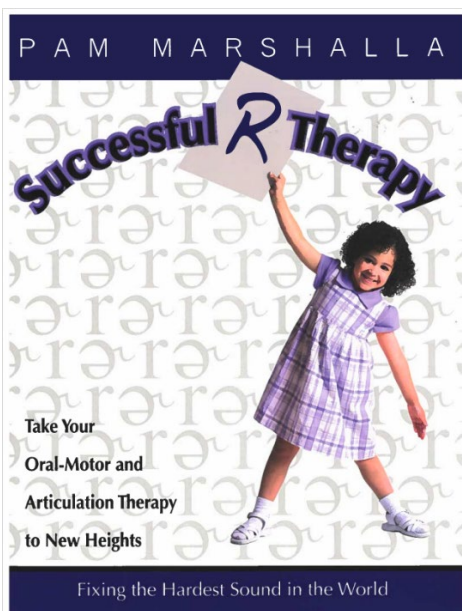
Photo by [Cody Dittmer](#) on [Unsplash](#)

Presents much of the information from the "Tutorial" article as well as information regarding establishment and generalization strategies.



/R/ What you want to know *RIGHT NOW!* – Angie Neal

Half hour presentation with direct “how-to” instructions to provide to clients.



Excellent resource for many aspects of the ‘r’ phoneme.

<https://pammarshalla.com/>

Traditionally...

Retroflex – Tip R – Curled R – Tip-Back R

Tongue tip elevates and curls back toward the velum; the sides of the tongue also curl; tongue scoops into a cup/bowl shape and tilts toward the back of the mouth; middle of tongue remains low

Bunched – High-Back R – Mature R

The back-lateral margins of the tongue elevate and are braced upward against the molars or palate on either side. They are the points of stability for all tongue movements; the tongue’s middle back tenses up toward the velum but does not touch; the tip retracts into the body of the tongue. Elevation of the tongue’s back-lateral margins forms a midline channel.

Successful R Therapy, Pamela Marshalla, 2015

<https://pammarshalla.com/>

However...

The Articulatory Phonetics of /r/ for Residual Speech Errors

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Residual Speech Errors: Causes, Implications, Treatment; Guest Editors, Tara McAllister Byun, Ph.D. and Jonathan L. Preston, Ph.D.

Semin Speech Lang 2015;36:257–270. Copyright © 2015 by Thieme Medical Publishers, Inc., 333 Seventh Avenue, New York, NY 10001, USA. Tel: +1(212) 584-4662.

DOI: <http://dx.doi.org/10.1055/s-0035-1562909>.
ISSN 0734-0478.

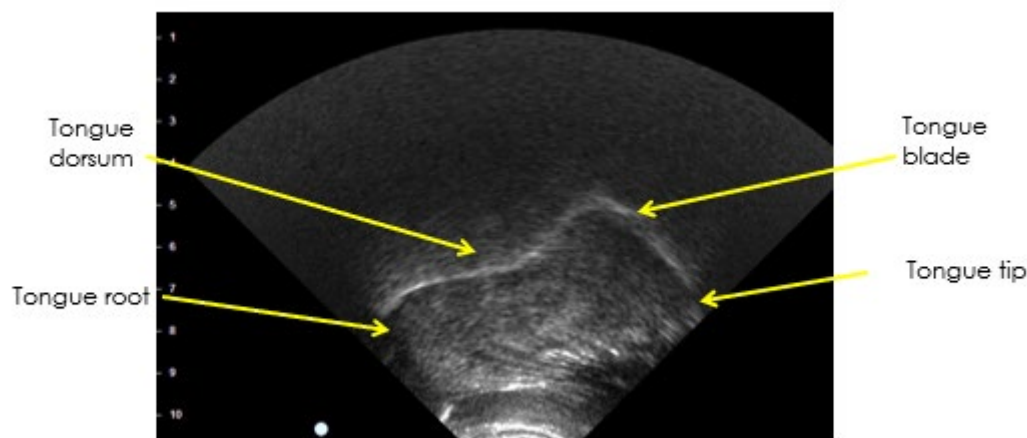
SEMINARS IN SPEECH AND LANGUAGE/VOLUME 36, NUMBER 4 2015

Some key comments:

- Tongue configurations for /r/ are significantly more variable than “bunched” and “retroflex.” **There are several different ways to shape the vocal tract for /r/.**
- There is a range of locations for the primary ‘place of articulation’ – the point of greatest vocal tract narrowing **along the palate.**
- A secondary place of constriction is needed **in the pharynx.** The tongue root moves toward the back pharyngeal wall.
- MRI images show **22 different** typical adult native speakers producing /r/...

Brief orientation to ultrasound...more to come

Lateral (side) view of /r/



Therefore...Adjustments to instruction...

- Instruct constriction of tongue “in the middle”
- Instruct *movement* of front of tongue upward
- Instruct “squeeze” at the base of the tongue
- Instruct lateral tongue to molar placement
- Limited instruction to relax lips
- Limited instruction on specific “place” of tongue
 - **3 key components: front tongue up, dorsum down, root of tongue back**
 - (See Preston & Leece ASHA webinar resource)
- Additional consideration...address postvocalic /l/ for the tongue tension and liquid quality
- **Angie Neal presentation on SpeechPathology.com** instructs “out-in” movement.
- Combine that information with a focus on the down, up movement
 - Roller coaster with /æ/; elicits all positions
 - Modify to elicit vocalic by stopping in middle
 - Change vowels
 - Move to words
 - Keep jaw still and only move tongue up
- **DO NOT ONLY SAY “BACK”**
 - Tongue **root** constriction toward pharyngeal wall is needed...
 - **Sides of tongue** need to be up, touching **molars**...
 - The client’s definition of “back” and the SLP’s definition of “back” are different...
 - Give **specific** information rather than “in the back” ...
 - Why? See video...

Contexts of /r/ --- Word sorting exercise

- Pre-vocalic = CV = run, right, ray, read, rock
- Inter-vocalic = VCV = carrot, marry, sorry, parachute
- Post-vocalic, moving and not moving = VC =
car, fire, art, corn bird, earth, sure, her doctor, catcher, sugar

Analyze the word for the context of the sound... What makes production of that target **easy**?

What makes production **difficult**? ==== room ... worm ... girl ... ruler ... squirrel ... world

Therapy Materials:

- Use diligence and analyze the phonetic context of the /J/ in the therapy materials you use...
- HELP your client to be successful with a facilitating context...Make the learning easier for the client, especially when establishing the accurate production...
- Variations of context should be reserved when working on generalization of the accurate production...

Use a critical ear for the high clarity of the /r/

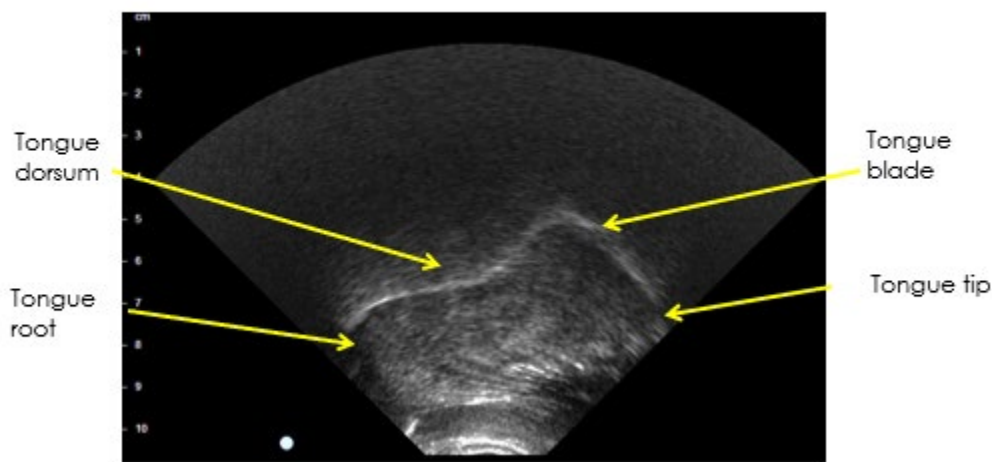
- You may be the 'last stop' for this client to achieve accurate articulation
- "Approximations" are accepted only as a starting point
- Reward "change" that the client shows; it means moving away from the error
- Move past "approximations" and achieve a highly clear /J/ production, especially in the postvocalic position
- Provide honest, direct feedback about the accuracy of the production. "Good job" is not enough...

Incorporate auditory skills

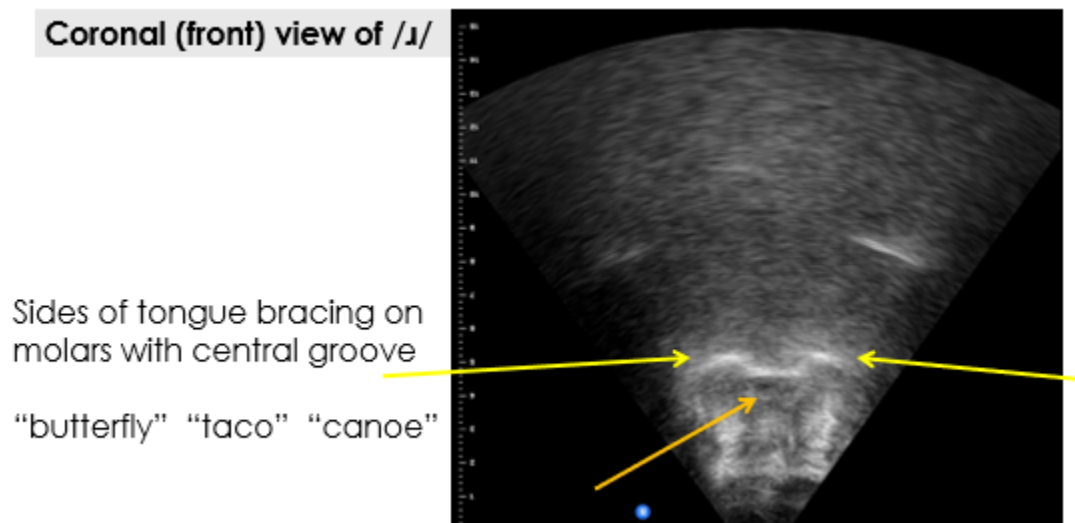
- Could start with labeling the accurate vs. inaccurate production with **your model**
- **Ideally**, provide recordings of other clients who produce accurate/inaccurate for the child to build awareness
- Once the client can produce a clear 'r,' instruct the client to identify / discriminate **their own productions**
- Label the production as the **'old' sound vs. the 'new R' sound**
- An option to consider is to reference a % scale of accuracy: 50% -- 80% -- 100%
- Inform the client **how you hear** their production of the /J/
 - Be honest and specific; reference the necessary components for the accurate production:
 - **front tongue lifted**
 - **sides on molars**
 - **squeeze at root/base of tongue**
- **Add the instructions** to achieve the clear /J/ and **restate** your new assessment of the production
- Continue to reference **chosen label** for the clarity of the /J/ as the client progresses ('old vs. new' sound or % accurate)

More on ultrasound biofeedback:

Lateral (side) view of /ɹ/



Coronal (front) view of /ɹ/



Client instructions:

- Give the overview of the ultrasound
 - gel placed on probe, which is then placed under the chin
 - picture is shown on iPad/tablet
 - demonstrate on yourself if needed
- Once the probe is placed, label the parts of the tongue for the client
 - have the client say “t, t, t, t” and then “k, k, k, k”

- then have client attempt the /ɹ/ sound and label the position the client shows
- instruct client to make changes toward the accurate position / production
- use open vowel to move from downward tongue position to upward in middle-front of tongue to show contrast = “aah—rrr”
- endeavor to keep a vowel attached to the /ɹ/ production (**see Marshalla text**)
- front of tongue (blade) lifted = “middle-front of tongue lifted”
- brace sides of tongue against molars to create “dip” in the middle (dorsum)
- hold jaw still / keep jaw open
- combine instruction with traditional cues
- as client improves movement/positioning, add ‘squeeze’ at base of tongue to foster pharyngeal constriction component
- use ultrasound while moving up the hierarchy from syllables to words
- postvocalic production is often most challenging
- keep focus on movement from open vowel upward for the /ɹ/
- attend to the vowel context surrounding the /ɹ/
- Suggested sequence for postvocalic /ɹ/ instruction
 - Moving (stressed, diphthong context) = ‘chair, car, more, hear’ /ɔɹ/
 - If you transcribe a vowel prior to the /r/ sound, then you have a ‘moving’ context.
 - “fire” = /fɪɹ/
 - Not moving (stressed) = ‘stir, her, sure’
 - If there is no additional vowel before the /r/ sound, then it is ‘not moving.’
 - “fur” / “fir” = /fɜr/
 - **Make them move with a prolonged vowel:** “fihhh-er” to transfer the skill
 - Not moving (unstressed) = ‘butter, doctor, sugar, afternoon’ /əɹ/
 - **Make them move with a prolonged vowel:** “sug-eehh-er” to transfer the skill

At OSU:

<https://www.butterflynetwork.com/> connected to an iPad for display

Tutorial reference:

Journal of Visualized Experiments: Ultrasound Images of the Tongue: A Tutorial for Assessment and Remediation of Speech Sound Errors, 2017. <https://app.jove.com/v/55123/ultrasound-images-tongue-tutorial-for-assessment-remediation-speech>

Many variations of positions are possible!

- Therefore...
 - Listen with your ears
 - Watch with your eyes
 - Use the specific terms for parts of tongue
 - Combination of traditional elicitation
 - Watch for tongue root to retract toward pharynx
 - “Butterfly” shape of tongue with tongue braced on molars
 - Provide very specific feedback and corrective feedback to the client to shape/improve the ‘r’ quality

What *NOT* to do...

- Do not tell a client “good” or any variation of “good” when the accuracy of the /J/ quality does not match the expected “100% accuracy”
- Do not solely tell a client “put your tongue in the back” or a variation of “back”
- See description in Marshalla text, page 36-37.

Generalization...

- See Preston “Tutorial” article and ASHA webinar for the specifics of Principles of Acquisition, Knowledge of Performance, then Knowledge of Results.
- **Additional options:**
 - Reference “old sound” vs. “new R sound”
 - Generalization begins as soon as a clear /J/ is achieved at syllable level... ‘generalize’ to word level...then build independence/spontaneous productions at that level...then continue to next level. Don’t “wait” until all is perfect...start immediately with fostering independence.
 - address/instruct/practice co-articulation across word boundaries
 - fade clinician direction – see Preston and Maas references for “Knowledge of...”
 - foster client independence with “all by yourself” “show me you can...” “let me hear you...” “keep your sound in there” “hit it and go” “look for the letter ‘r’ when reading”
 - get outside the “4 walls”
 - specific homework assignment to speak to differing individuals using successful material
 - take data in front of client
 - present ‘challenge’ words to include
 - use of e-devices/reminders/calendars

Key Takeaway Information...

- **3 key components: front tongue up, dorsum down, root of tongue back**
 - (See Preston & Leece ASHA webinar resource)
- At age **5 years**, 90% of children had acquired the 'r'
- By age **6 years**, 90-100% of children had acquired **all** consonants
- Be **specific** with instructions and feedback to the client on the performance (specific movements) and the results (accurate/ inaccurate clarity)
- **Do not** "wait until age ____" to begin instruction
- **Do not solely focus on "tongue back" or "smile lips" or "strong"**
- If possible, gain experience with and add **ultrasound biofeedback** as a tool
- **Stay well-informed with research-based resources**

Resources:

Boyce, S. E., The articulatory phonetics of /r/ for residual speech errors. *Seminars in Speech and Language*, 36(4), (2015). doi: <http://dx.doi.org/10.1055/s-0035-1562909>

Crowe, K., & McLeod, S., Children's English consonant acquisition in the United States: A review. *American Journal of Speech-Language Pathology*, 29, 2155–2169 (2020). https://doi.org/10.1044/2020_AJSLP-19-00168

Herbst, B. M., Beiting, M., Schultheiss, M., Benway, N. R., & Preston, J. L. Speech in ten-minute sessions: A pilot randomized controlled trial of the chaining SPLITS service delivery model. *Language, Speech, and Hearing Services in Schools*, 56, 102–117. (2025). https://doi.org/10.1044/2024_LSHSS-24-00043

Preston, J., Leece, M. C., Treating /r/ errors: evidence-based cueing and practice strategies. *ASHA Professional Development Webinar*, <https://www.asha.org/> (2020).

Maas, E., Robin, D.A., Austermann Hula, S.N., Freedman, S.E., Wulf, G., Ballard, K.J., Schmidt, R.A., Principles of Motor Learning in Treatment of Motor Speech Disorders. *American Journal of Speech-Language Pathology*, 17, 277-298. (2008) [https://pubs.asha.org/doi/10.1044/1058-0360\(2008/025\)](https://pubs.asha.org/doi/10.1044/1058-0360(2008/025))

Marshalla, P. *Successful R therapy*. Marshalla Speech & Language. (2015).

McLeod, S., & Crowe, K., Children's consonant acquisition in 27 languages: A cross-linguistic review. *American Journal of Speech-Language Pathology*, 27, 1546–1571. (2018). https://doi.org/10.1044/2018_AJSLP-17-0100

Preston, J. L., Benway, N. R., Leece, M. C., Hitchcock, E. R., & McAllister, T. Tutorial: Motor-based treatment strategies for /r/ distortions. *Language, Speech, and Hearing Services in Schools*, 51, 966–980. (2020). https://doi.org/10.1044/2020_LSHSS-20-00012

Preston, J. L., McAllister Byun, T., Boyce, S. E., Hamilton, S., Tiede, M., Phillips, E., Rivera-Campos, A., Whalen, D. H. Ultrasound Images of the Tongue: A Tutorial for Assessment and Remediation of Speech Sound Errors. *J. Vis. Exp.* (119), e55123, doi:10.3791/55123 (2017). <https://app.jove.com/v/55123/ultrasound-images-tongue-tutorial-for-assessment-remediation-speech>

Seeing Speech website for ultrasound videos: <https://www.seeingsspeech.ac.uk/r-and-l-in-english/>

Ultrasound device website: <https://www.butterflynetwork.com/>

Contexts of “r” sounds

Words to sort into chart below:

run	four	strong
sister	prime	car
right	afternoon	art
learn	sure	acorn
word	fire	chair
favor	third	crisp
burgundy	circle	fear
sugar	tree	bird
doctor	liar	work
ray	deer	polar
carrot	frighten	sorry
marry	where	purse
hurry	more	heard
break	grapes	dollar
wrap	sir	perfect

Pre-vocalic (initial)	= Consonant Vowel = CV	
Inter-vocalic (medial)	= VCV =	
Initial Blends (initial)	= CCV / CCCV =	
Post-vocalic (final)	= vowel + r = VC	These are most challenging for increasing clarity. They are further divided in to “stressed” and “unstressed” contexts.
<u>Stressed</u> /ɜ:/ <u>Moving (diphthong) vowel+r</u> <u>Unmoved vowel+r</u>		<u>Unstressed</u> /ə/

Contexts of "r" sounds – ANSWER KEY

Pre-vocalic (initial)	= Consonant Vowel = CV	run right ray
Inter-vocalic (medial)	= VCV =	carrot marry sorry hurry parent parade
Blends (initial)	= CCV / CCCV =	break prime tree crisp frighten grapes strong spring
Post-vocalic (final)	= vowel + r = VC	These are most challenging for increasing clarity. They are further divided in to "stressed" and "unstressed" contexts.
<div> <div> <u>Stressed</u> /ɜ:/ <u>Moving (diphthong) vowel+r</u> car more fork art four fire chair <u>where</u> liar fear deer acorn farm bear horse <u>Unmoved vowel+r</u> bird third girl work word <u>learn</u> <u>sure</u> purse perfect heard circle </div> <div> <u>Unstressed (disregard spelling) /ə/</u> doctor sister dollar polar energy afternoon favor sugar </div> </div>		