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Disclosure Statements

Relevant Financial Relationships:

- Carol Koch is a member of the faculty at Samford University for which she receives a salary. She teaches courses on speech sound disorders at the graduate level.
- Carol Koch also has intellectual property rights and receives a royalty from Jones and Bartlett.
- Carol Koch is co-author for products related to intervention for speech sound disorders through Bjorem Speech Publications and receives royalties.

Relevant Non-Financial Relationships:

- Carol Koch is a member of the SHAA Executive Board and serves the Association as Treasurer.

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Course Objectives

After participating in this session, participants will be able to:

1. Describe the common challenges related to remediation of the /j/ sound
2. Describe strategies of facilitating contexts for remediation of the /j/ sound
3. Describe the target selection criteria for the facilitating contexts for remediation of the /j/ sound

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A note about /j/

THE INTERNATIONAL PHONETIC ALPHABET (revised to 2015)											
CONSONANTS (PULMONIC)											
	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	p b			t d			ʈ ɖ	k ɡ	q ɢ		ʔ
Nasal		m ɱ		n ɳ			ɲ	ŋ		ɴ	
Trill										ʀ	
Tap or Flap				ɾ							
Fricative		f v		θ ð	s z	ʃ ʒ	x ɣ	χ ʁ	ħ ʕ	h ɦ	
Lateral fricative				ɬ ɮ							
Approximant						ɻ	ɹ	ɻ			
Lateral approximant				l			ʎ	ʟ			

Symbols to the right in a cell are voiced, to the left are voiceless. Shaded areas denote articulations judged impossible.

/r/:

- Alveolar
- Voiced
- Trill

/ɹ/:

- Postalveolar/Palatal
- Voiced
- Rhotic liquid/approximant

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Let's Not....

- Waste precious time or money on magical solutions that lack evidence or logic –
 - “Tongue strengthening” exercises
 - Horns, whistles, straws
 - Scooters, dollies, exercise balls
- ...Let's Not....Assume that a lack of progress is the child's fault

Preston & Leece, (ASHA Webinar)

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When can children produce /j/ accurately?

- 50% of 3-year-olds
- 90% of children age 5:6

- Age of acquisition norms:
 - Early 13: /b, p, n, m, d, h, w, t, k, g, f, n, j/ (Age 2-3)
 - Middle 7: /v, ds, l, ʃ, s, j, z/ (Age 4)
 - Late 4: /s, i, θ, θ/ (Age 5-6)

Crowe & McLeod (2020)

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How is /ɹ/ produced?


<p>Final /ɹ/:</p> <ul style="list-style-type: none"> Produced as /ə/ or as a component of an r-diphthong/r-colored vowels /ɹ/, /ɹ/, /ɹ/, /ɹ/, /ɹ/, /ɹ/, /ɹ/, /ɹ/, /ɹ/, /ɹ/ hear, lure, core, star, bear, mother, fur Produced when both sides of tongue elevate to touch or approximate the upper gum ridge near the molars Mid-portion of tongue depressed to allow airflow – central groove 	<p>Initial /ɹ/:</p> <ul style="list-style-type: none"> Produced as a consonant /ɹ/ red, right, rain, reed Produced as /ɹ/ then gliding tongue (without moving the lips) forward for the vowel 	<p>Medial /ɹ/:</p> <ul style="list-style-type: none"> When followed by a consonant, /ɹ/ is produced (skirt, hurt) When followed by a vowel, is produced like an initial /ɹ/ (carrot, borrow)
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Articulatory requirements for /ɹ/

- Tongue root retraction
- Lateral elevation
- Lowering of tongue body
- (anterior) oral constriction
- (slight) lip rounding

WHY?
Anterior portion of tongue (the tip or the blade) must be raised toward the palate. Tip for retroflex or blade for bunched.




Important for thinking:

- about facilitating contexts: /d ɹ/ and /t ɹ/
- shaping cue /l/ to /ɹ/ or /lɹ/ to /ɹ/
- metaphor cues: like a bow and arrow – pull center of tongue back and down and lift the front; an elevator; a bulldozer
- phonetic placement: cues lift front of tongue like for a /l/ but don't touch the roof; point tip of tongue toward the bump behind your top teeth"

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MRI of bunched tongue posture


- Tongue blade is elevated
- Dorsum (body) is lowered
- Tongue root is retracted



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MRI of retroflex tongue posture

- Tongue tip is elevated
- Dorsum (body) is lowered
- Tongue root is retracted



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These are MRI images of correct /r/ productions. Some are variations of a bunched tongue posture. Some are variations of a retroflex tongue position.



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Why do some children have trouble producing /ɹ/?



For final /ə/:

- Not raising back of tongue on each side to approximate the gum ridge near molars
- Raising back of tongue in the middle, resulting in /ŋ/

For initial /ɹ/:


- Liprounding, resulting in /w/
- Derhotacized, production is neither /ɹ/ or /w/, but is a distorted form where quality is lost

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Substitutions and Distortions of /ɹ/

Errors are usually characterized by:

- Lowered front of tongue
- Raised dorsum (body)
- Lack of pharyngeal constriction
- Lack of lateral bracing



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Specific Challenges of /ɹ/

- Typically described as being produced with only two tongue shapes: bunched and retroflex
- Descriptions of correct /ɹ/ production based more on acoustic feedback than tactile feedback

***Tongue shape and feedback are challenges that must be addressed by our therapeutic strategies.


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Common /ɹ/ Errors Involving Articulatory Posture

Lip Rounding

Flat/Depressed Tongue – Blade or Tip not elevated or Tongue Root not retracted

We have to change the motor plan that the child uses to posture the tongue to attempt /ɹ/ production.



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Evidence-Aligned Treatment Strategies

Improving Stimulability

- Focus on principles of acquisition
- Be specific in your cues
- Consider phonetic context
- Train perception

Improve Stabilization

- Principled, adaptive structure
- Monitor perception

Improve Generalization

- Principles of (speech) motor learning

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Principles of Motor Learning

Motor Performance

- Accuracy of a motor behavior during acquisition (e.g., during treatment)

Motor Learning

- Retention/Generalization of the learned behavior
- Relatively permanent change

Maas, et al. (2008)

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What Conditions Affect Acquisition and Motor Learning?

Feedback

- Type: knowledge of performance vs. knowledge of results
- Frequency: high frequency vs. low frequency
- Timing: immediate vs. delayed

Practice Conditions

- Amount: few vs. many trials
- Schedules: blocked vs. random (within a session)
- Variability: constant practice vs. variable practice
- Target complexity: simple vs. complex

Maas, et al. (2008)

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Motor Learning Principles - Overview

To ACQUIRE a skill (Motor Performance)	To RETAIN a skill (Motor Learning)
Knowledge of performance	Knowledge of results
Massed practice	Distributed practice
Frequent feedback	Less frequent feedback
Immediate feedback	Delayed feedback
Many trials per session*	Many trials per session
Blocked practice	Random practice
Constant practice	Variable practice
Small stimulus set	Large stimulus set
Simple targets	Complex targets

Maas, et al. (2008)

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Be specific with your cues

	Correct /ɪ/	Incorrect /i/
Front of tongue	Up off floor of mouth toward the hard palate	Too low
Posterior tongue dorsum	Low	Too high
Tongue root	Pulled back in pharynx	Not retracted
Sides of tongue	Against back teeth	Lacking lateral contact/bracing on molars/gums

- Know the phonetic requirements of the sound
- Have a good guess at what the client is doing wrong

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Be specific with your cues

- Use analogies or “rich descriptions” to highlight tongue “posture” or shape:

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Be specific with your cues

- Use visual strategies to support the verbal descriptions
- <http://seeingspeech.ac.uk/ipa-charts>

Side view (sagittal) ultrasound images and animated images to show where the tongue should be, the approximate shape of the tongue, and the movement needed

Electropalatography images show where the tongue touches the hard palate

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Be specific with your cues

	Correct /ɪ/	Phonetic Placement Cue
Front of tongue	Up off floor of mouth toward the hard palate	Lift the front of the tongue up off the floor of the mouth
Posterior tongue dorsum	Low	Pull back the tongue down and back into your throat
Sides of tongue	Against back teeth	Feel the sides of the tongue against the back molars

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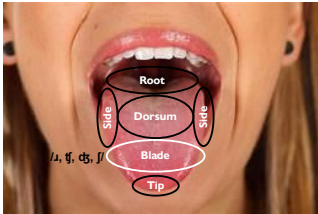
Avoid Over-Cueing Lip Posture

- Don't emphasize lip position as a primary cue!
- Lip position will change naturally with coarticulation
- Lip position is NOT a static phonetic characteristic

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Consider all dimensions of tongue movement



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News you can use.....

.....the tongue is a muscular hydrostat, just like the tentacles of an octopus!!



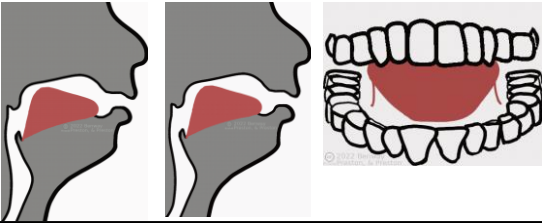
both of these appendages can easily bend, extend and change shape



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More news.....

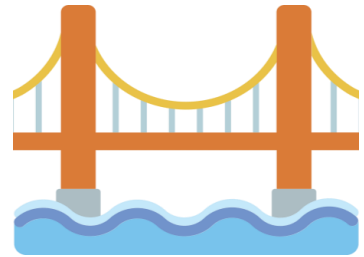
...../l / is a continuant....the place of articulation is not static.



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A Bridge:

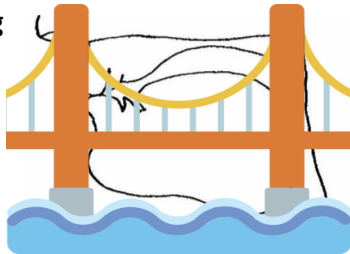
Helps us to get from one place to another!



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A Facilitating Context:

Helps us to get from one place to another!



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What is Contextual Facilitation?

Paying attention to phonetic context – position of articulators in speech sounds that might influence correct articulatory posture for the target sound. Use facilitative vowels or consonants.

How do we do Contextual Facilitation?

Pay close attention to the articulatory posture that you need to change. What is the child doing that is contributing to the error production? What does the tongue need to be doing?



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Co-Articulation and Assimilation

Concept that articulators are continually moving into position for other segments over a stretch of speech

Adaptive articulatory changes through which one speech sound becomes similar or identical to a neighboring sound segment

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Contextual Facilitation

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Specific Context for Facilitation

To decrease lip rounding:

- Utilize a context that facilitates lip spreading
- Add "reed", "ree", or "ray" to words

/ɜ/	/e ɪ/	/i ɪ/	/æ ɪ/	/ɔ ɪ/	/a ɪ/
fur	bear	dear	dire	core	star
her	care	leer	hire	door	tar
blur	fair	tear	mire	four	are
per	share	cheer	tire	fore	far
sir	pair	ear	sire	more	car
**whir/were	mare	clear	spire	store	mar
	hair	fear	**wire	bore	bar
	stair	sheer		sore	
	air	peer		tore	
	dare	steer		snore	
	chair	perce		score	
**challenge words	**wear	spear		**wore	

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Specific Context for Facilitation

To decrease lip rounding:

- Utilize a context that facilitates lip spreading
- "errr" plus "ree" to decrease lip rounding

/ɜ/	/e ɪ/	/i ɪ/	/æ ɪ/	/ɔ ɪ/	/a ɪ/
hurry	berry	dearie	flery	Corl	starry
hurry	carry	teery	diary	Dory	larry
blurry	Gary	teary	**wiry	Jory	Arie
jury	fairy	cheery		Laurie	
curry	Larry	serie		Morey	
flurry	marry	**weary		story	
**worry	hairy			glory	
	very				
	dairy				
	cherry				
	**wary				

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Specific Context for Facilitation

To improve tongue posture

- "errr" to /n/ for tongue tip elevation for retroflex:

earn	learn	fern	turn	burn
------	-------	------	------	------

- /L/ to /ɹ/ for retroflex:

learn	Laura	lark
lair	leery	Lori

- /ɹ/ to /L/ for retroflex:

Carla	Orla	forlorn
Carli	early	curly
four-leaf	core-love	garlic
marlin	barley	gnarley
Marley		

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Specific Context for Facilitation

To improve tongue posture

- /dɹ-/ for tongue tip up for retroflex and facilitating vowels:

/ɹ/	/e/	/a/	/æ/	/as/
dream	drake	drop	draft	dry
	drage	drama	drat	drive
	drain		drum	

- /tɹ-/ for tongue tip up for retroflex and facilitating vowels:

/ɹ/	/e/	/a/	/æ/	/as/
tree	tray	tropical	track	try
treat	trace	drama	trap	tribe
trees	trait		tram	trike
	train			
	trays			

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Specific Context for Facilitation

To improve tongue posture

- /dɹ-/ for tongue tip up for retroflex:

bidder	badder	ladder	madder	**wider
feeder	leader	seeder	colder	folder
**wader	fader	heeder	**weeder	

- /tɹ-/ for tongue tip up for retroflex:

fatter	batter	latter	matter	**whiter
seater	meter	neater	Peter	butter
**water	cutter	heater	putter	fighter
**waiter	better	butter	hatter	hotter

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Specific Context for Facilitation

To improve tongue posture

- /kɹ-/ for tongue retraction and facilitating vowels:

/ɹ/	/e/	/a/	/æ/	/as/
creed	cray	crop	crab	cry
creep	crage	crook	crum	crime
creek	crate		craft	cries
crease	crane		crack	cried
cream	trays			
	crase			

- /gɹ-/ for tongue retraction and facilitating vowels:

/ɹ/	/e/	/a/	/æ/	/as/
greed	gray	grook	grab	grime
greet	grape	crook	gragh	grind
greek	grate		grad	grimy
grease	grain		grand	
grief	grail		gram	
green	grade		grass	
	graze			
	grace			

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Specific Context for Facilitation

To improve tongue posture

- /gɹ-/ for tongue retraction and elevation:

bigger	bagger	lagger	blogger	logger
fogger	hugger	slugger		

- /kɹ-/ for tongue retraction and elevation:

biker	baker	laker	maker	**waker
faker	cooker	looker	peeker	booker
poker	soaker	talker	taker	soaker
leaker	seeker	sneaker	weaker	sleeker

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Specific Context for Facilitation

To improve lateral bracing

- /ʃɹ-, /ʒɹ/ and /θɹ-/ for lateral bracing and elevation:

Shirt	Shirk	Shark	Sure	Shard
Washer	Masher	Pusher	Dasher	
Thirty	Thursty			


- /ʒɹ- and /θɹ-/ for lateral bracing and elevation:

Churn	Chirp	Church		
Teacher	Catcher	Pitcher	Rancher	Butcher
Jury	Jerome	Jerky	Giraffe	Gerbil
Germ	Badger	Major	Dodger	Danger/ous

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Specific Context for Facilitation

/l/ to vowels



/i:/	/ɪ:/	/u:/	/ʊ:/	/e:/	/æ:/	/ɜ:/	/a:/
read	remember	roof	roofer	ray	rock	rabbit	rye
ream	rich	root	rookie	rage	rocket	rack	ride
reek	rip	room	rook	radio	rod	rad	rhyme
reef	really	rooster		rake	rotten	rat	rile
reel	reveal	roommate		rail	rob	racquet	rice
reap				rain	robber	wrap	rise
reason				raise	rocker	ram	right/write
reaction				rate		ramble	Rhine
report						rant	ripe

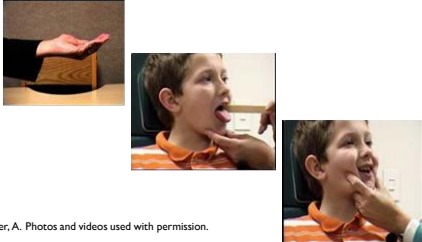
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The Use of Physical Prompts

- Final /ə/ is a continuant, so tongue position needs to be established – this should be corrected first
- Using your hand – demonstrate to the child how the shape of the tongue should be like a boat
- Using a tongue blade, stimulate both sides of the back of the tongue, then stimulate the upper gum ridge near the molars. Tell the child to put these parts together
 - Some children have a hard time pulling tongue back without bringing lips forward, have them bring lips back at the same time in a wide smile
- Assist child with posterior tongue elevation by pushing up under the chin with the middle finger while squeezing the cheeks with the thumb and forefinger
 - Raising the entire back of the tongue results in /ŋ/. Close the child's nose. This will make /ŋ/ impossible to produce.


Kummer, A.

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Kummer, A. Photos and videos used with permission.

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Kummer, A. Photos and videos used with permission.

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Kummer, A. Photos and videos used with permission.

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Tactile Feedback

- Also incorporates the use of rich descriptions and metaphors
- Upper molars are the tracks
- Lateral margins of the tongue are the trains
- Curl the sides of the tongue toward the upper molars
- Instruct child to get the train on the tracks and let the train drive back to the molars
- Contact of the tongue with the molars will provide tactile feedback of tongue position



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**What other facilitating contexts could be targeted in therapy?
Think about what needs to change about the error.**

Facilitating contexts for interdental /s/

Fronting of velars t/k

Stopping of fricatives t/s

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QUESTIONS?

- Correct /ɹ/ production is difficult.
- Most production challenges are related to lip rounding, tongue shape, posture, and position.
- Remember to provide as much information as possible:
 - Rich description
 - Phonetic placement cues – specific cues
 - Facilitating context
 - Physical prompts
 - Auditory model

Coming Soon!
BJOREM
BIG JOY OF R
R Screening B
Box of R
Using biofeedback prompts

Feel free to contact me anytime!
ckoch2@samford.edu

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