Establishing Vocal Communication in Autism Spectrum Disorders

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Learning Objectives:

- Describe three steps in using rapid motor imitation training (RMIA) as a tool to gain first words/ approximations for labels and requests

- State three reasons to consider sign language as a bridge to vocal communication

- Give rationale for teaching approximations of words for kids with ASD who struggle to speak
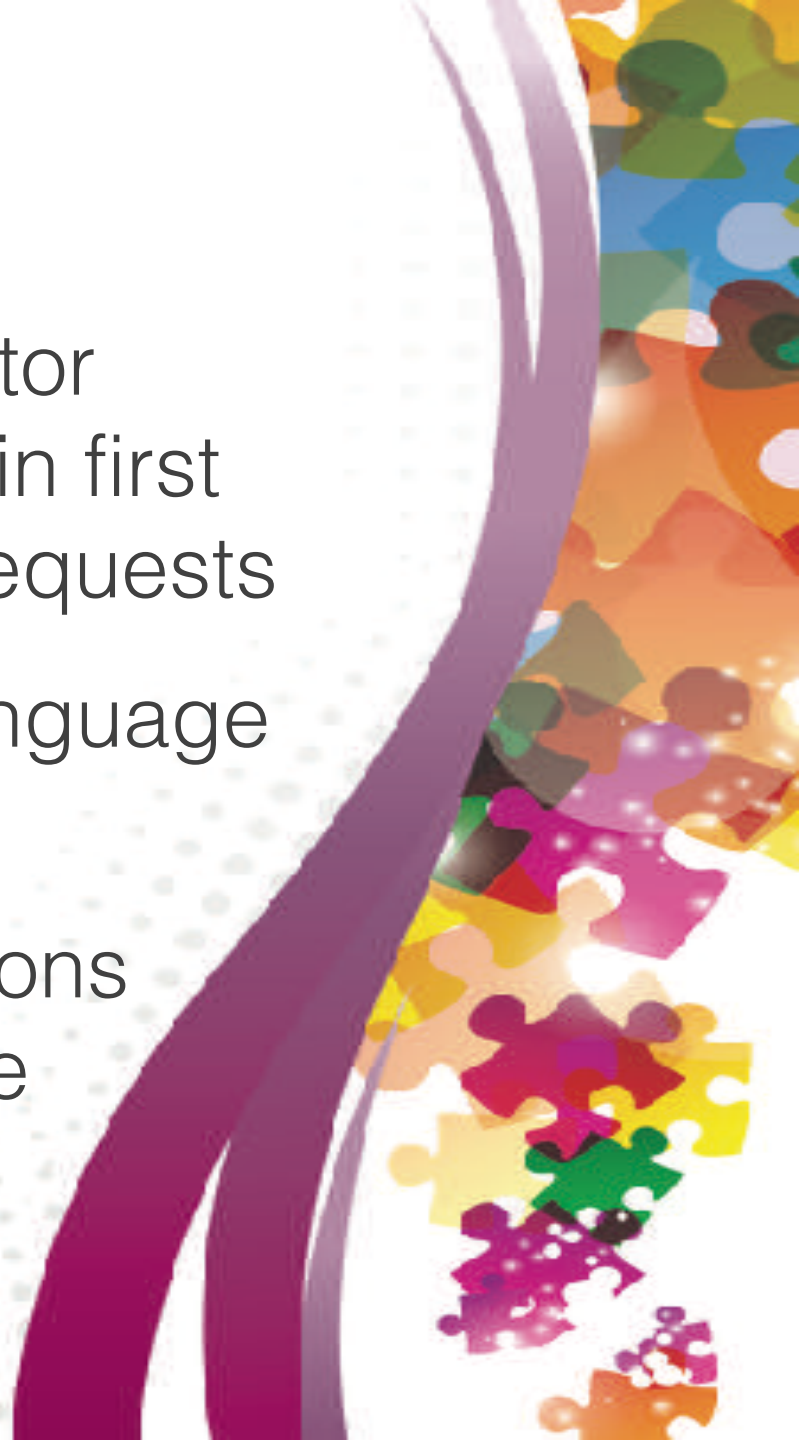
Challenges In Establishing Speech-Motor Skills In ASD:

- It is estimated that approximately 30% of young children with autism spectrum disorders (ASD) do not
gain functional speech (Rogers, 2006)

- Long-term outcomes are poor for individuals with ASD who do not develop functional speech

    (Howlin, 2005; Billstedt, Gillberg & Gillberg, 2007; Picket, Pullara,

    O'Grady, & Gordon, 2009)

- Applied behavior analysis (ABA) provides evidence-based strategies for gaining vocal/verbal skills (Reichow & Wolery, 2009)
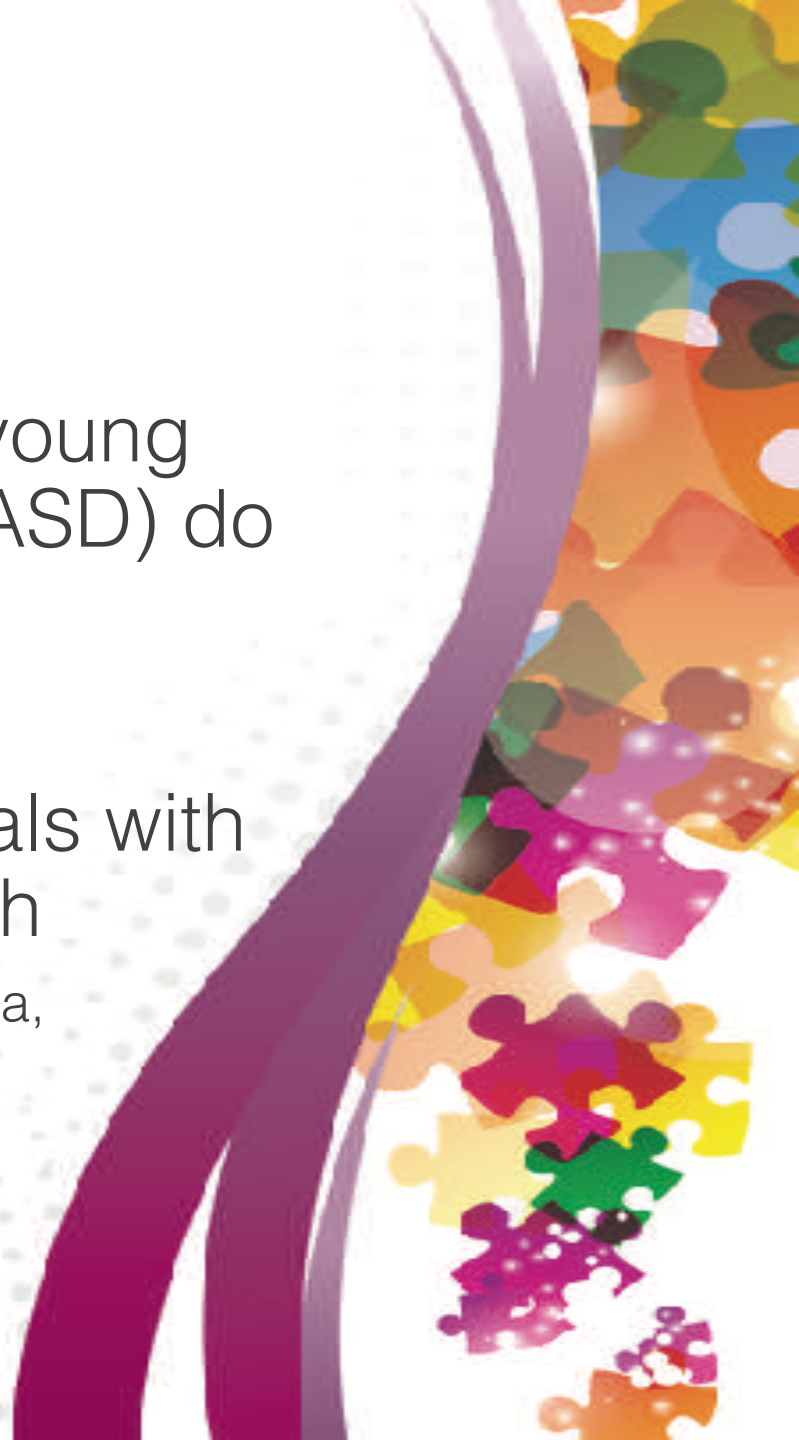
Establishing Vocal/Verbal Skills:

- Vocal imitation is necessary for any approach for establishing vocal/verbal expressive language

- SLPs need to gain vocal imitation, though ASD presents unique challenges

- Challenges with autism include: *difficulty with sitting and attending, motivation, self-stimulatory behaviors, limited receptive language and cognitive functioning*

Establishing Vocal/Verbal Skills:

- Children with ASD often need the intensity of interventions such as ABA (applied behavior analysis) up to 30+ hours weekly

- SLPs may not have opportunity to collaborate with an ABA team

- Strong collaboration between SLP and BCBA is often needed to maximize effective teaching and get best outcomes for vocal/verbal skills

Establishing Vocal/Verbal Skills:

- Best practices for CAS (childhood apraxia of speech) can be effective for children with ASD who struggle to speak.
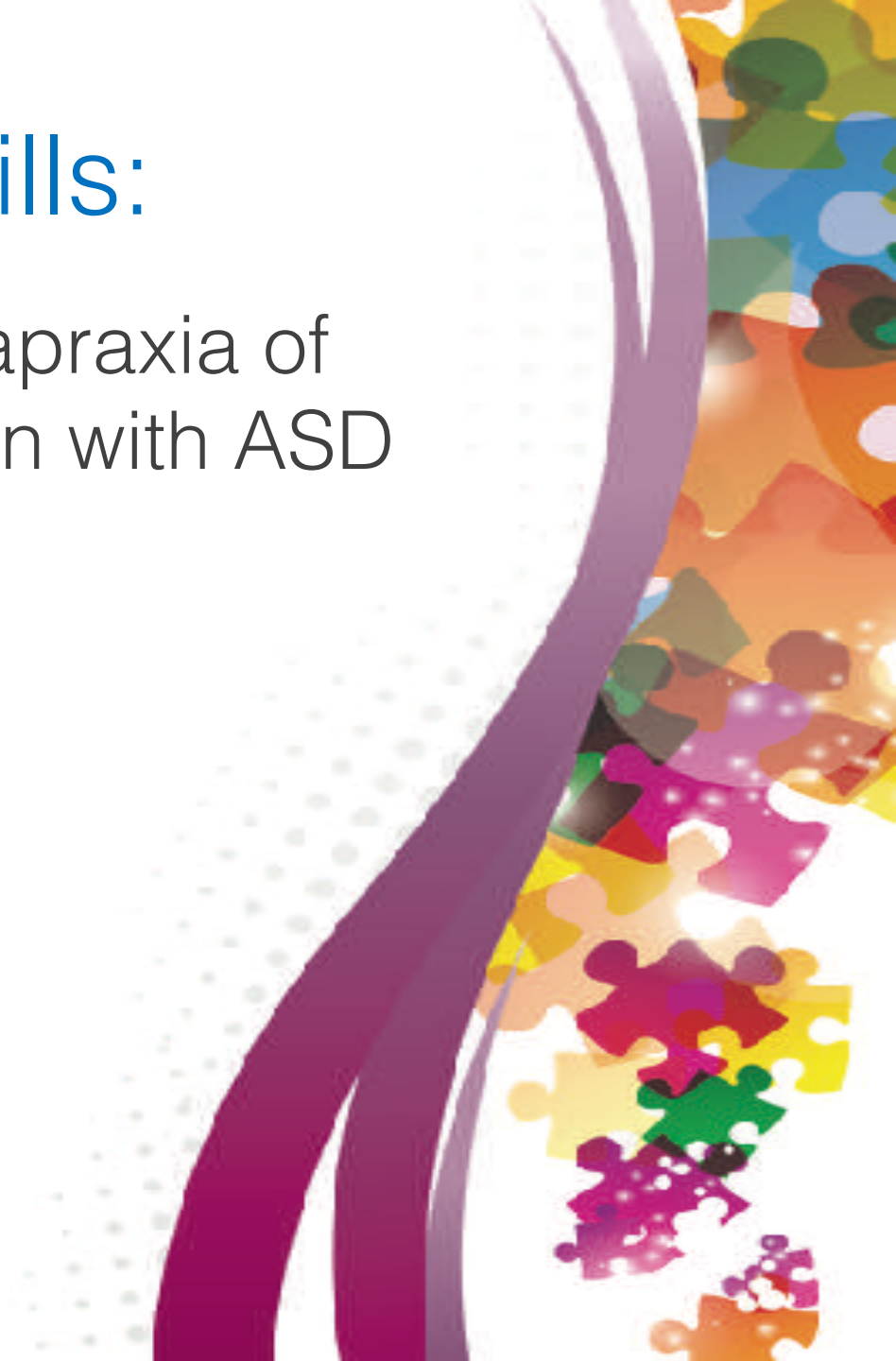
Rapid Motor Imitation Antecedent Training (RMIA)

- Some children do NOT begin to imitate a vocal approximation when they are requesting

- RMIA procedure may increase vocal imitation behavior

- RMIA (research manual) combines expertise of the fields of ABA (applied behavior analysis) and speech pathology

(Tsiouri & Paul 2009)
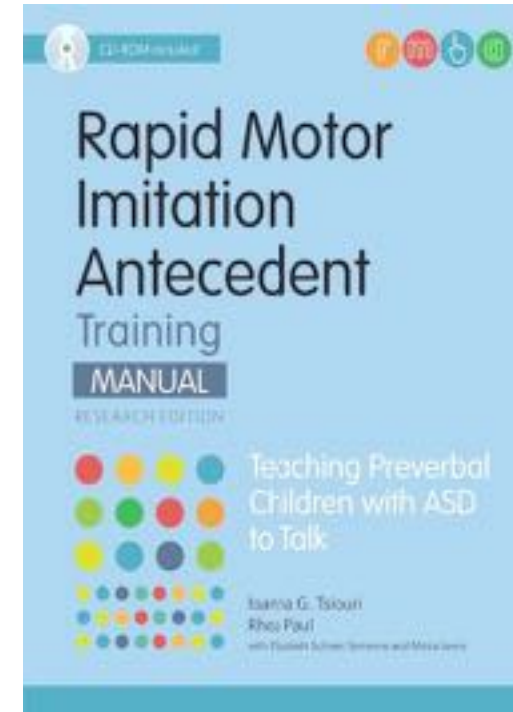
Rapid Motor Imitation Antecedent Training (RMIA)

- Proven effective to help young children develop functional speech (Tsiouri & Paul 2009)

- Intended to be part of a comprehensive intervention program not a "stand alone" treatment

- RMIA relies on quick motor imitations to ensure the child attends to and imitates the adult

- Uses behavioral momentum to get vocal imitation following motor imitation

Rapid Motor Imitation Antecedent Training (RMIA)

- Relationship between motor imitation deficits in young children with ASD has been well established (Rogers, 2006)

- Children with ASD who can imitate the motor behavior of others are more likely to develop speech/language repertoire (Ingersoll, 2008)
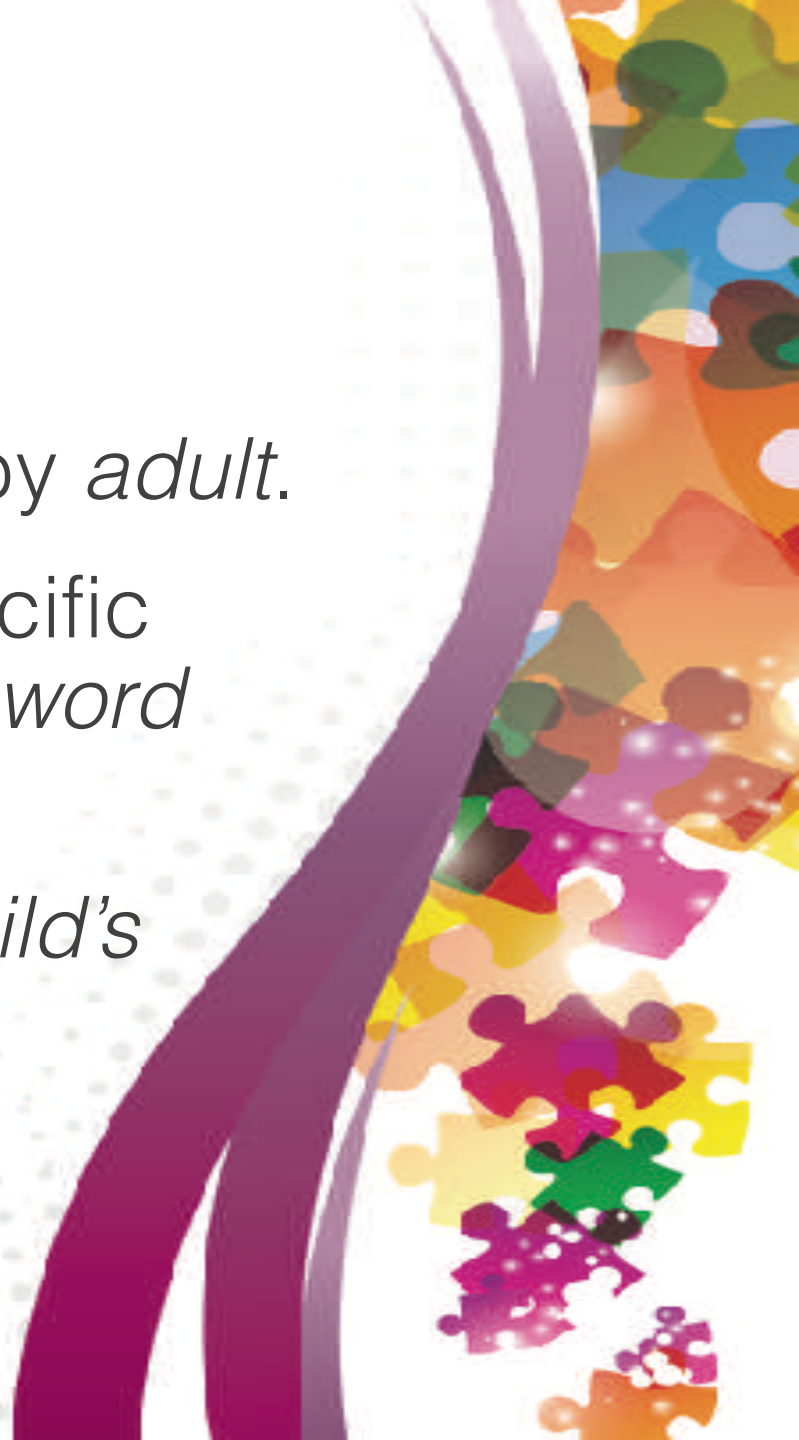
Rapid Motor Imitation Antecedent Training (RMIA)

- Discrete Trial Teaching (DTT) that relies on the principles of applied behavior analysis (ABA)

- Utilizes *motivation, differential reinforcement, shaping, prompting, and fading*

Rapid Motor Imitation Antecedent Training (RMIA)

- Materials are selected and controlled by *adult*.

- Child is *reinforced* for producing a specific vocal response or set of responses as *word approximations.*

- *Reinforcement* is chosen based on *child's* highly-preferred *toy* or *edible*.

Rapid Motor Imitation Antecedent Training (RMIA)

- Reinforcement is provided for performing motor imitation tasks even if the vocal imitation does not occur

- Important to reinforce sitting and imitating the motor behavior of the adult to keep responding steady

- Child only receives the most preferred reinforcer when they produce the target vocal response/word

Before Starting RMIA:

- Observe what consonants, vowels, and combinations the child produces when in play?

- Conduct baseline of child's spontaneous vocalizations (SLP) (Barb Esch, Ph.D., BCBA-D,CCC-SLP, 2018)

- Consider the Target Selection Worksheet

  (Barb Esch, Ph.D., BCBA-D,CCC-SLP, 2018)

Before Starting RMIA:

- Conduct a preference assessment to identify target requests and reinforcers (BCBA)

- Identify at least two "levels" of reinforcement

- Some reinforcers will be used to reinforce child responding to imitation tasks (variety)

- Select highly-preferred item(s) for target word as request (ball = child receives *ball*)

- Select a target word as label (mama = child receives a different known reinforcer when *says mama*)
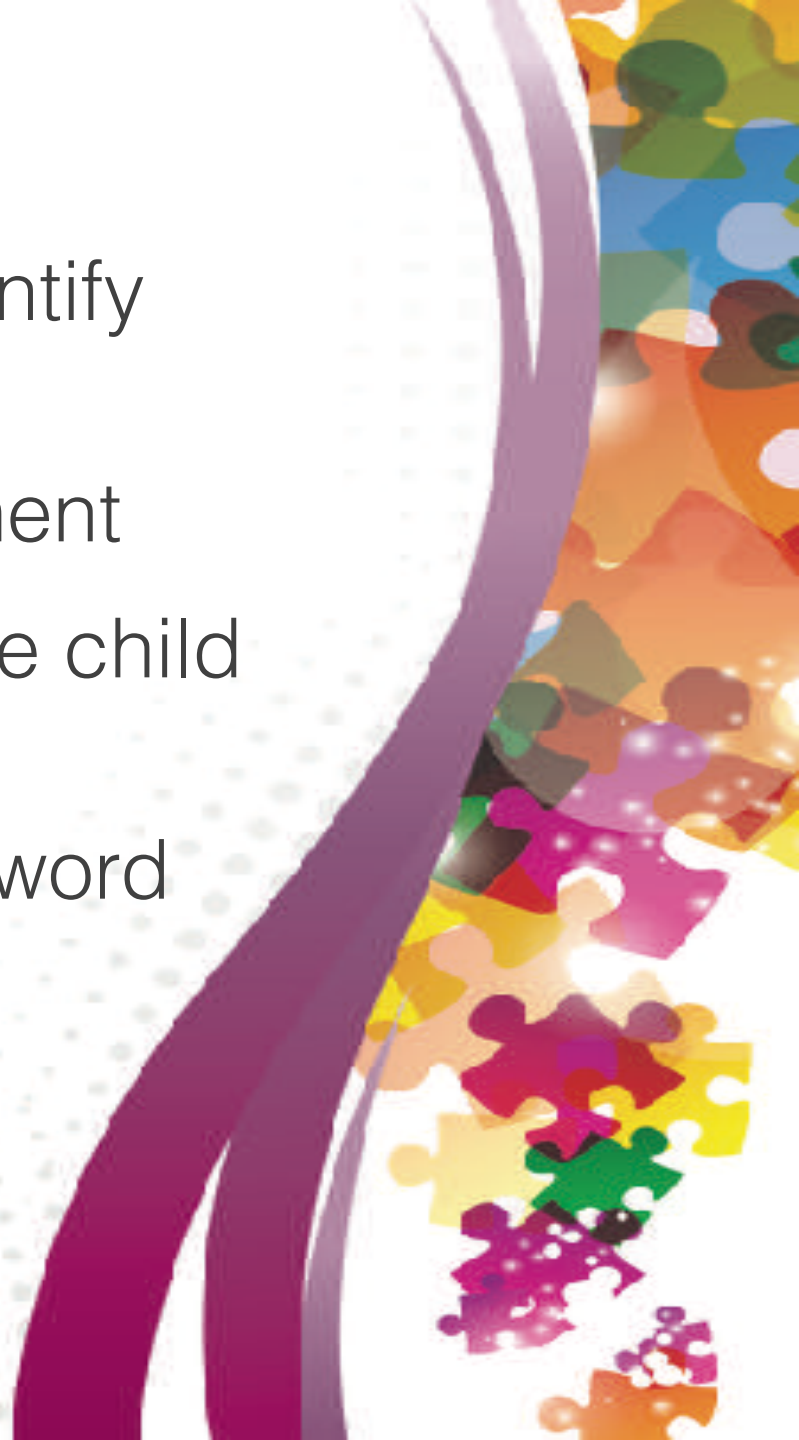
Conduct RMIA Baselines

- Accuracy: Child must imitate 20 motor actions in a row (combined gross and fine) fluently (18/20).

- Fluency: 14 to 18 imitations in 30 seconds without needing reinforcement.

- Child must meet criteria before introducing vocal targets as requests/mands or labels/tacts.

- May be necessary to improve motor imitation skills before beginning
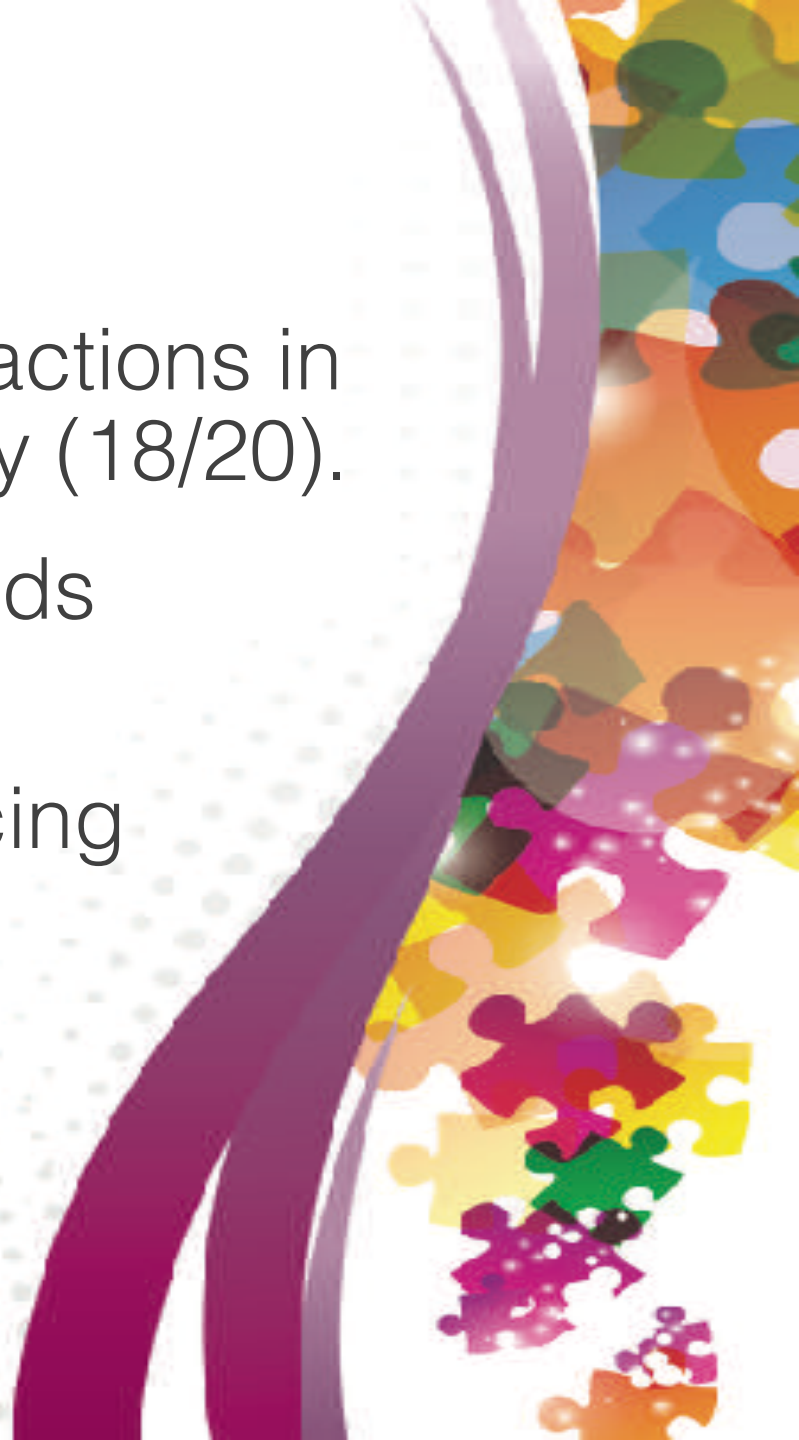
Request/Label Baselines:

- Present 20 opportunities and document the child does not already produce a vocal approximation or word when provided a model to request or label
the target items

- If the child already readily imitates word approximations you may not need this procedure

Selecting First Words To Teach

- Pick one or two items the child is highly motivated to gain to be taught as *requests*

- Item must be something that can be delivered briefly or in small quantities.

Selecting First Words To Teach

- Select simple syllable combinations that are similar to early words (*bubble, ball, cracker*)

- Target response (what will be accepted as successful may include a simpler sound pattern (bubble= *buh buh*) as an approximation
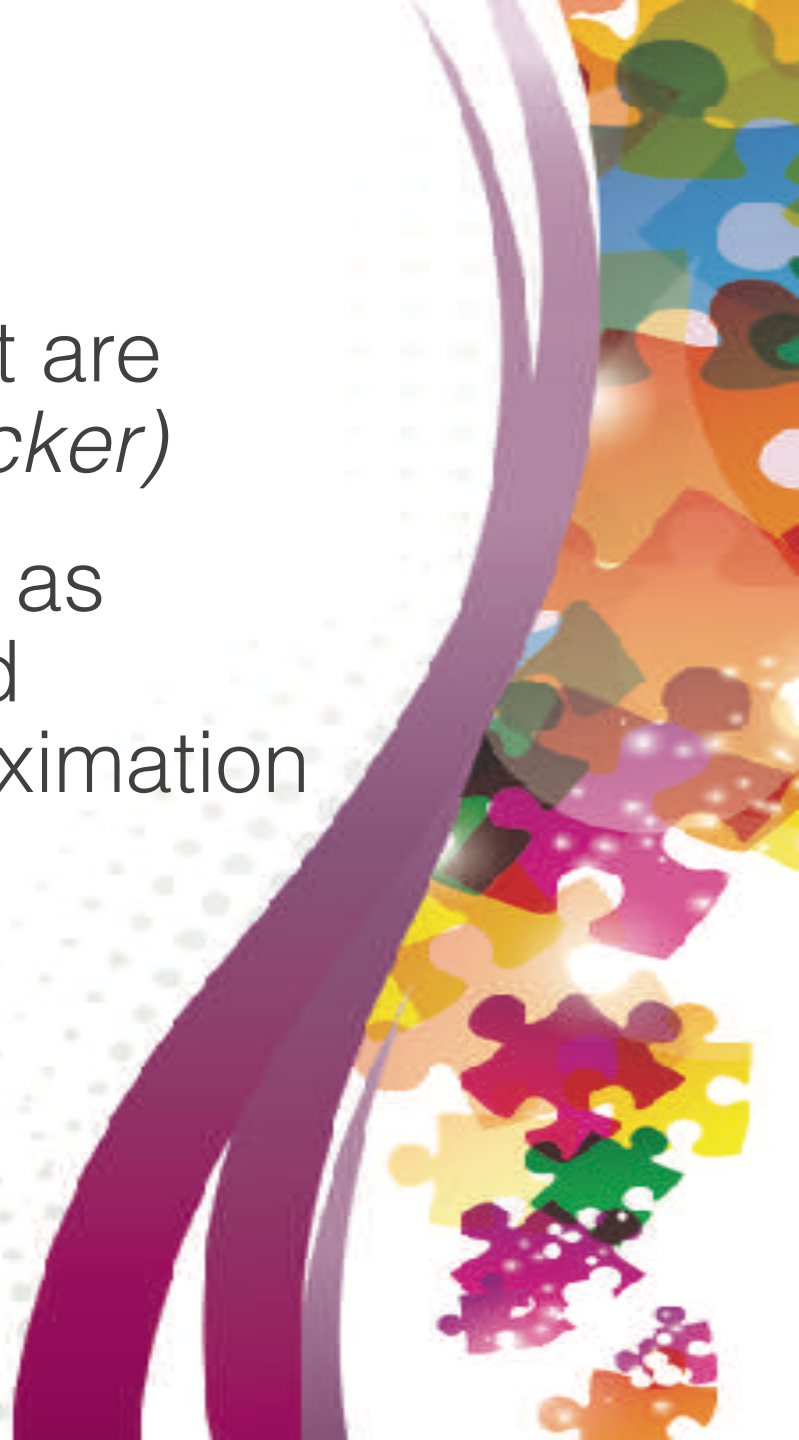
Teaching Procedure: Requests

- Adult must be motivating, pleasant, and have supportive affect when interacting with the child

- Determine what will be accepted as an approximation for the item (cookie = *kuh kuh; kuh kee*) (consider *K&K Sign to Talk* for suggested approximations)

- Say "do this," (until it is not necessary) followed by 6 motor imitation tasks (3 gross, 3 fine motor ending near the face)

- Holds up item and model the word (e.g. *cookie)*

Requesting Trial

6 motor imitation tasks + vocal model

2 errors or no response

1st target response

2nd target response

provide the item immediately reinforcing the vocal behavior

2 errors or no response

5th target response

provide vocal model alone

2 errors or no response

hold item up & wait for spontaneous response

Labeling Trial

6 motor imitation tasks + vocal model

2 errors or no response

1st target response

2nd target response

provide reinforcer (not requesting trial target)

2 errors or no response

provide vocal model alone

5th target response

2 errors or no response

hold item up & wait for spontaneous response
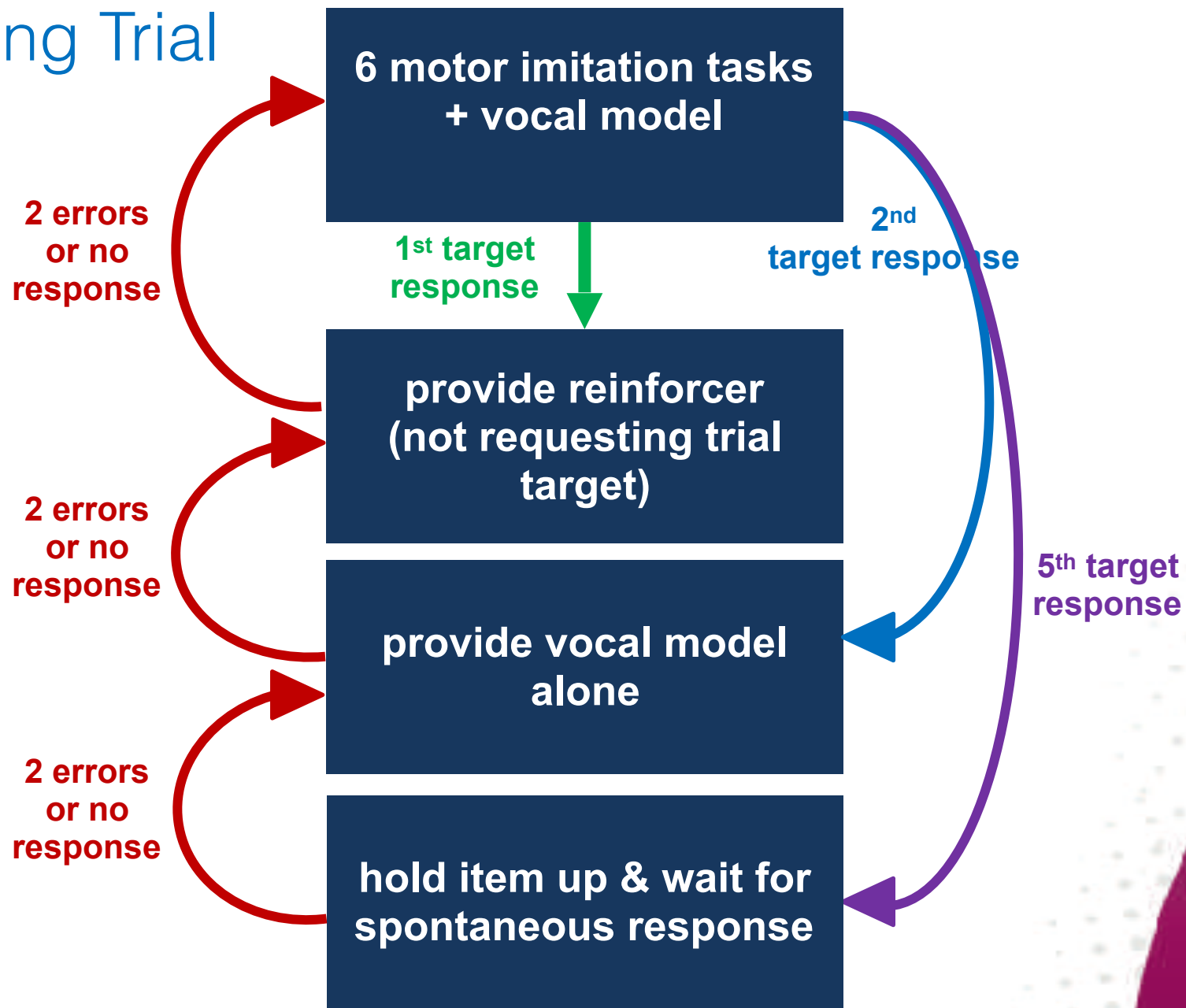
RMIA : Sample Target

RMIA request: COOKIE
Accepted approximations: /kuh kuh/ /kuh kee/ (no single syllables accepted)

cookies
ku-kē
kē-kē
ku-ē
tu-tē
tu-ē
tu-tu
u*-ē

*u as in oat
Use "t" for "k" if child can't produce "k".
If child can say cookie, add "z" to make plural,
use "s" for "z" if the child can't produce "z".

cookie

cookies: fingertips of right C-hand touch
left palm up open hand and twist in the
shape of a cookie on a plate.

Teaching Requests: RMIA Data Set

	MI	ERw	ERwo	R		MI	ERw	ERwo	R	L
1.	+	-			1.	+				
2.	+	+			2.	+				
3.		+			3.			+		
4.			+		4.			+		
5.			-		5.			+		
6.			-		6.			+		
7.		+			7.			+		
8.		+			8.				-	
9.			+		9.				+	
10			+		10				+	
11			+		11				+	
12			+		12				+	
13			+		13				+	
14				-	14				+	
15				-	15				+	

Considerations for Teaching Requests

- Child may be more motivated to vocalize to gain a preferred item.

- However, frustration levels may be higher as they are NOT going to gain access to items unless they produce the target response

- Important: When teaching *requests* avoid items child already can ask for another way (*sign*)
as you will only be giving the item if they produce the target vocal approximation

RMIA Considerations for Teaching Requests

- When teaching requests, limit child's access to the items 24 hours prior to teaching (establish motivation)

- Clearly determine what will be accepted/ reinforced ahead of time for each target

- The child will be reinforced with the item itself so be sure to have small amounts that can be controlled by the adult

Generalizing Requests & Labels

- Once child has 5-10 words to request or label they likely can learn words in a less structured format

- Requests and Labels must be moved to the natural environment

- Careful attention must be given to be certain child produces the correct word for the correct items

- Maintenance and generalization data are always necessary
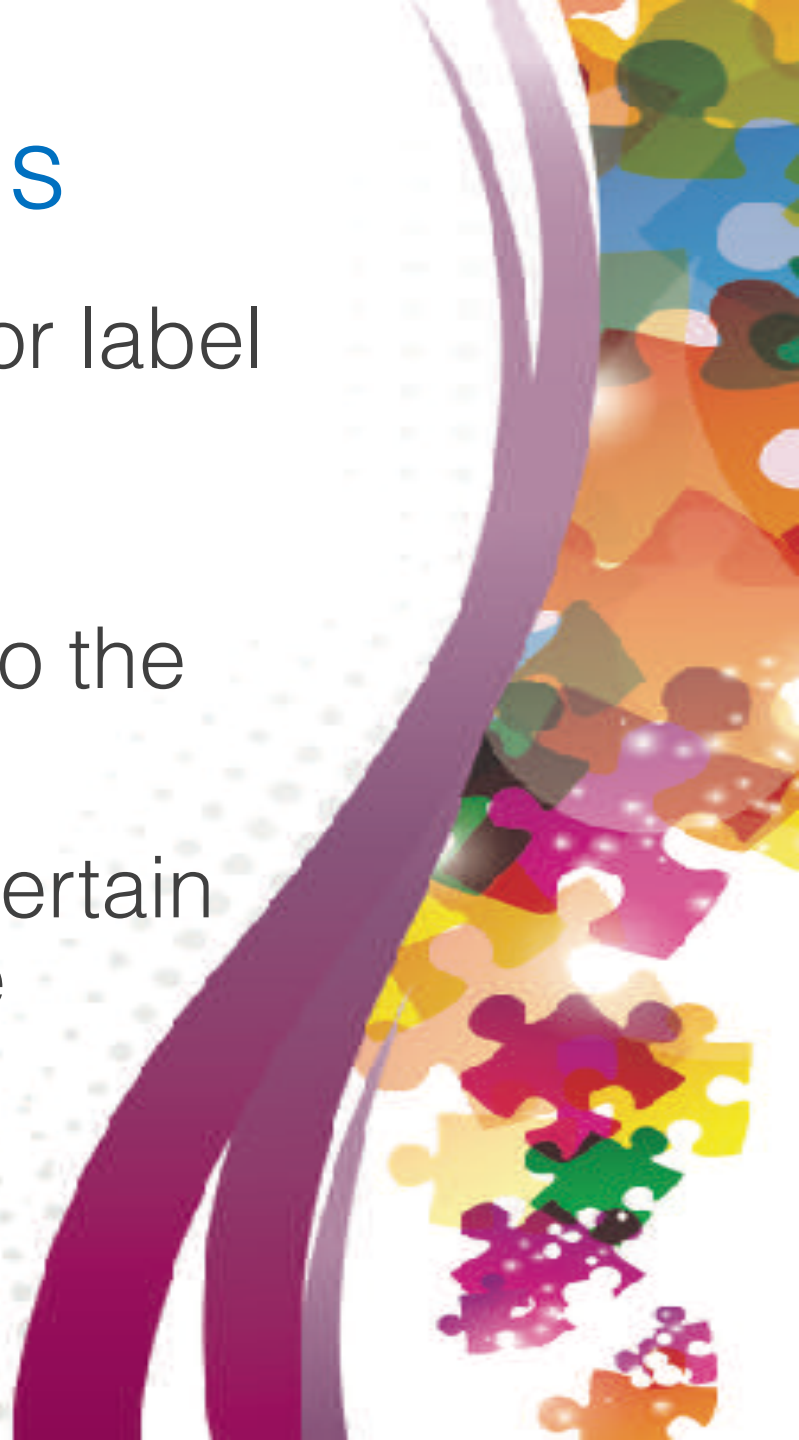
Sign Language as a Bridge to Vocal Skills

- When children are not yet vocal imitators, we can teach sign language as a bridge to vocal communication

- Signs are intended to be temporary as the child gains other skills to support vocal imitation (echoic)

- Evidence that sign language enhances the use of speech for some children with ASD

  (National Academy of Sciences Educating Children with Autism, 2001,

  Millar, Light, & Schlosser, 2006, Schlosser & Wendt, 2008)

Sign Language as a Bridge to Vocal Skills

- *"Research on manual sign and gestures for children with autism reveals strong intervention effectiveness …as well as related outcomes for…speech production"* (Schlosser & Wendt, 2008)

- *"Signs offer the individual the ability to communicate in a manner that is more like speech than other modalities"* (Shillingsburg, 2011)
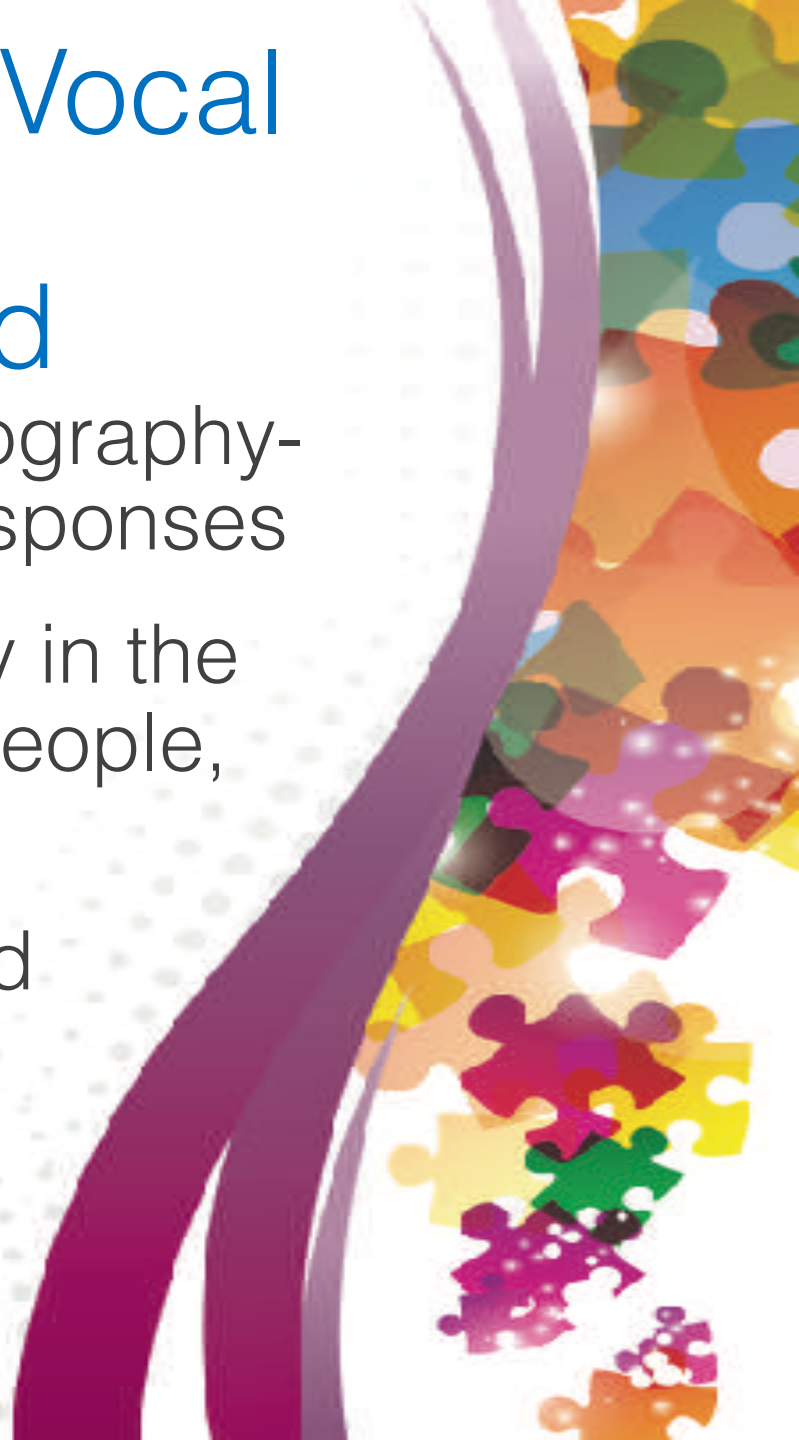
Sign Language as a Bridge to Vocal Skills:
Selection vs Topography Based

- Speech and sign language are both topography-based responses vs. selection-based responses

- When requesting using sign, child is truly in the speaker role (initiating requests across people, settings, without materials needed)

- When requesting using a selection-based method, the child depends on a set of stimuli from which to "select" that have been provided by another person

Sign Language as a Bridge to Vocal Skills:
Benefits of Sign Language

- Signs are portable, not requiring materials to be carried by a young child that may become a distraction

- Vocabulary and opportunity to communicate is never controlled by another or by the presence of other stimuli being present

"apple"

Sign Language as a Bridge to Vocal Skills:
Verbal Behavior Perspective

- Signs offer the individual the ability to communicate in a manner that is more like speech than other modalities

  (Shillingsburg, 2011)

- Signs have no limitations in establishing a full verbal behavior repertoire

- Selection-based systems have some limitations to establishing a complete verbal behavior repertoire

Sign Language as a Bridge to Vocal Skills:
Verbal Behavior Perspective

- ABA/Verbal Behavior approach emphasizes the need to teach across functions (Skinner, B.F. 1957)

- Verbal Behavior does not mean speech
  (can be verbal or non-verbal)

- Meaning of a "word" is rooted in its function/purpose

- Evoked from a speaker under differing motivations

- Shaped and maintained by different consequences

Sign Language as a Bridge to Vocal Skills:
Verbal Behavior/Verbal Operants

- Echoic (repeating speech with similarity)

- Mand (requests to gain preferred items, activities, attention or access to information)

- Tact (label/describe something about a stimulus)

- Intraverbal (answering questions/ conversations)

- *Most verbal behavior is multiply-controlled

- *(Michael J. 2011)
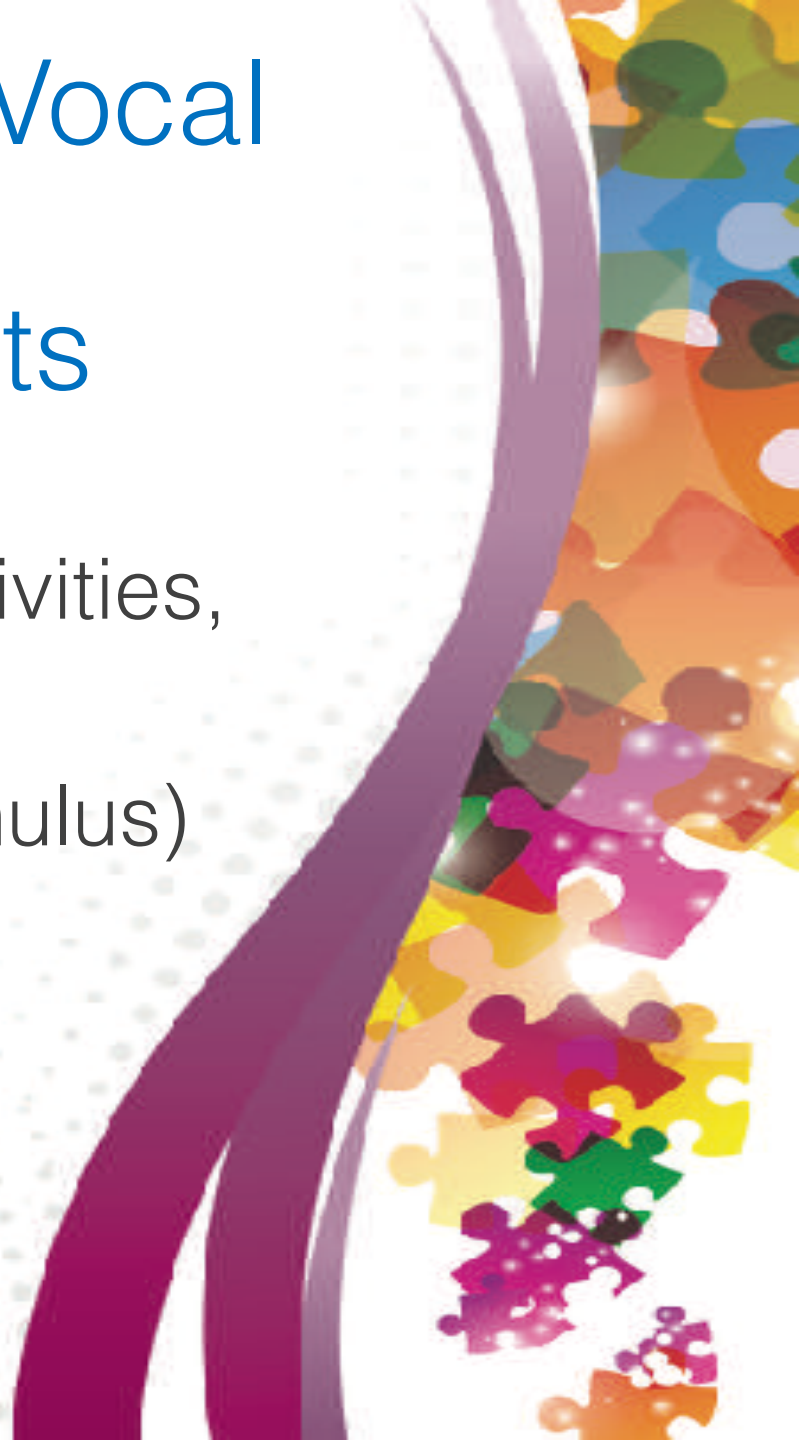
Verbal Operants

Verbal Operant	Antecedent	Behavior	Consequence
Mand	Motivative Operation (wants cookie)	Verbal behavior (says "cookie")	Direct reinforcement (gets cookie)
Tact	Sensory Stimuli (sees or smells cookie)	Verbal behavior (says "cookie")	Non-specific reinforcement (gets praised, for instance)
Intraverbal	Verbal stimulus (someone says:"What do you eat?"	Verbal behavior (says "cookie")	Non-specific reinforcement (gets praised, for instance)
Echoic	Verbal Stimulus (someone says "cookie")	Verbal behavior: repeats all or part of antecedent (says "cookie")	Non-specific reinforcement (gets praised, for instance)
Receptive (actually not a verbal operant)	Verbal stimulus (someone says "touch cooke")*	Non-verbal behavior (child touches cookie)	Non-specific reinforcement (gets praised, for instance)

Sign Language as a Bridge to Vocal Skills:
Tact/Labeling

- Signs allow child to label (tact) common items in a way picture/selection-based responses do not

- Showing a child a *ball* and asking *"what is this"*

- If child scans an array and selects an icon/ symbol or picture of a *ball*

- Child is completing in a non-identical *match to sample task (3D to 2D)*

Sign Language as a Bridge to Vocal Skills: Intraverbal

- Signs allow child to fill-in phrases or answer questions about features or function of common items

- *"You sleep in (signs bed)"*
  "What has a beak (signs bird)"

- Signs allow the child to answer questions regarding features, function, class without relying on stimulus items from which to select
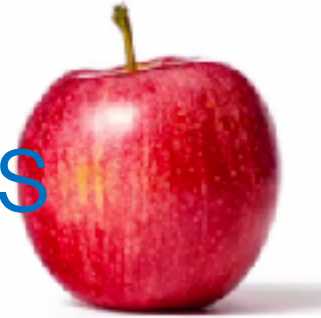
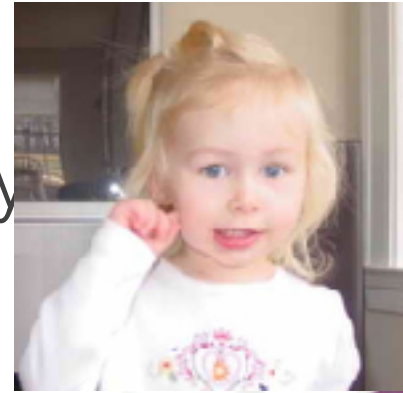# Sign Language as a Bridge to Vocal Skills: Requesting

- Focus is initially on the requesting repertoire as it directly benefits the child (socially-significant)

- Reduces the need for challenging behavior to gain items they want/need

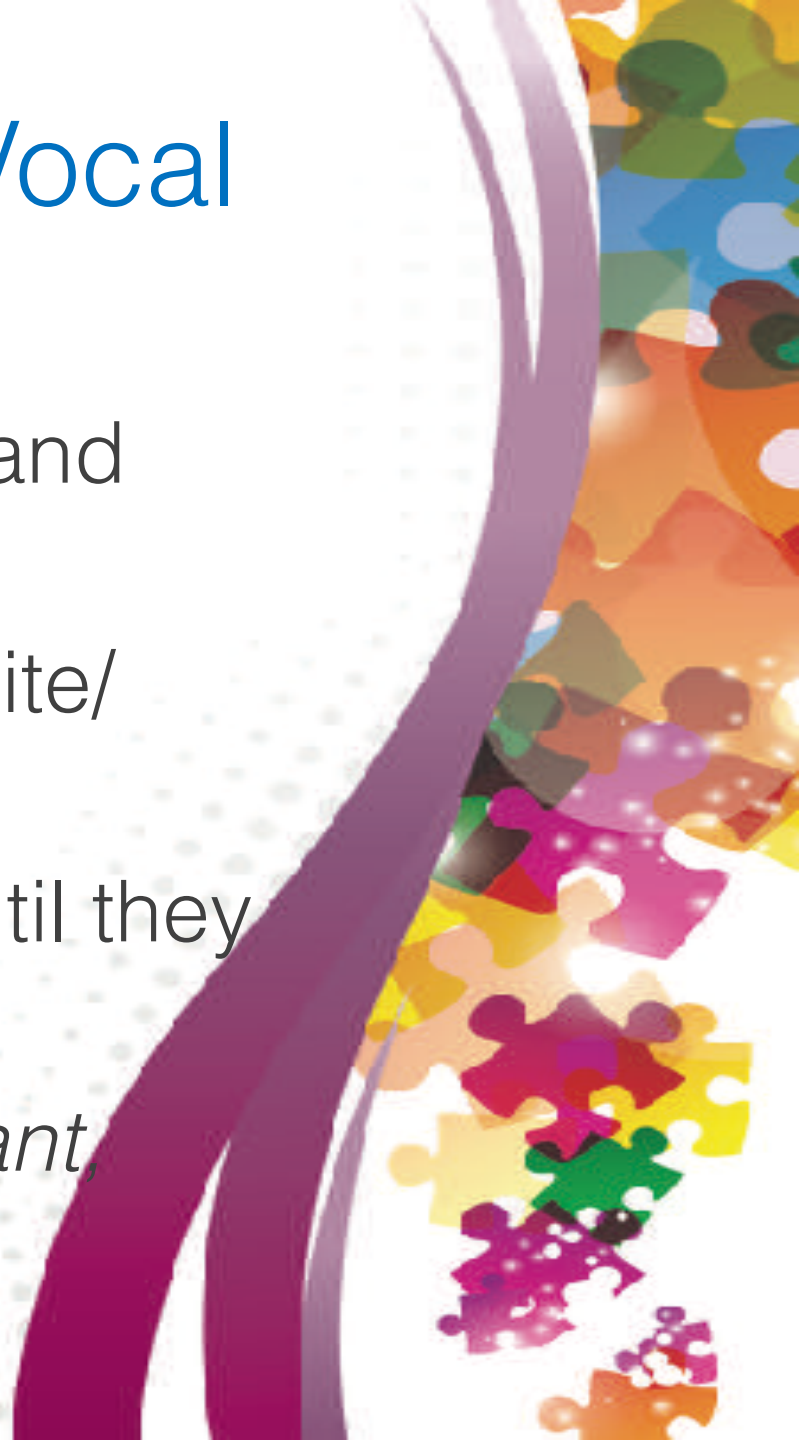# Sign Language as a Bridge to Vocal Skills: Teaching Requests

- The most effective way to teach signs is while the child is actually motivated to obtain an item or to engage in an activity.

- Teaching signs takes place in the natural environment during activities of daily living and during structured sessions with the child's favorite items.

- The first signs taught are items the child would ask for if they could.

Sign Language as a Bridge to Vocal Skills: Requesting

- *Sign to Talk* program requires specific and intensive teaching techniques.

- Teach child to sign in order to get favorite/ needed items.

- Avoid general verbs like *eat* or *drink* until they can be combined with existing nouns

- Avoid teaching signs such as *more, want, please, help*

Sign Language as a Bridge to Vocal Skills: Requesting

- If taught these signs first they have little need to expand their vocabulary; and will not be able to initiate specific requests (Kasper & Kaufman, 2005)

- Strong push to start with core vocabulary for first words

- Teaching core vocabulary first to people with little-to-no established verbal behavior has no conceptual backing in any kind of evidence-based scientific principles.

(Dower & Lindblad, 2018)

Sign Language as a Bridge to Vocal Skills: Requesting

- Consider waiting to teach core vocabulary until the child has established means to ask for and label items that are most important to him/her

  (Wendt & Weber, ASHA 2018)

- Avoid first signs that are classes/categories (e.g., food, toy, animal)

- Choose signs that are not too similar to each other (*until motor imitation skills improve)

Sign Language as a Bridge to Vocal Skills: Requesting

- *Be careful to choose the word that best matches the item (i.e., teach sign for *cracker* NOT *fish* for "fish cracker")

- Select two to three highly-preferred items that can be limited and controlled by adult

Sign Language as a Bridge to Vocal Skills: Requesting

- When child shows motivation for an item, shape child's hands to make the sign (physical prompt) deliver preferred item right away

- Child is prompted to produce the sign the same way every time to establish the motor plan for each sign

- Shaping the best topography of the sign is important so sign can be distinguished from others
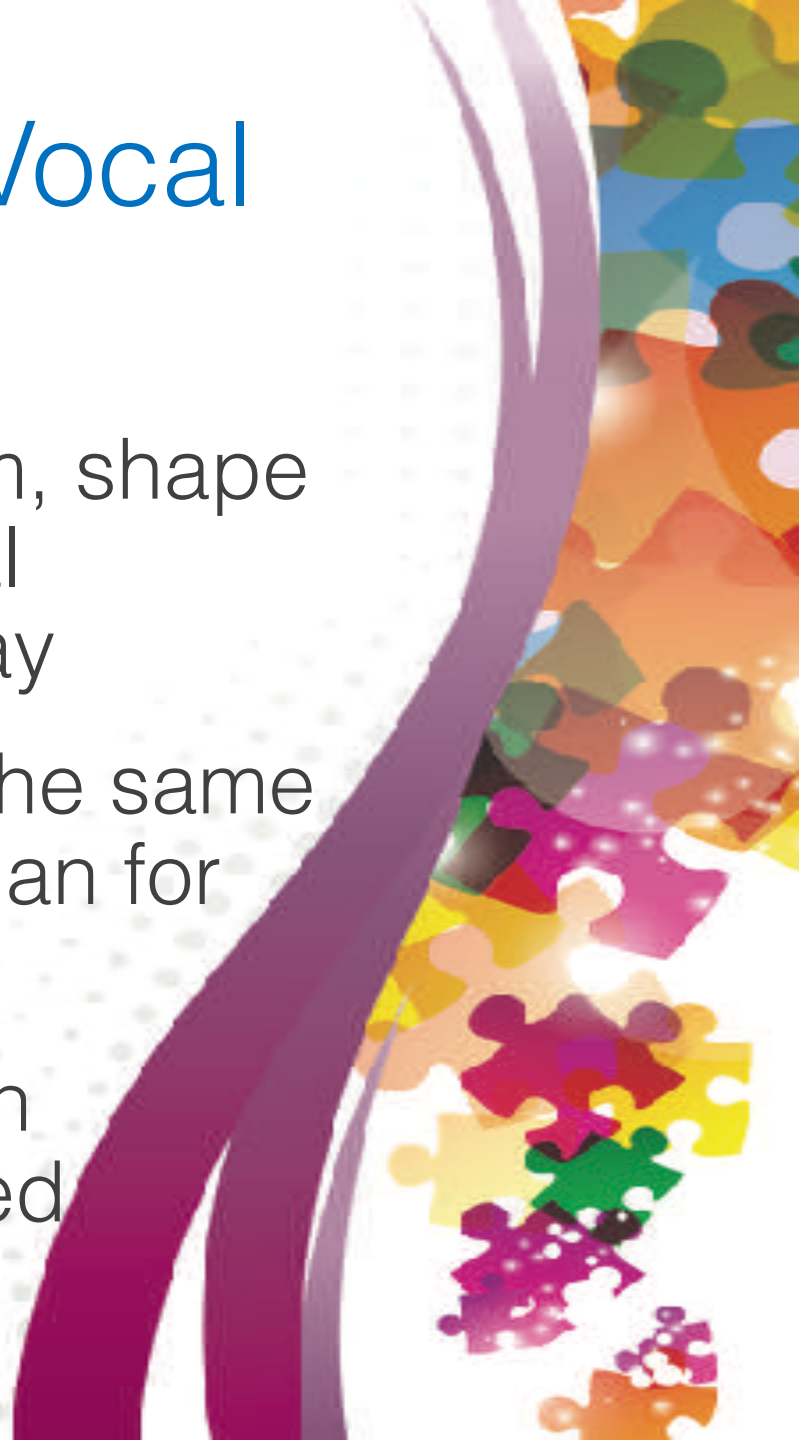
Sign Language as a Bridge to Vocal Skills: Requesting

- Once the child can imitate the sign with good similarity to the model, the physical prompt is eliminated

- Physical prompts are faded very quickly to model/gesture prompts

- Adult always models the sign as a mirror of what the child would do

- Fading prompts quickly helps to avoid prompt dependency

Sign Language as a Bridge to Vocal Skills: James

- Received Early On services 16 months to 3 years
- ASD diagnosis age 2:6
- One semester in an ECSE class half days
- Began ABA therapy (in another program) at 3:6
- Hospital-based speech therapy concurrent with ABA in a play-based format Was taught PECS and then given an AAC at age 5:0

Sign Language as a Bridge to Vocal Skills: James

- Came to Kaufman Center for speech evaluation and had almost no vowels, consonants or combinations under direct vocal imitation

- Demonstrated fairly good motor imitation skills

- Began speech therapy with an emphasis on *Sign to Talk* procedures while on ABA waiting list

- Transferred to KCC's ABA Program at age 5 years, 6 months

Sign Language as a Bridge: Teaching Signs to Label Items

- Once child has a sign to request an item they are then taught to label/name items when shown a picture of it

- The child produces the sign not to get an item but to show they know what it is called

- The child is taught to label/name familiar and important items they encounter throughout the day (e.g.,*shoe, mom, dad)*
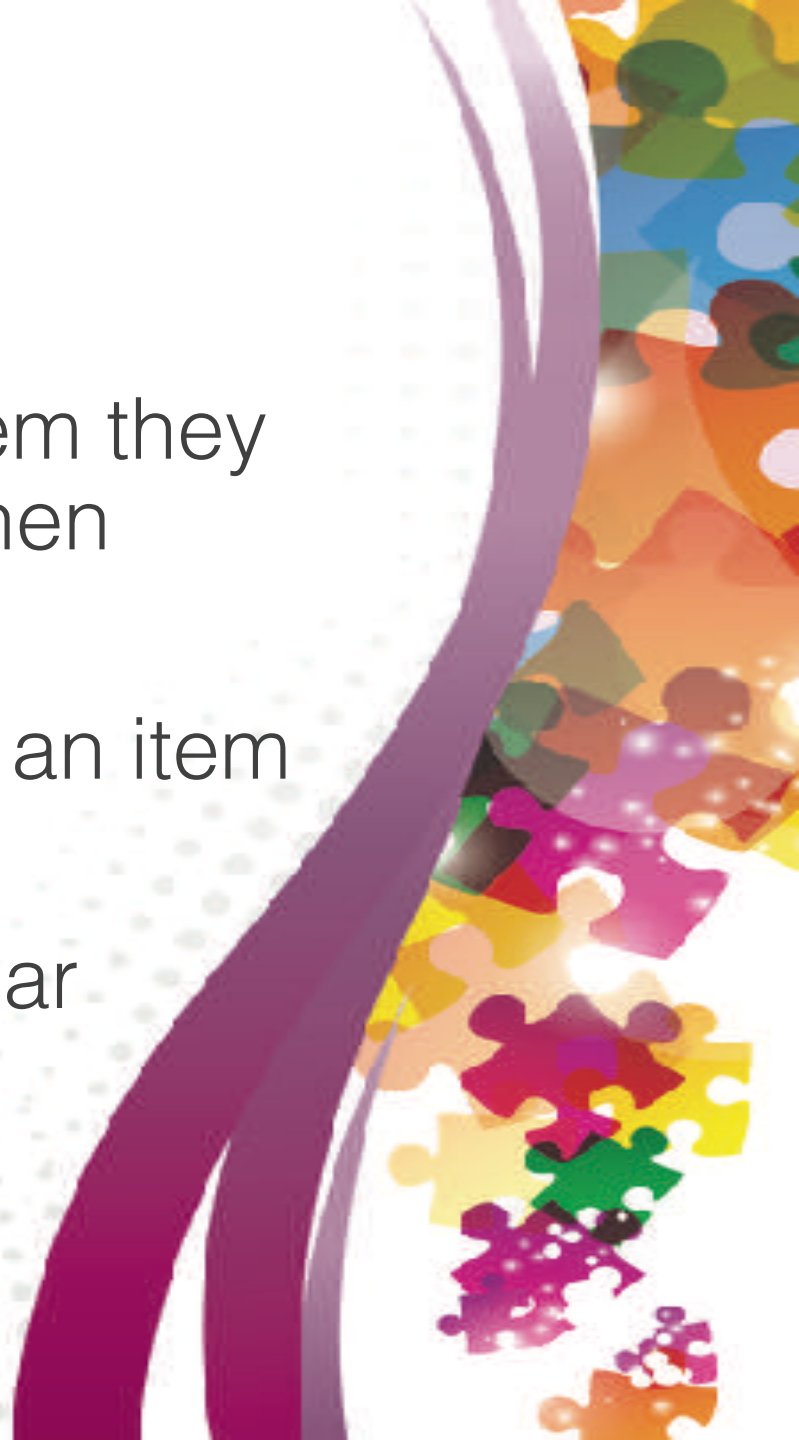
Teaching Signs May Fail if:

- First signs taught are not *REQUESTS*
- Signs selected are too general *(eat, more, please)*
- Not enough teaching opportunities
- Trying to teach signs when there is no motivation for the item
- Signs being taught are too complex
- Failure to create a signing community
- Prompting and Fading Procedures are lax

Common Challenges/Errors When Teaching Signs

- Child overgeneralizing one sign across several items/activities

- Child scrolling through more than one sign

- Child only requesting item in one location/ setting (i.e., does not ask for crackers other than at table)

- Child not transferring signs to labels
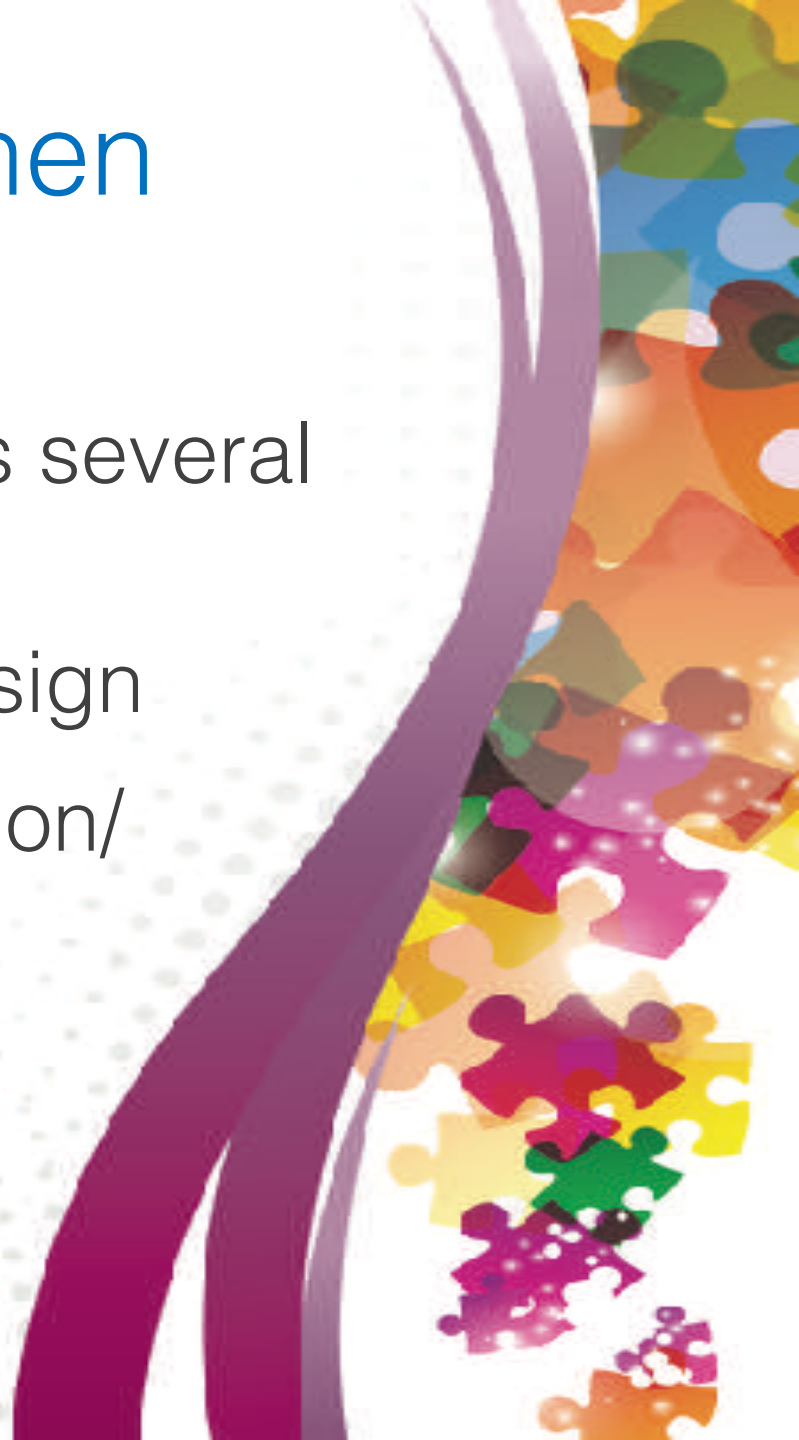
Sign Language as a Bridge to Vocal Skills: Bill

- Early On services from age 2 year, 1 months
- Early On recommended ASD diagnosis and intensive ABA services
- ASD diagnosis 2 years, 4 months
- No functional communication skills
- ABA Kaufman Children's Center half-days 2 years, 5 months
- Full-day ABA 2 years, 10 months
- No receptive or expressive language, no motor imitation

Sign Language as a Bridge to Vocal Skills: Bill

- ABA program focused on *Sign to Talk* teaching signs as requests within the natural environment

- First signs taught included: *book, swing, push, cracker*

- Motor imitation skills were worked on within sign/mand training and

Procedures for Generalization: Request Between Two Preferred Items

- Have two preferred items present

- Determine which item child has motivation for FIRST

- They will typically reach toward or look at desired item)

- WAIT 2-3 seconds to be sure they spontaneously produce the sign for the item they want

- Deliver the item

Requesting Between Two Preferred Items: Correspondence Checks

- Two or more preferred items present

- Child produces a sign for one

- Say the word for the item (*"cracker"*)

- Say "take it" and move all items within reach
of the child

- Make sure they take the item they signed

Error Correction Procedure

- When the child makes an error

- Re-set hands to "neutral position"

- Provide least intrusive prompt that will evoke the correct sign from the child

- Once child produces the correct sign independently have them put "hands down"

- WAIT 1-2 seconds for them to produce sign spontaneously

- *Deliver a small amount of the item*

Error Correction Procedure

- Spontaneous correct requests get better reinforcement = more of the item than if the child has to be prompted or corrected

- Behavior analysis and understanding principles of *motivation, reinforcement, stimulus control* and *differential reinforcement* are extremely helpful for shaping signs for successful communication

Sign Language as a Bridge to Vocal Skills: Prompt Delay +Echoic = Vocalizations

- Once the child readily accurately requests preferred item using sign

- Adult delays the delivery of the item for 5 seconds while modeling the word (delay prompt)

- Child may vocalize when sign alone does not result in gaining the item

- Adult reinforces vocalization paired with the sign

- Differential reinforcement and shaping are used to gain vocal approximations

Prompt Delay and Echoic
Prompting Procedures

MO----------Sign Response---------Reinforce

ONCE RESPONSE IS STRONG
DO THE FOLLOWING

MO--------Sign Response ---(5 sec Delay)--- **Vocalization**---Reinforce

OR

MO-------Sign Response ---(5 Sec Delay)---**NR**--(Echoic Prompt)--- **Vocalization**--Reinforce

OR

MO--Sign Response ---(5 Sec Delay)--- **NR**-- (Echoic Prompt)---**NR**-----Small
Reinforcer

Sign Language as a Bridge to Vocal Skills: Classifying Child's Vocal Responses

- Speech Sound = one vocal production containing at least one phoneme (may include one in the adult form of the word) *duh* or *mah* for marble

- Word Approximation=vocal production containing at least two phonemes included in the adult form of the word, and emitted more than once during a single requesting session *muh buh* for marble

Sign Language as a Bridge to Vocal Skills: Classifying Child's Vocal Responses

- Intelligible Word= Word that is understood by an unfamiliar listener but may not have all the phonemes of the adult from of the word e.g., *mar-boh* =marble

- Adult Form= Word contains all the phonemes (accurately produced) of the adult form of the word

- (Carbone, V. 2012)

Skills:
AAC methods effect on vocalizations ASD

- Schlosser and Wendt 2008 Systematic Review

- Identified only 9 rigorously-controlled single-subject studies of vocal production with AAC treatment

- 5 studies included (PECS) ; 2 subjects demonstrated improved vocalizations

- 1 study included sign; significantly improved vocalizations

- 3 studies included SGD; 1 showing some improved vocalizations

Sign Language as a Bridge to Vocal Skills: Lee

- Early On services at 2 years
- SLP stated possible apraxia but no autism concern
- Nancy Kaufman, SLP for speech evaluation for apraxia 2 years, 1 month
- Recommends ruling out ASD due to "red flags"
- ASD diagnosis confirmed at age 2 years, 3 months
- Begins ABA therapy at Kaufman Center at 2 years, 8 months

Sign Language as a Bridge to Vocal Skills: Lee

- *Sign to Talk* emphasis on teaching signs as requests within ABA sessions

- Motor Imitation a priority for teaching

- No words, word approximations or speech/ vocal imitation for vowels, consonants or simple syllables, significant groping noted

- Learned signs quickly to request and label

- Demonstrated significant receptive/ expressive gap

Sign Language as a Bridge to Vocal Skills

- SLP may probe/test direct imitation of vowels and consonants and simple syllable shapes (echoic baseline)

- Early Echoic Skills Assessment (Esch, 2009)

- SLP can begin to work separately on ways to increase child's awareness of and ability to imitate oral postures (lips together, open mouth, etc.)
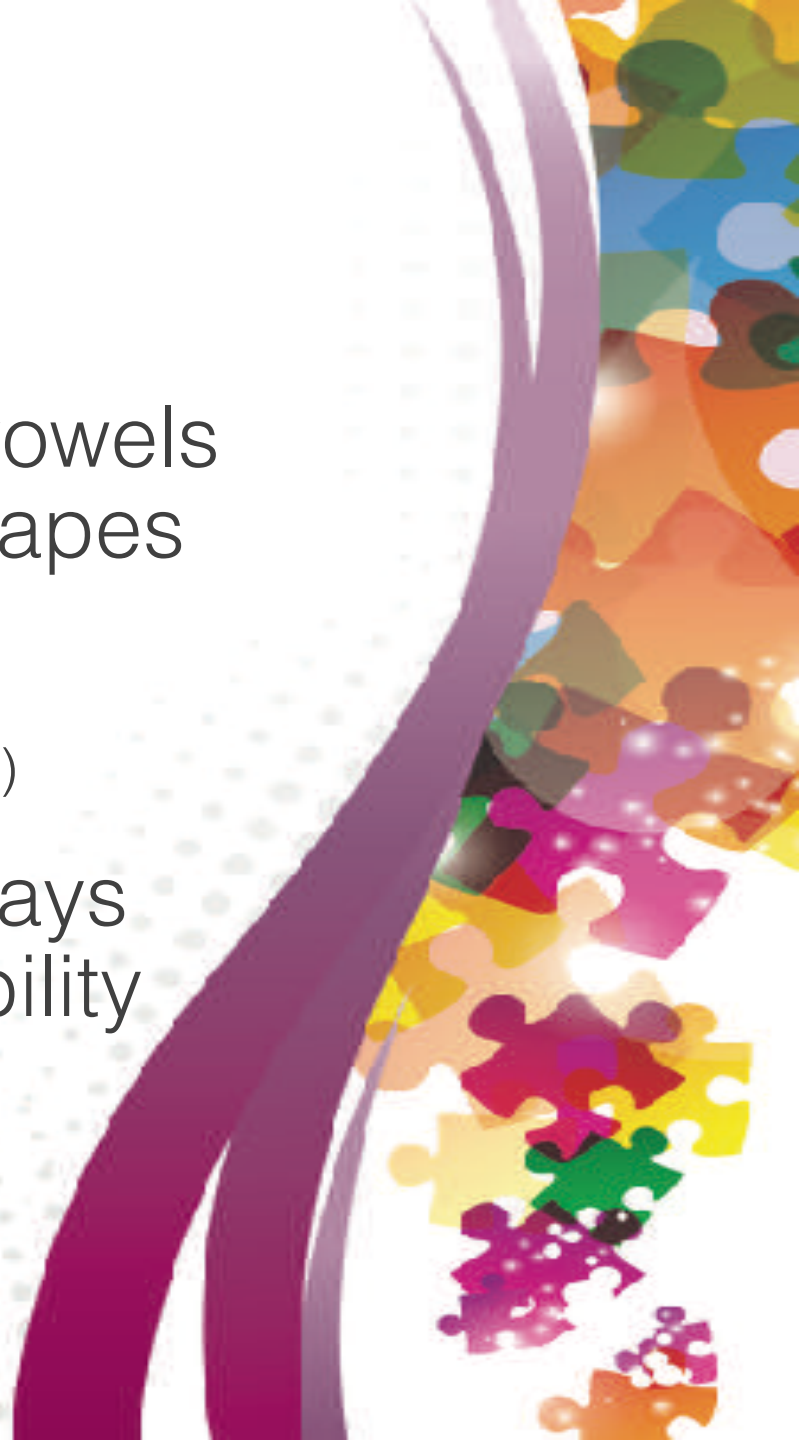
Sign Language as a Bridge to Vocal Skills

- SLP may use tactile/sensory cues to gain those initial sounds

- SLP will use visual or hand cues that evoke the target sound/sounds

- As soon as the child has any sound/syllable or word approximation, sign alone no longer is accepted/reinforced across both requesting and labeling tasks

Sign Language as a Bridge to Vocal Skills: Gaining Vocal/Speech Imitation

- Strategies that are effective for kids with CAS are also effective for kids with ASD

- Child must be able to sit, attend, understand imitation, tolerate demands before receiving reinforcement

- Those with some receptive language skills will respond better and respond to directions as cues (lips together, open mouth, tongue up)
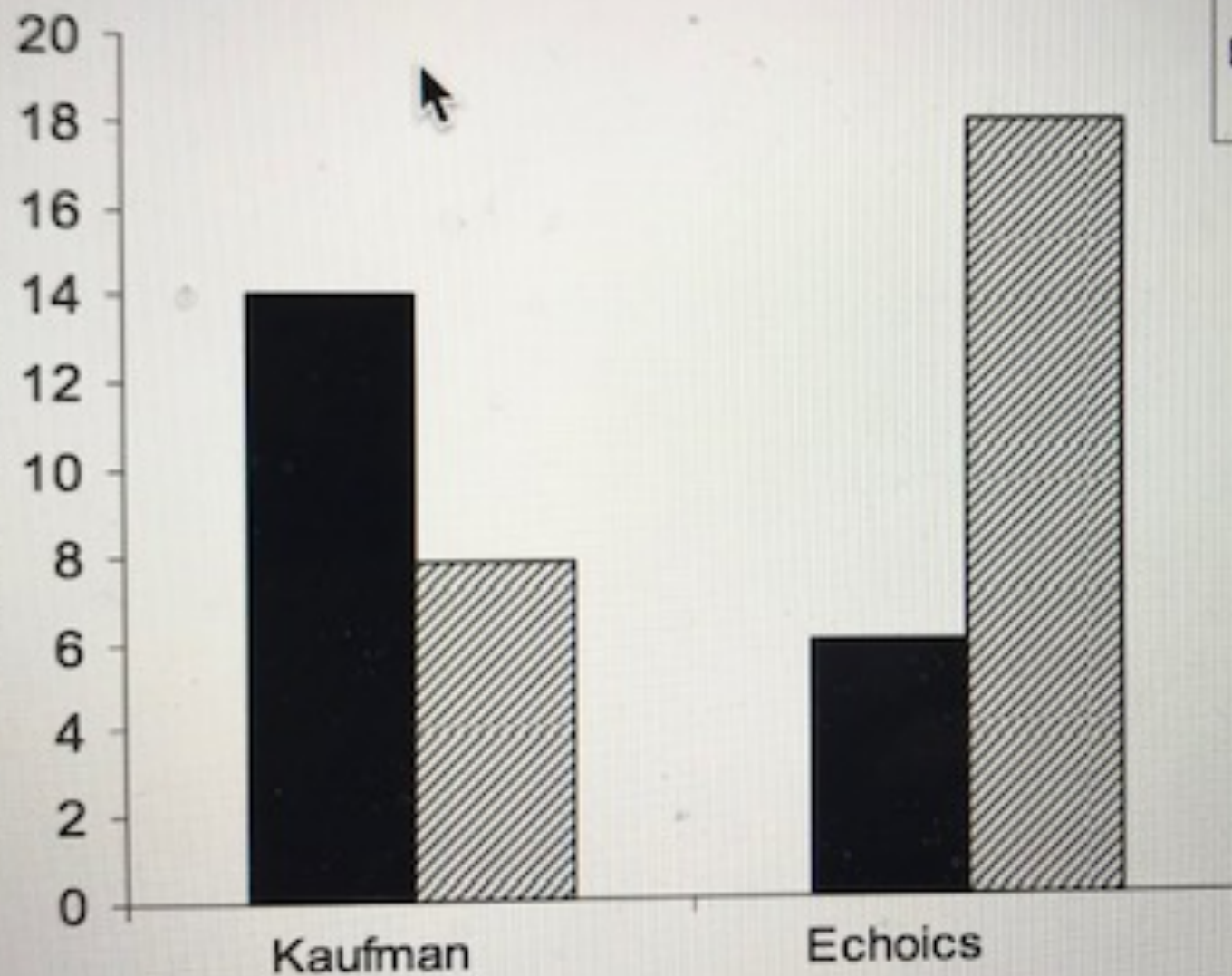
Kaufman Speech to Language Protocol (K-SLP)

- Research supports teaching approximations for words if child with ASD is unable to imitate full word

- Teach child successive approximations for preferred and common words

- Allow the child to simplify word temporarily as they improve speech accuracy

Sweeney-Kerwin, E. J. (2005)

Sign Language as a Bridge to Vocal Skills: Gaining Vocal/Speech Imitation

- Always working toward the adult form of the word

- KSLP hierarchy includes only suggestions and is not exhaustive of all ways to simplify a word

- Combine consonants, vowels and syllables using word shells

- Target simple CV, CVCV, CVC, VC words first

- Cues are faded quickly to gain independence

Kaufman Speech to Language Protocol (K-SLP): Example of Cues to be Faded

- Concurrent
(saying word together simultaneously = parity)

- Whisper

- Oral posture + gesture

- Gesture/Hand Cue

Kaufman Speech to Language Protocol (K-SLP): VCV


apple
a-pō
ah-pō
a-puh
ah-puh
ah-ō

Kaufman Speech to Language Protocol (K-SLP)

- Be sure to transfer the words to labels/tacts
- KSLP Kits 1 & 2 are intended for speech-motor skills and not necessarily for meaning
- For kids with ASD choose only words that will have meaning
- Increase to three-syllable combinations as child's speech-motor accuracy improves

Kaufman Speech to Language Protocol (K-SLP): Suggestions for kids with ASD

- Consider a variety of syllable shapes (avoid all CVCV words)

- Avoid deleting initial consonant unless it is a continuant (and only if necessary short-term)

- If child deletes final consonants you may need to "devoice" voiced final consonants initially to avoid a schwa on the end of a word

- Model the correct full adult form always once child produces their best approximation

- Target vowel accuracy especially for diphthongs
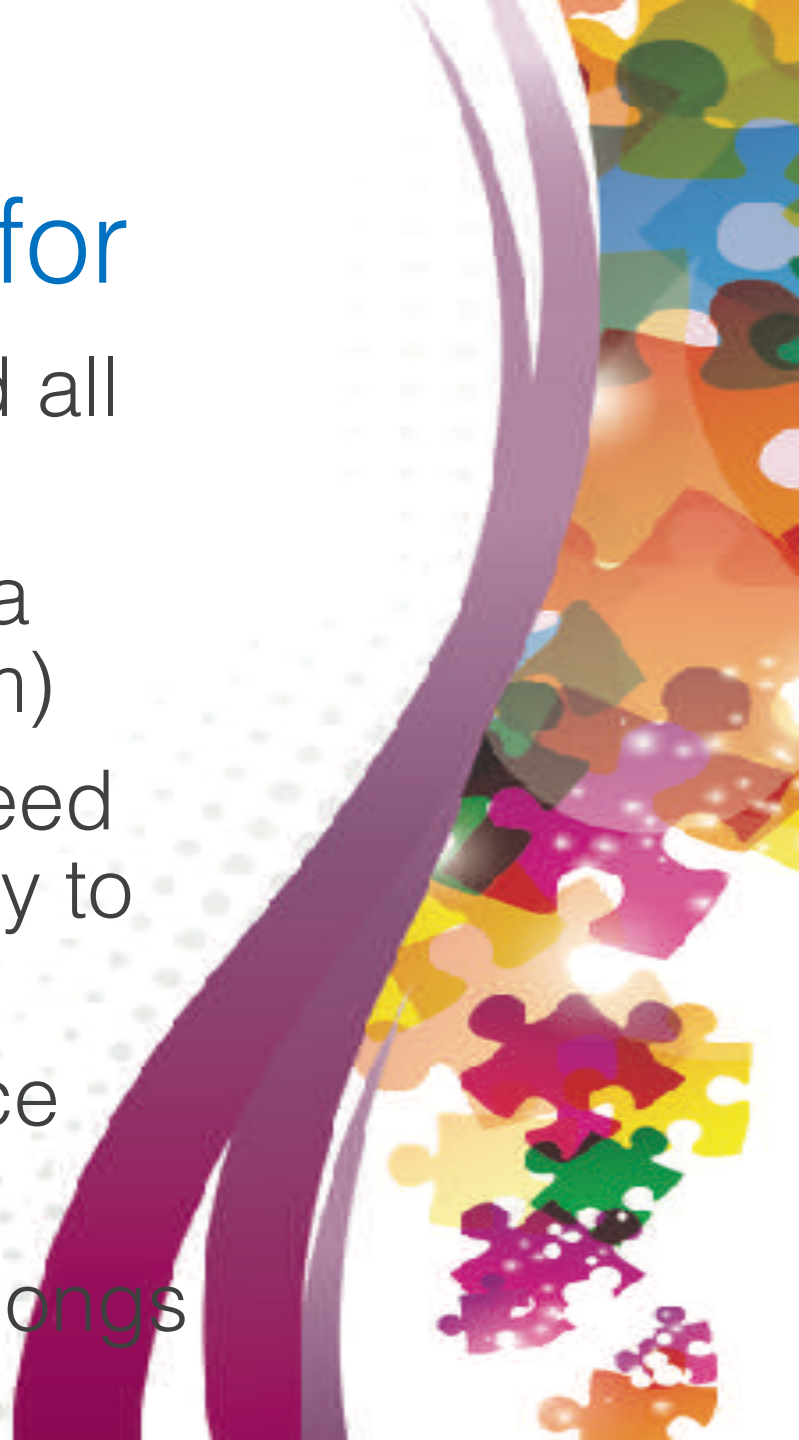
Kaufman Speech to Language Protocol (K-SLP)

- Add pivot words/phrases (words or phrases that remain constant)
- Put on ___
- Hi ____
- Take off___
- I want ___
- I want to ___(verb)
- Verb + noun (read book, eat cookie)
- Etc.

How Are They Now? James

- Functional vocal communicator
- Requests, labels, answers questions
- Greets others by name
- Answers yes/no
- Spontaneously uses phrases sentences *(Mom, can I have juice with ice?)*
- Ongoing qualitative prosody issues
- Ongoing expressive language and social language therapy/treatment

Where Are They Now? Lee
2 years, 5 months   6 years, 6 months

How Are They Now? Lee

- Uses signs, words, AAC device (TouchChat)
- Able to say many single words/word approximations *cracker, grandma, grampa, ball, rock, backpack, book*, etc.
- Combines a few words *go up, go home* as daily scripts
- Poor vowel accuracy
- Significant difficulty with all alveolars (t, d, n)
- Anterior lingual frenulum release age 4 years, 5 months
- Posterior lingual frenulum release age 5 years, 5 months

Lee, continued

- Pediatric Orthopedic Orthodontist, Dr. Maureen Kuta presented Jan.2019 at Kaufman Center
- Specializes in restricted airway due to tethered oral tissues (TOTs)
- Shared photos and signs indicating "flags" for restricted airway and when to refer
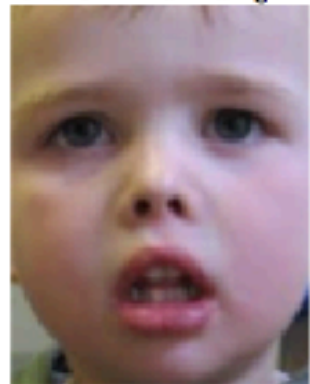
Obstructive Tonsils   Grinding – flat baby teeth   Tongue Thrust, poor tongue posture

Open mouth breathing   Long lower third, chin muscle strain

Upper lip tie   Tongue tie, tongue "cupping"

Posterior Crossbite   Anterior crossbite   Open Bite
(Upper teeth inside lower teeth)   (Front teeth not touching)

Lee, continued

- Remembered noticing "Lee's" teeth being very small/ground down in recent months

- Talked to mom who reported teeth grinding only at night for past several months

- Increased sleep challenges in recent months waking in the night, poor sleep

- Presented also with increase behavioral challenges

Lee, continued

- Evaluated by Dr. Kuta who confirmed significantly restricted airway, high arched palate, incomplete release of posterior lingual frenulum

- Tongue remains on floor of mouth at rest contributing to high arched palate, reduced oral cavity

- Child can experience restricted airway when lying down

- teeth grinding brings jaw forward to increase airway during sleep

- Referred to SLP specializing in myofunctional therapy (Keisha Nolan, Ph.D. SLP)

Lee, continued

- Significant improvement in tongue movement (elevation, lateralization)
- Emerging alveolar sounds now
- Release surgery scheduled will include presence of SLP to insure release is complete
- Grateful for Dr. Maureen Kuta & Keisha Nolan, SLP for their expertise
- Continue coordination of care between all providers

How Are They Now? Bill

- Receiving full-day ABA since September 2018

- Increased motor imitation, receptive skills, engagement, play skills

- Several words/word approximations as requests to include: *push, go, up, water(wah wah)*

- Requests using word approximations and signs

- Labels *mama, baby, ball, dada*
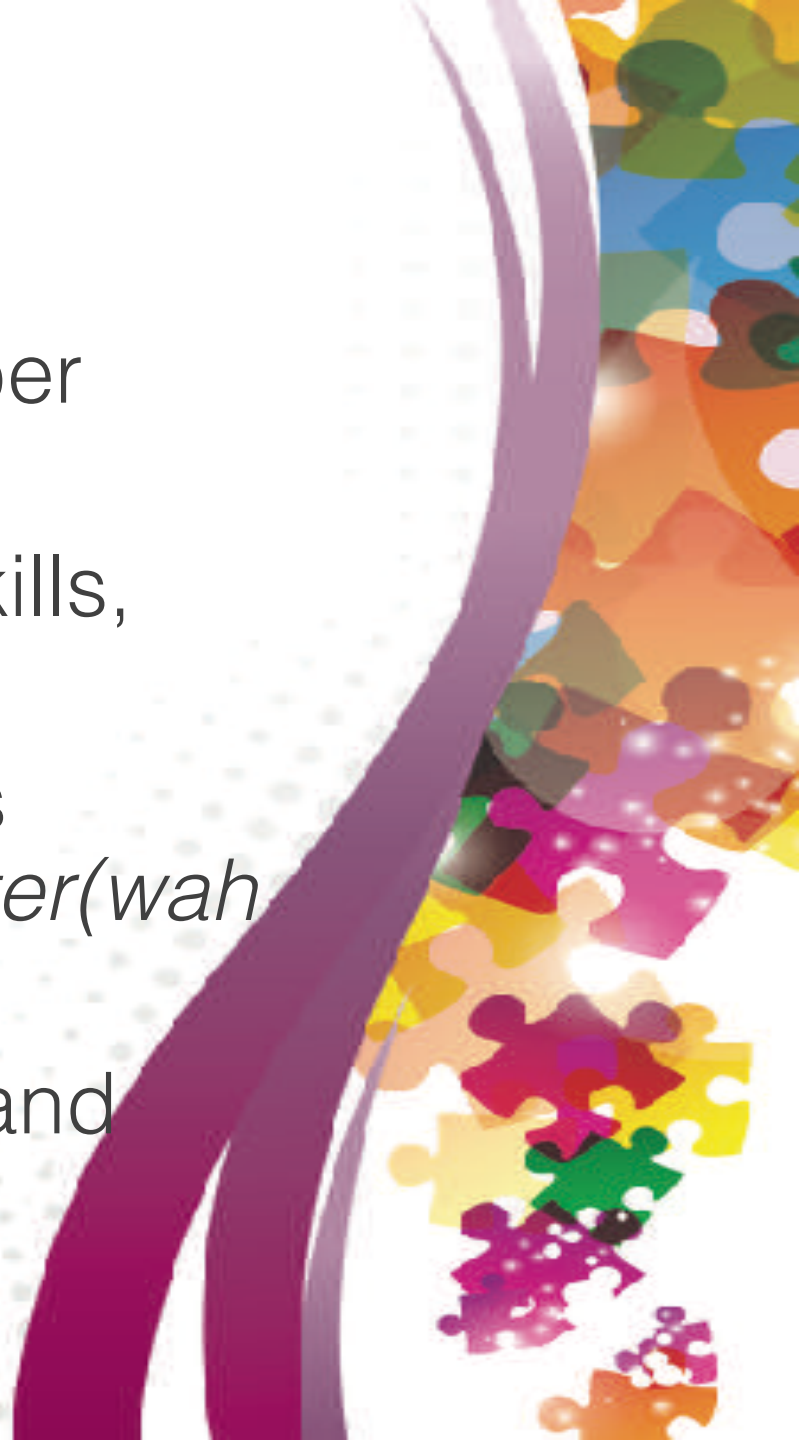
Closing Remarks

- RMIA combines speech pathology and ABA to gain early vocal imitation as part of an intensive program

- Signs can be a bridge to gaining vocal skills and may lead to speech quickly

- Methods for treating CAS (apraxia) are also effective for children with ASD who struggle to speak

- Consider other conditions that may be contributing to speech production limitations
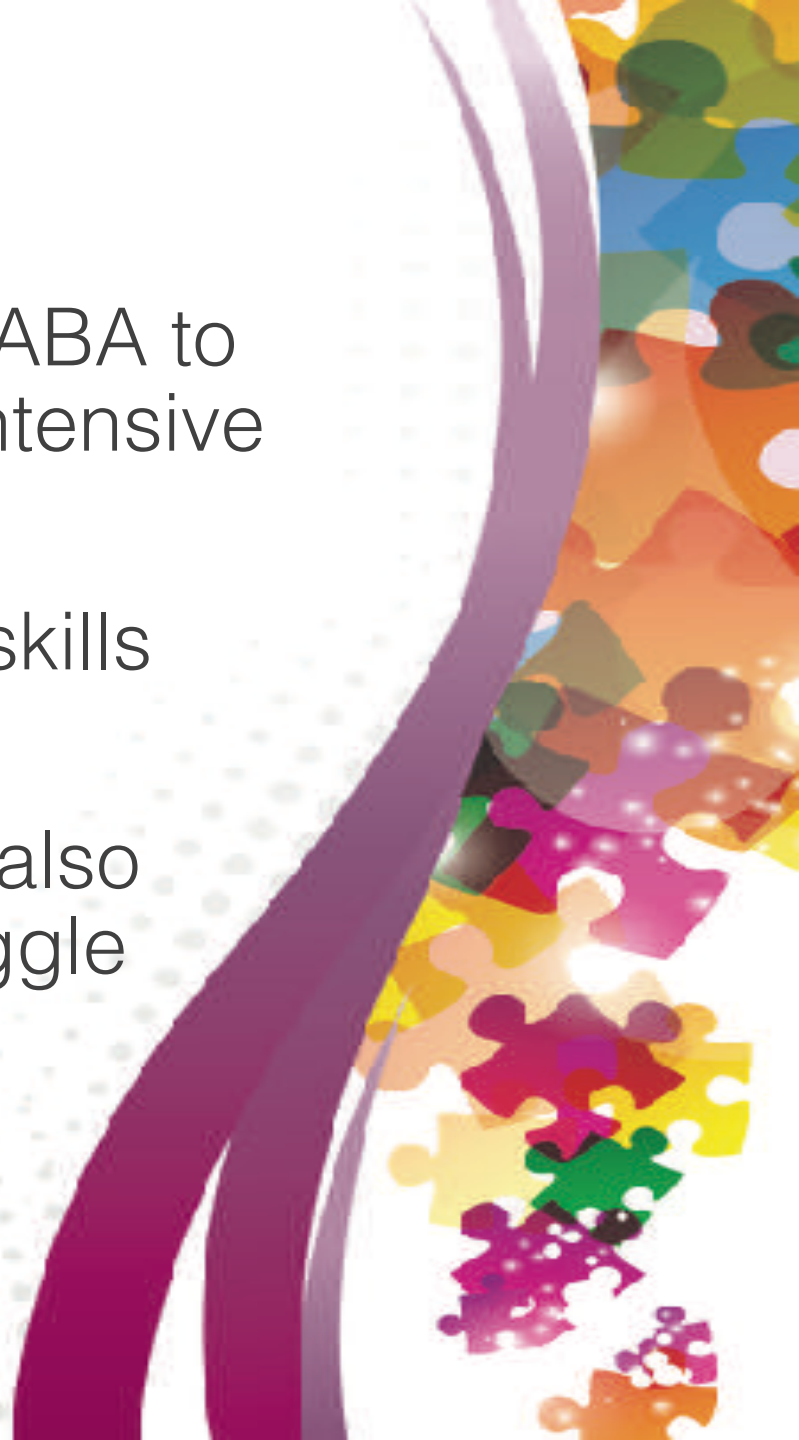
Questions?

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Barbera, M., & Rasmussen, T. (2007). *The Verbal Behavior Approach: How to Teach Children with Autism and Related Disorders*. London: Jessica Kingsley Publishers.

Carbone, V., Sweeney-Kerwin, E., Attanasio, V. & Kasper, T. (2010). Increasing the Vocal Responses of Children with Autism and Developmental Disabilities Using Manual Sign Mand Training and Prompt Delay. *Journal of Applied Behavior Analysis*, 43(4), 705-709.

Carbone, V. (2012) Increasing Speech Sound Production of Children with Autism. 33rd Annual Conference of the Berkshire Association of Behavior Analysis

Eldridge, A., Kasper, T., & Goodwin, J. (2006). *Effect of Tutor-Modeled Successive Approximations Versus Tutor-Modeled Adult Forms to Improve Topography of Tacts.* Presented at the International Convention of the Association for Behavior Analysis, Atlanta, GA.

Esch, B. (2008). *Early Echoic Skills Assessment (EESA)*.

Esch, B. (2014). *Vocal Training Procedures: A Review of Behavioral Research.* Presented at the National Autism Conference, Pennsylvania State University, PA.

Esch, B., LaLonde, K., & Esch, J. (January 01, 2010). Speech and Language Assessment: A Verbal Behavior Analysis. *The Journal of Speech and Language Pathology – Applied Behavior Analysis, 5,* 2, 166-191.

Gomez, M., McCabe, P., Jakielski, K. & Purcell, A. (January 01, 2018). Treating Childhood Apraxia of Speech with the Kaufman Speech to Language Protocol: A Phase I Pilot Study. *Language, Speech, And Hearing Services in Schools*, 1-13.

Holbrook, S., King, L. & Pelayo, H. (2013). *Efficacy of The Kaufman Approach in Increasing Speech Output with A Low-Verbal Child with Autism Spectrum Disorder.* Presented at the Annual Loma Linda University, School of Allied Health Professions, Department of Communication Sciences and Disorders Graduate Research Symposium, Loma Linda, CA.

Ingersoll, B. (2008). The Social Role of Imitation in Autism: Implications for The Treatment of Imitation Deficits. *Infants & Young Children, 21,* 5, 107-119.

Jones, S. (2009). The Development of Imitation in Infancy. *Philosophical Transactions of the Royal Society B: Biological Sciences, 364*(1528), 2325-2335.

Kasper, T. & Godwin, J. (2003). *Improving Vocal Verbal Behavior Via Tutor-Modeled Successive Approximations.* Presented at the International Convention Association for Behavior Analysis, San Francisco, CA.

Kasper, T. & Kaufman, N. (2009, 2012). *K&K Sign to Talk: Shaping Verbal Language for Individuals with Autism and Other Developmental Challenges*. Northern Speech Services, Gaylord, MI.

Kasper, T. & Kaufman, N. (2012). *Children Who Struggle to Speak? Motivate, Sign, Cue, & Script!* Presented at the American Speech-Language-Hearing Association National Convention, Atlanta, GA.

Kasper, T. & Slim-Topdijan, L. (2018). *Using Phonetic Hand Cues to Promote Speech Production Skills in Children with Limited Vocal Repertoires.* Presented at the Women in Behavior Analysis Conference, Nashville, TN.

Kasper, T. (2015). *Progressive and Systematic Speech and Language Training for Children on the Autism Spectrum*. [Online course]. Northern Speech Services, northernspeech.com

Kaufman, N. (1995). *Kaufman Speech Praxis Test*. Wayne State University Press, wsupress.wayne.edu.

Kaufman, N. (2001). *Kaufman K-SLP Treatment Kit for Children, Advanced Level*. Northern Speech Services, northernspeech.com.

Kaufman, N. (2005). *Kaufman K-SLP Workout Book*. Northern Speech Services, northernspeech.com.

Kaufman, N. (2010). *Kaufman Mutt Family Total Language Builder*. Northern Speech Services, northernspeech.com.

Kaufman, N. (2010). *Kaufman Speech to Language Protocol Instructional DVD Set*. Kaufman Productions, kaufmandvd.com.

Kaufman, N. (2016). *Eight Behavioral Teaching Strategies for Treating Childhood Apraxia of Speech*. [Online course]. Northern Speech Services, northernspeech.com

Kaufman, N. (2016). *Evaluation and Treatment of Childhood Apraxia of Speech: The Kaufman Speech to Language Protocol (K-SLP)*. [Online course]. Northern Speech Services, northernspeech.com.

Koenig, M., & Gerenser, J. (2006). SLP-ABA: Collaborating to Support Individuals with Communication Impairments. *Journal of Speech and Language Pathology – Applied Behavior Analysis*, 1(1), 2-10.

Lindblad, T. & Dower, N. (2018). *Implementation of Speech Generating Devices (SGDs) Using a Behavior Analytic Framework.* Presented at the National Autism Conference, Pennsylvania State University, PA.

Maas, E. (2008). Principles of Motor Learning in Treatment of Motor Speech Disorders. *American Journal of Speech-Language Pathology*, 17(3), 277-298.

Maul, C., Findley, B. & Adams, A. (2016). *Behavioral Principles in Communicative Disorders: Applications to Assessment and Treatment.* San Diego, CA: Plural Publishing.

Michael, J. (1988). Establishing Operations and The Mand. *Analysis of Verbal Behavior*, 6, 3-9.

Michael, J. (1993). *Concepts and Principles of Behavior Analysis.* Kalamazoo, MI: Society for the Advancement of Behavior Analysis.

Michael, J. (2011). The Multiple Control of Verbal Behavior. *The Analysis of Verbal Behavior, 27, 3-22*

Nancarrow, D., Kaufman, N., & Burns, M. (2009). *Shaping Successive Approximations for Speech Intelligibility: Effect Upon Language.* Presented at the American Speech-Language-Hearing Association Annual Convention, New Orleans, LA.

Reichow, B., & Wolery, M. (January 01, 2009). Comprehensive Synthesis of Early Intensive Behavioral Interventions for Young Children with Autism Based on the UCLA Young Autism Project Model. *Journal of Autism and Developmental Disorders, 39,* 1, 23-41.

Rogers, S., Hepburn, S., Stackhouse, T., & Wehner, E. (July 01, 2003). Imitation Performance in Toddlers with Autism and Those with Other Developmental Disorders. *Journal of Child Psychology and Psychiatry, 44,* 5, 763-781.

Rosenfeld-Johnson, S. (2009). *Oral Placement Therapy for Speech Clarity and Feeding*. Charleston, SC: Talk Tools Therapy.

Rosenfeld-Johnson, S. *TalkTools™ Speech Tools*. Charleston, SC: Talk Tools Therapy.

Roy-Hill, R. & Solomon, R. (2012). *Systematic Approach to Teaching Speech to Non-Vocal Individuals with Autism*. [Self-study course]. TalkTools, talktools.com.

Schlosser, R. & Wendt, O. (2008) Effects of Augmentative and Alternative Communication Intervention on Speech Production in Children with Autism: A Systematic Review. *American Journal of Speech-Language Pathology, 17, 212-230.*

Shafer, E. (January 01, 1993). Teaching topography-based and selection-based verbal behavior to developmentally disabled individuals: Some considerations. *The Analysis of Verbal Behavior, 11,* 117-33.

Skinner, B. (1957). *Verbal Behavior*. New York: Appleton-Century-Crofts.

Strand, E. (2005). *The Relationship of Practice and Repetition to Motor Learning for Speech in Children with Apraxia*. Apraxia Kids, apraxia-kids.org.

Sundberg, C., & Sundberg, M. (April 01, 1990). Comparing topography-based verbal behavior with stimulus selection-based verbal behavior. *The Analysis of Verbal Behavior, 8,* 1, 31-41.

Sundberg, M. & Partington, J. (1998). *Teaching Language to Children with Autism or Other Developmental Disabilities.* Pleasant Hill, CA: Behavior Analysts, Inc.

Sundberg, M. (January 01, 1993). Selecting A Response Form for Nonverbal Persons: Facilitated Communication, Pointing Systems, or Sign Language? *The Analysis of Verbal Behavior, 11,* 99-116.

Sweeney-Kerwin, E., Zecchin, G., Cabone, V., Janecky, M., & Murray, D, & McCarthy, K. (2005). *Improving the Speech Production of Children with Autism.* Presented at the New York State Association for Behavior Analysis, Verona, NY.

Tsiouri, I., & Greer, R. (September 01, 2003). Inducing Vocal Verbal Behavior in Children with Severe Language Delays Through Rapid Motor Imitation Responding. *Journal of Behavioral Education, 12,* 3, 185-206.

Tsiouri, I., Schoen, S., & Paul, R. (July 01, 2012). Enhancing the Application and Evaluation of a Discrete Trial Intervention Package for Eliciting First Words in Preverbal Preschoolers with ASD. *Journal of Autism and Developmental Disorders, 42,* 7, 1281-1293.

Valentino, A., & Shillingsburg, M. (April 01, 2011). Acquisition of Mands, Tacts, and Intraverbals Through Sign Exposure in an Individual with Autism. *The Analysis of Verbal Behavior, 27,* 1, 95-101.

Wendt, O. & Weber, B. (2018). *Critical Issues in Early Language Training Using Augmentive and Alternative Communication in Autism Spectrum Disorders.* Presented at the ASHA SIG Conference, Boston, MA.

Wraikat, R., Sundberg, C., & Michael, J. (January 01, 1991). Topography-Based and Selection-Based Verbal Behavior: A Further Comparison. *The Analysis of Verbal Behavior, 9,* 1-17.