



Language Acquisition through Motor Planning

AAC Strategies for Promoting the Development of
Communication for Individuals with Autism Spectrum Disorder

2022 Early Intervention and Preschool Conference
Mobile, AL
Monday October 18, 2022

Thank you:
Children
Parents
Teachers/Therapists
PRC

Disclosure Statement

I (Melissa Pouncey) have a financial and nonfinancial interest in an organization whose services are reviewed in the presentation. I receive compensation from the Prentke Romich Company for whom I am employed by as a LAMP trainer.

By the end of this session you will be able to:

- 1. List the 5 principles of LAMP.**
- 2. Describe how to pair teaching strategies with LAMP principles.**
- 3. Describe the barriers to typical language development in children with Autism.**
- 4. List strategies for increasing joint attention in interactions using AAC.**
- 5. Describe sensory interventions to increase readiness to learn.**



Who Are We?



Our Mission:

To improve public awareness of the unique qualities of the power of AAC to change the lives of non-verbal individuals with autism and other developmental disabilities by:

- Providing specialized clinical training to health care professionals, teachers, and parents
- Supporting clinical research
- Supporting clients and families with education, resources, and information

What is LAMP?

- It is not an item used to illuminate dark places
- It is not an app
- It is not a device



LAMP Words for Life®

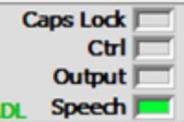
• **5 Vocabulary Options:**

- LAMP WFL 84 1-hit - 82 words
- LAMP WFL 84 transition – 205 words
- LAMP WFL 84 Full – over 4000 words
- Available on Accent or iPad
- English/Spanish version
- Visually Impaired version
- Keyguard available

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finished	mine	little	up	yes	good	some	no	down	out	off	bad
me	my	wear	am	please	that	and	in	what	a	+s	there
I	we	are	is	were	was	on	to	SPELL/NUM	an	the	end
you	they	new	play	like	work	have	feel	read	more	fast	stop
it	he	want	all	come	time	do	go	get	big	color	help
she	look	slow	hear	think	right	said	live	love	follow	ride	put
CLEAR	not	talk	sit	eat	find	make	need	drink	watch	turn	sleep

Neuroplasticity

LAMP strives to improve language and communication by imitating the neurological process associated with typical speech development by

- ✓ Pairing a unique motor movement with
- ✓ Hearing the word produced by that movement
- ✓ Experiencing another's reaction to the word

It has been estimated that between 33-50% of individuals with autism will not develop functional speech.

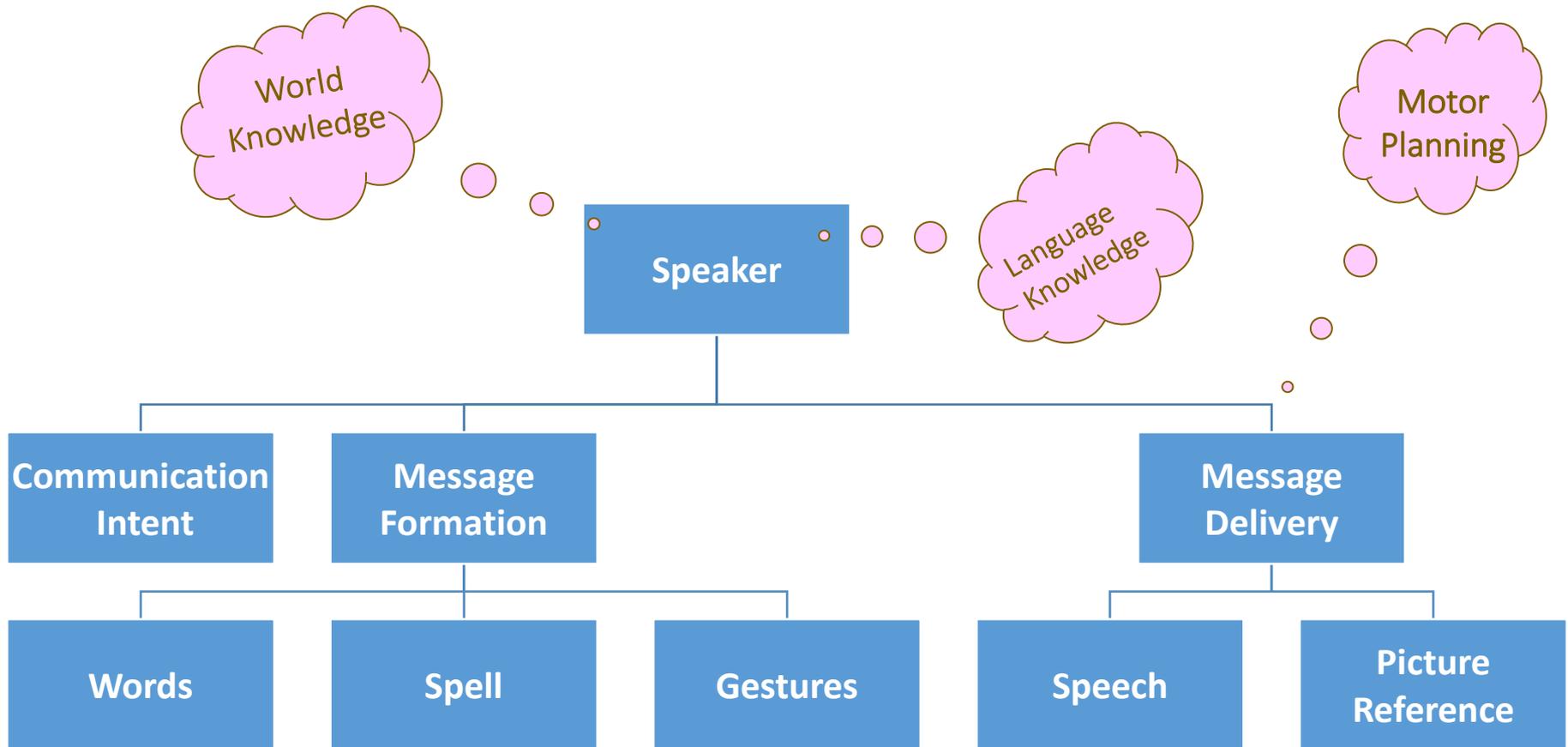
Wodka, Mathy, & Kalb 2013

Approximately 25% to 30% of children with ASD remain minimally verbal, even after years of intervention (Kasari, 2014).

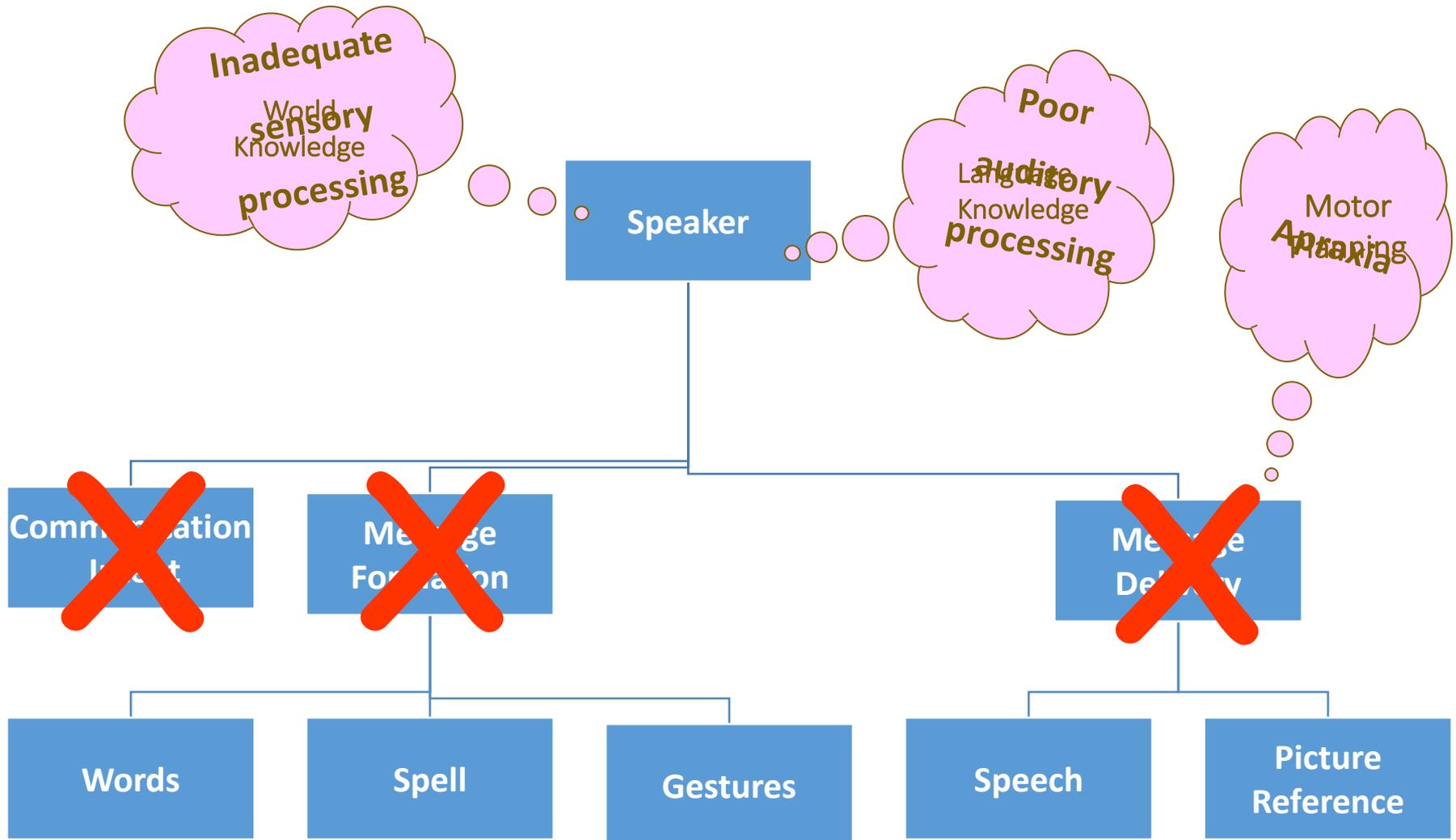
Failure to develop spoken language by age 5 years increases the likelihood of a poor long-term prognosis for social and adaptative functioning. (Kasari, 2014)

20-30 % of children with ASD won't develop spoken language by school age. (Rogers, 2006)

Normal Communication Process



Presumed causes in ASD



Weaknesses Impacting Language Development

- Inadequate sensory processing
 - Impacts ability to attend to conversations and tasks
- Poor auditory processing
 - Difficulty with segmentation of speech
- Apraxia-verbal and/or motor
 - Impacts speech and access

AAC in EI- How early and why?

- Researchers indicated that infants and toddlers benefit from AAC intervention even at the earliest stages of communication development (Holyfield et al., 2017; Ronski et al., 2015).
 - AAC proves too often be a challenging conversation, especially for children without a diagnosis.
 - Families are often afraid that AAC will prevent children from developing spoken speech.
 - What barriers have you encountered?
 - How have you opened these conversations with families?
- Providing AAC intervention early serves to “jump-start” communication and language development in individuals with ASD (Beukelman & Light, 2020).

- 1) Ensure all individuals have the right to communicate.
- 2) Start intervention as early as possible.
- 3) Provide intervention for older beginning communicators.
- 4) Involve family and other communication partners.
- 5) Focus on meaningful opportunities for communication.
- 6) Ensure opportunities for communication are age-appropriate.
- 7) Provide appropriate accommodations to support participation.
- 8) Provide numerous opportunities for communication.
- 9) Choose effective evidence-based intervention techniques.

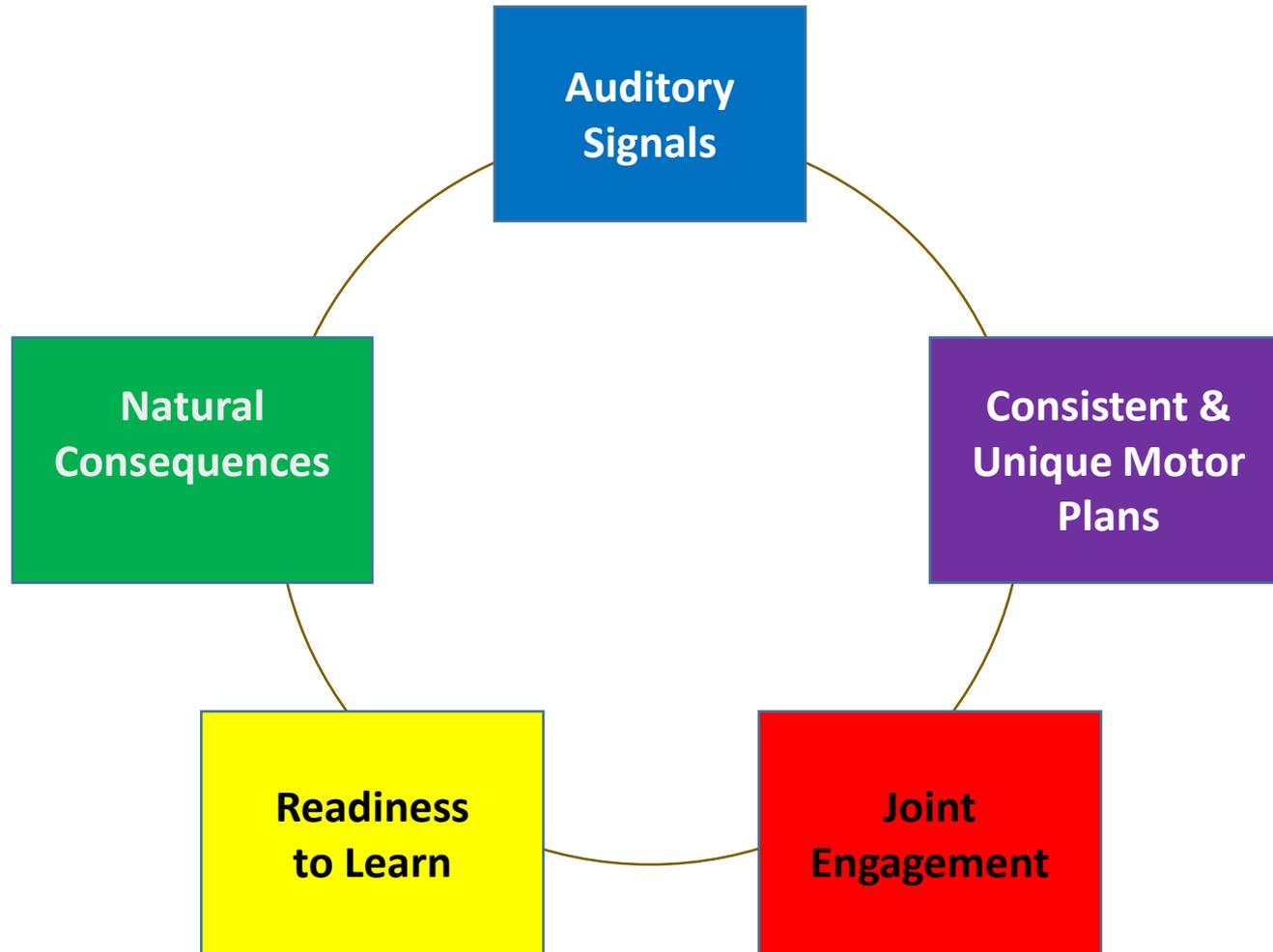
Play and Language Development

- Since natural environment based- play and interaction are the focus of EI, this setting is perfect for families to be more involved and “bought-in” to device use.
 - As a child grows, school will cause separation from family-based involvement.
 - EI providers are critical to these important conversations, as AAC should be whole- child centered from the beginning!
- Play- based interventions are critical to LAMP success, especially in the beginning.
- <https://www.asha.org/public/speech/development/01/>
- Without an “output” method, children become passive participants in the communication process- we want them to be ACTIVE!

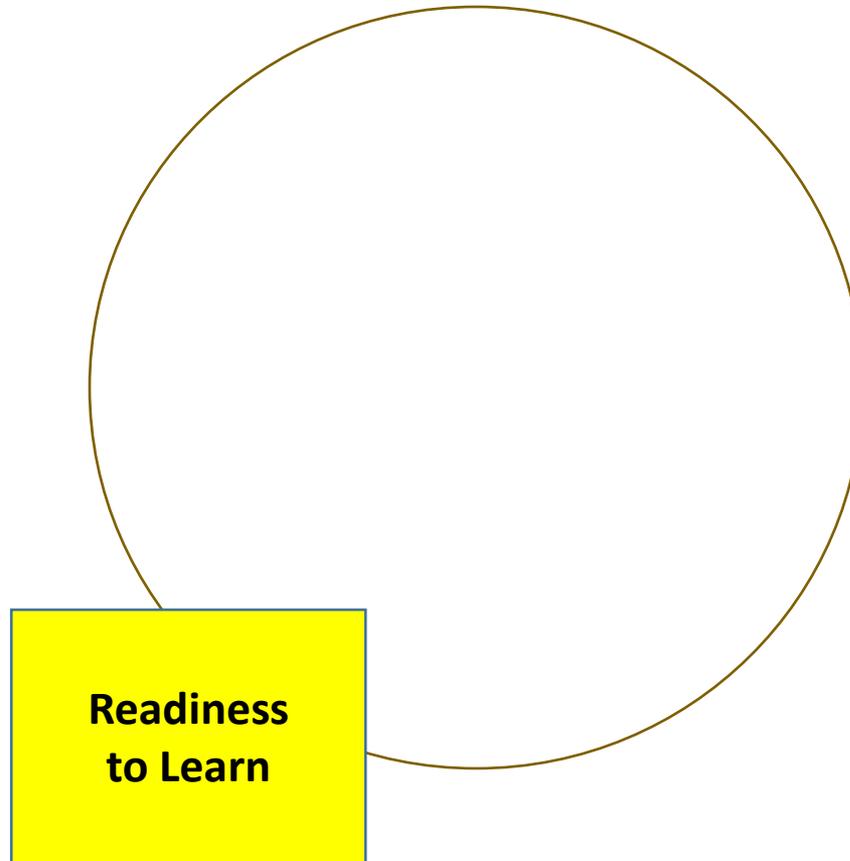
Think about natural language development

- Teach single words (Turn, go, stop, eat, drink, my, more)
- Combine two single words, combine them in different ways (My turn, my toy, I go, you go, go home, more drink, more eat, my drink, drink water, drink milk)
- Combine three words, morphemes, concepts
- AAC is just language therapy on a device. Let the hand be the articulator instead of the mouth.

Components of LAMP



Components of LAMP



Readiness to Learn

Is the individual at a state to receive optimal benefit from the learning experience?

Influencing Factors:

- Arousal Level-conducive for participation and learning from activity
- Emotion- many brain systems being activated simultaneously so information is processed more effectively.
- Motivation- difficult to direct and sustain behavior if the goal is not valued by the individual or they are not motivated to obtain the goal.
- Task- We must present the “just right challenge.” (Ayres, 1983)
- Components of task or environment modified so they can attend

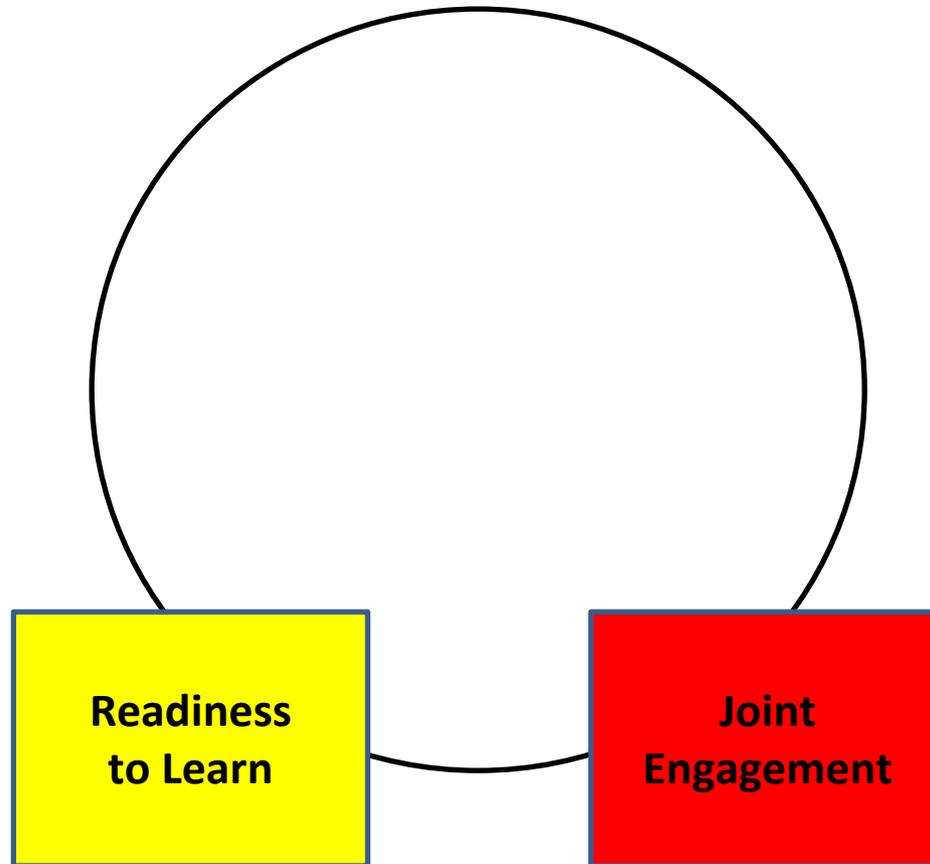
THERAPEUTIC APPLICATIONS

- Use strategies to calm or alert
 - Calming sensory input**
 1. Slow repetitive movements (swinging, rocking)
 2. “Heavy work”/ resistive activities (pushing, pulling)
 3. Deep pressure
 - Alerting sensory input**
 1. Quick, unexpected movements (bouncing, spinning)
 2. Loud noises, music
 3. Oral motor activities (eating something sour/crunchy)
- Be aware of other factors (e.g., pain, dirty diaper, scratchy shirt, etc..)
- Make task motivating/interesting and not too difficult or too boring/easy and end on a positive note and don't force participation

EI Implications

- In the homes we go to, MANY children are not ready to learn. We might see dysregulation, behaviors, and parents who are not understanding the reasons “why”.
 - Teaching parents to ask “why?” may often be the beginning of communication.
 - Some sensory understanding is important.
 - How have you talked about this before?
- Teach readiness to learn as a foundation for communication.
 - Explaining to families that we can’t learn when we’re upset or hurting is so important.
 - Have you encountered families that have a hard time understanding this?
- Use AAC as a way for that child to ask for what they need- often this becomes their first communication.
- This may take lots of time!

Components of LAMP



Joint Engagement

Kasari et al. (2014)

- Minimally verbal school-aged children can make significant and rapid gains in spoken spontaneous language with a novel, blended intervention that focuses on joint engagement and play skills and incorporates an SGD.

Journal of the American Academy of Child & Adolescent Psychiatry
[Volume 53, Issue 6](#) , June 2014

Joint Engagement

Intervention Strategies:

- Surprising and Novel-novel situations enhance learning and neural plasticity.

Purposeful and Intentional

- Many children with ASD lack the motor planning and/or ability to initiate purposeful behaviors

Use Movement

- Movement helps maintain a shared focus and also allows language to be used more easily. Provide child with full compliment of appropriate sensory input.

Carefully Use Barriers

- Can be an effective way to encourage communication to solve a problem

Joint Engagement

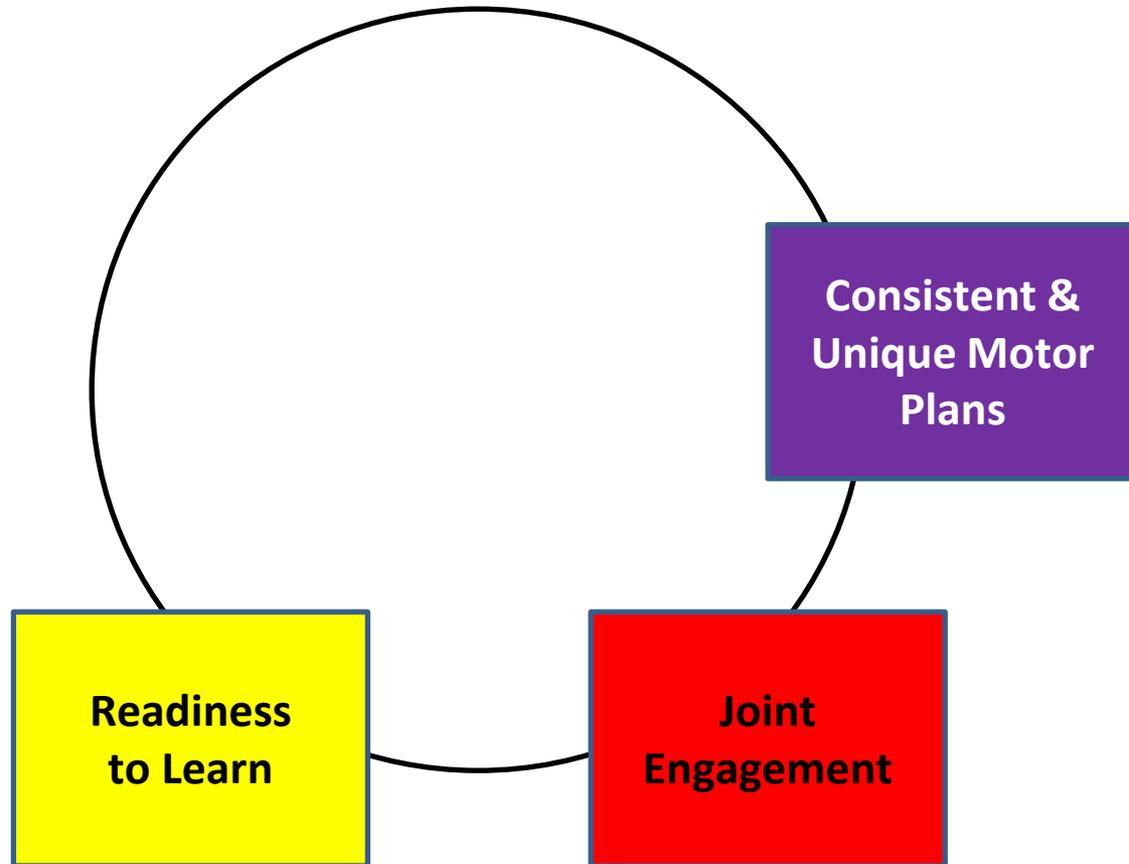
Device Considerations

- A large vocabulary set needs to be available at all times so that words that fit the child's chosen activity can be used and introduced.
- The social partner needs quick access to vocabulary so that it can be taught as the opportunity arises.

EI Implications

- LAMP allows a users to become an ACTIVE participant in exchanges vs passive.
 - Parents want to hear what their child wants, thinks, and needs- LAMP provides an opportunity for a child to become independent and spontaneous.
 - Gestures alone could not allow for input-output symmetry.
 - Access to LAMP early on would allow parents to focus on language and play development in the same way young speaking peers receive it.
- Allows the child autonomy in home early on, which can set up that child for success as they grow.
- Learning to communicate before we communicate to learn.
- First, imitate THEM!

Components of LAMP



Dukhovny, E. & Gahl, S. (2014). Manual motor-plan similarity affects lexical recall on a speech-generating device: implications for AAC users. *Journal of Communication Disorders*. 48. 52-60.

- ***"provides initial support for the use of motor sequences in SGD-based language production."***
- ***"If SGD production quickly becomes automatic, as the current study suggests, one implication is that with continued SGD use, location of symbols on a grid becomes more relevant to fluent SGD production than the internal visual characteristics of the symbols. Therefore, in planning SGD design and intervention, location of symbols on the AAC device, and the resulting motor plans for accessing symbols, must be taken into account along with visual considerations."***
- ***"Evidence of automaticity in SGD-based production would speak in favor of introducing devices with adult-like language capacity earlier in a user's life, to allow the user to maintain automaticity of production."***

To become fluent using a SGD – you need automaticity

Possible when:

- Sensory input and the motor plan to say a word remain constant, movement is predictable, motor plan to say a particular word is unique from the motor plan to say all other words

Not possible when:

- Significant navigation is required, continuous visual refocus and/or re-orientation

Consistent & Unique Motor Patterns

The Device

- The same vocabulary should be consistently available in all settings.
- Teach motor pattern, NOT metaphor
- Start with a system that can evolve to support complex language without changing motor patterns.
- High tech systems allow for the addition of hundreds and thousands of words without changing previously learned motor patterns.

Consistent & Unique Motor Patterns

Levels of Prompting to Achieve Motor Automaticity –use least amount required/fade quickly

- Full physical assistance (hand over hand/hand under hand)
- Partial Physical assistance (touch elbow)
- Modeling
- Gestures (pointing)
- Direct Verbal Cue (“Do you want to go?”)
- Visual Prompt (gesture/point toward device)
- Indirect Verbal Cue/Open ended ? (“What now?”)
- Situational Cues (toy placed out of reach)
- Wait for child to activate (pause)

Consistent & Unique Motor Patterns

How to Help Achieve Motor Automaticity

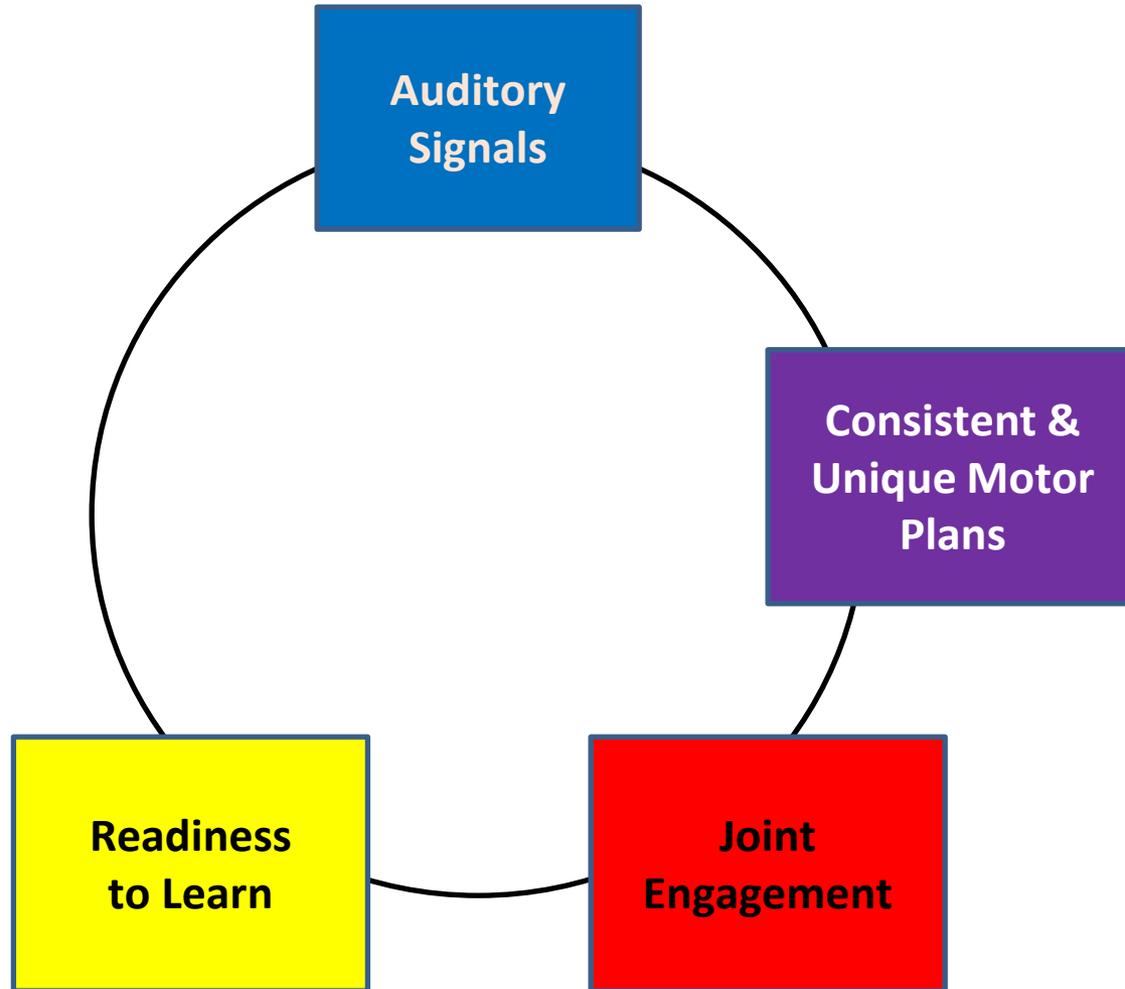
Other Supports:

- Use Vocabulary Builder to model and teach (quickly return to the full vocab-AAC device is a tool for babbling)
- Use keyguards
- Use masking
- Change color of keys to increase contrast
- Experiment with stylus

EI Implications

- While not all providers have access to the LAMP program at all times, having consistency in mind when designing AAC is KEY.
 - We want to teach movement and placement, not picture representation.
 - Focusing on motor repetition allows focus to remain on interaction.
- Sometimes PECS based systems make it challenging to expand vocabulary- we want lots of words from the beginning!

Components of LAMP



Auditory Processing

The way sounds and words are perceived directly influences an individual's ability to attend to and produce those sounds.

Individuals with autism have trouble segmenting incoming speech into meaningful word units.”

(Prizant 1983)

Studies on language acquisition in infants have demonstrated that statistical regularities in speech steams by guide one of the earliest steps in linguistic decoding (words segmentation)

(Aslin, Saffran, & Newport, 1996; Theiessen @Saffran, 2003)

LAMP Goal: Auditory Processing

- LAMP utilizes a speech-generating device that pairs consistent motor patterns with consistent auditory output as in natural speech development.
- The auditory output provides additional sensory information to enhance language learning.

What is Segmentation?

It is the process of identifying the boundaries between words, syllables or phonemes in spoken natural language

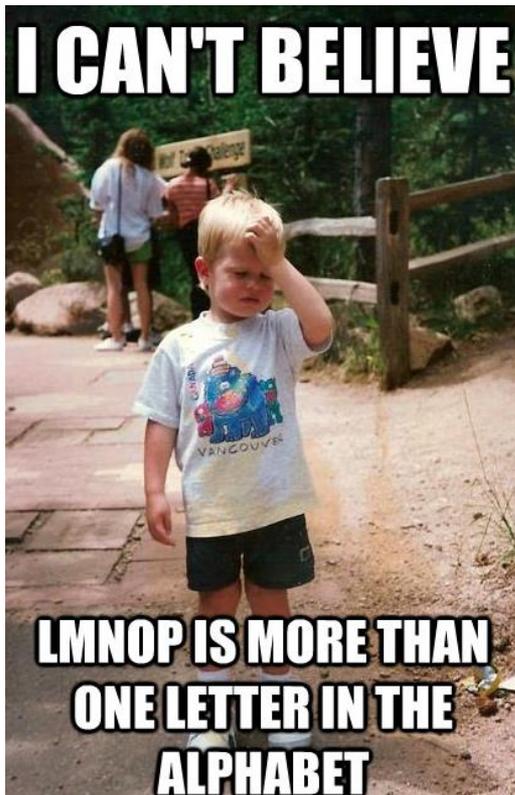
Auditory Signals

Pinker “The Language Instinct” (1994)

In speech one word runs into the next seamlessly; there are no silences between spoken words the way there are white spaces between written words.

We simply hallucinate word boundaries when we reach the edge of a stretch of sound that matches some entry in our mental dictionary

Segmentation linked to later ability in preschool



Studies on language acquisition in infants have demonstrated that statistical regularities in speech streams may guide one of the earliest steps in linguistic decoding: word segmentation (Aslin, Saffran & Newport, 1998. Aslin & Newport, 1996; Theissen @ Saffran, 2003).

In fact, the degree to which infants successfully segment has been linked to later ability in preschool children.....(Newman, Ratner, Jusczyk, & Dow 2006)

Auditory Signals

Device Considerations

La Sorte (1993): “Synthetic speech can facilitate the segmenting of speech into word units since the boundaries are more clearly defined than in human speech, and stress is not an important aspect of synthesized speech.”

- Therefore, the use of speech generating devices with synthesized speech may be the best systems to use with individuals with autism as they may assist in the segmentation of speech.

So what is the role of the device?

1. The device allows processing of speech sounds by providing a consistent motor movement with consistent auditory output while providing immediate visual reaction = convergence
2. Active means of language learning – learn to use words on the device and see natural reactions.
3. As phonetic representations develop individuals may begin to use words that *sound like* the intended word, and put sounds together to create new words.

Auditory Signals

Device Considerations

*Each Unique Motor Pattern = Specific auditory signal
=A specific word*

- Device needs to be single WORD based
- Core words
- Voice selection on device should provide good auditory model
- Almost simultaneous voice production between key selections and vocal output
- Allow access to words separate from other words so that segmentation can develop
- Shouldn't hear a word to get a word (i.e. One Hit on Accent)

Consistent & Unique Motor Patterns

LAMP Focus: Teach core words

most frequently
occurring words

% of total words
communicated

50

40-50%

100

60%

200

70%

400

80%

Vanderheiden & Kelso (1987)

<u>Words</u>	<u>Percentage</u>
1. I	9.5
2. No	8.5
3. Yes/yea	7.6
4. my	5.8
5. the	5.2
6. want	5.0
7. is	4.9
8. it	4.9
9. that	4.9
10. a	4.6
11. go	4.4
12. mine	3.8
13. you	3.2
14. what	3.1
15. on	2.8
16. in	2.7
17. here	2.7
18. more	2.6
19. out	2.4
20. off	2.3
21. some	2.3
22. help	2.1
23. all done/finished	<u>1.0</u>

These 26 core words comprise **96.3 %** of the total words used by toddlers in this study

Banajee, M., DiCarlo, C, & Buras-Stricklin, S. (2003). Core Vocabulary Determination for Toddlers, *Augmentative and Alternative Communication*, 2, 67-73.

96.3%

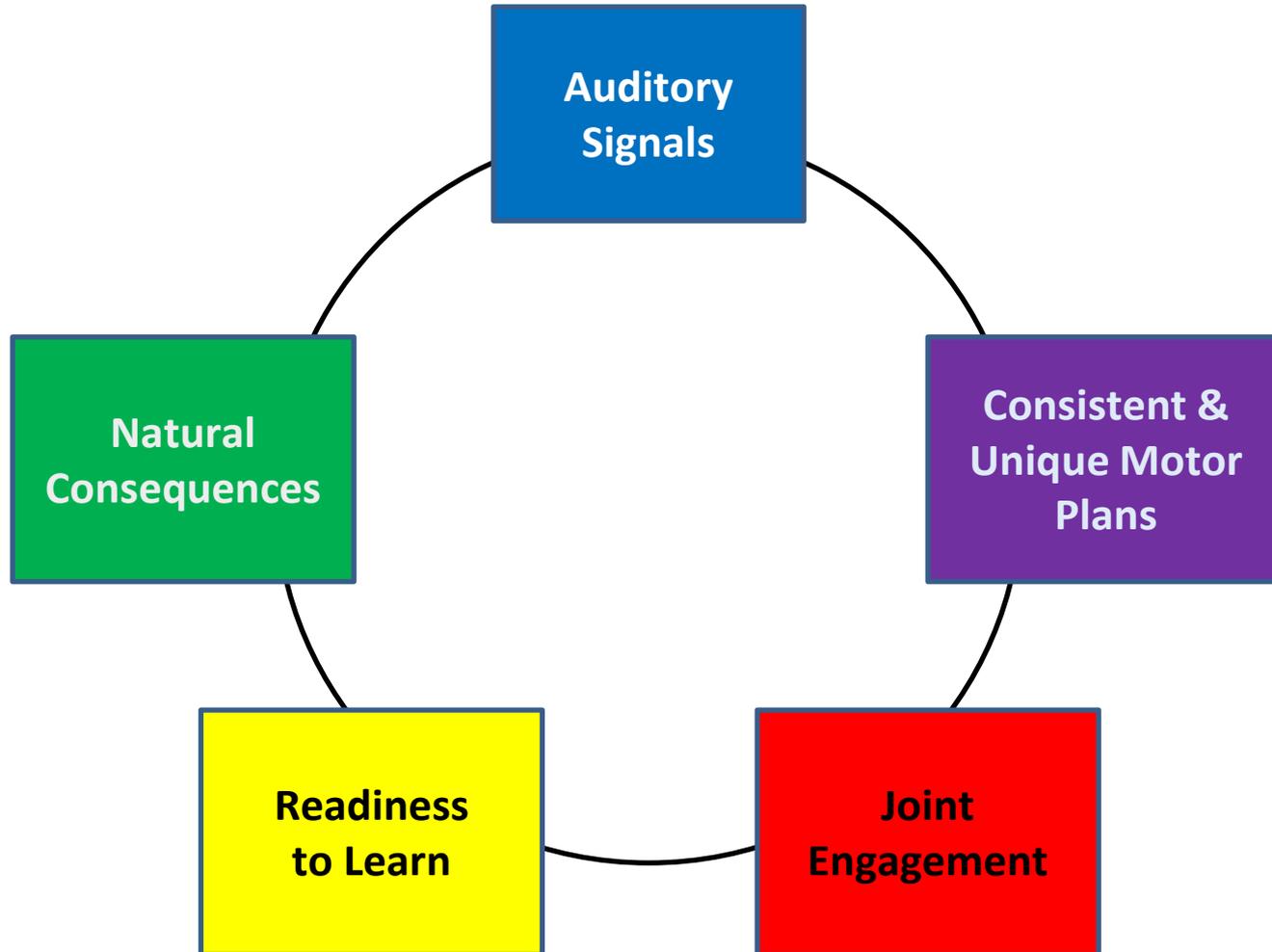
Consistent & Unique Motor Patterns

- Focus on “core” vocabulary as opposed to noun vocabulary because...
 - Generalization occurs through core
 - Expansion follows generalization
 - Expressive language may come before receptive language as repeated use of a word (with AAC device)

EI Implications

- Teaching core words alongside fringe words are essential in EI- helping families understand why their child needs to learn “drink” vs learning “milk” or “want” vs learning the names of toys.
- Help as a child is developing segmentation skills.
 - “Get” is an important word in “Go get your shoes”.
 - Echolalia
- Low tech systems can be SO helpful initially, but if you’re using it and parents are buying in- trying something dynamic can support auditory skills.

Components of LAMP



Natural Consequences

No Mistakes:

No matter what the child selects on the AAC device, the rule for the communication partner is

RESPOND

Allows the opportunity to teach new words through converging that set of motor, auditory, and visual inputs.

Natural Consequences

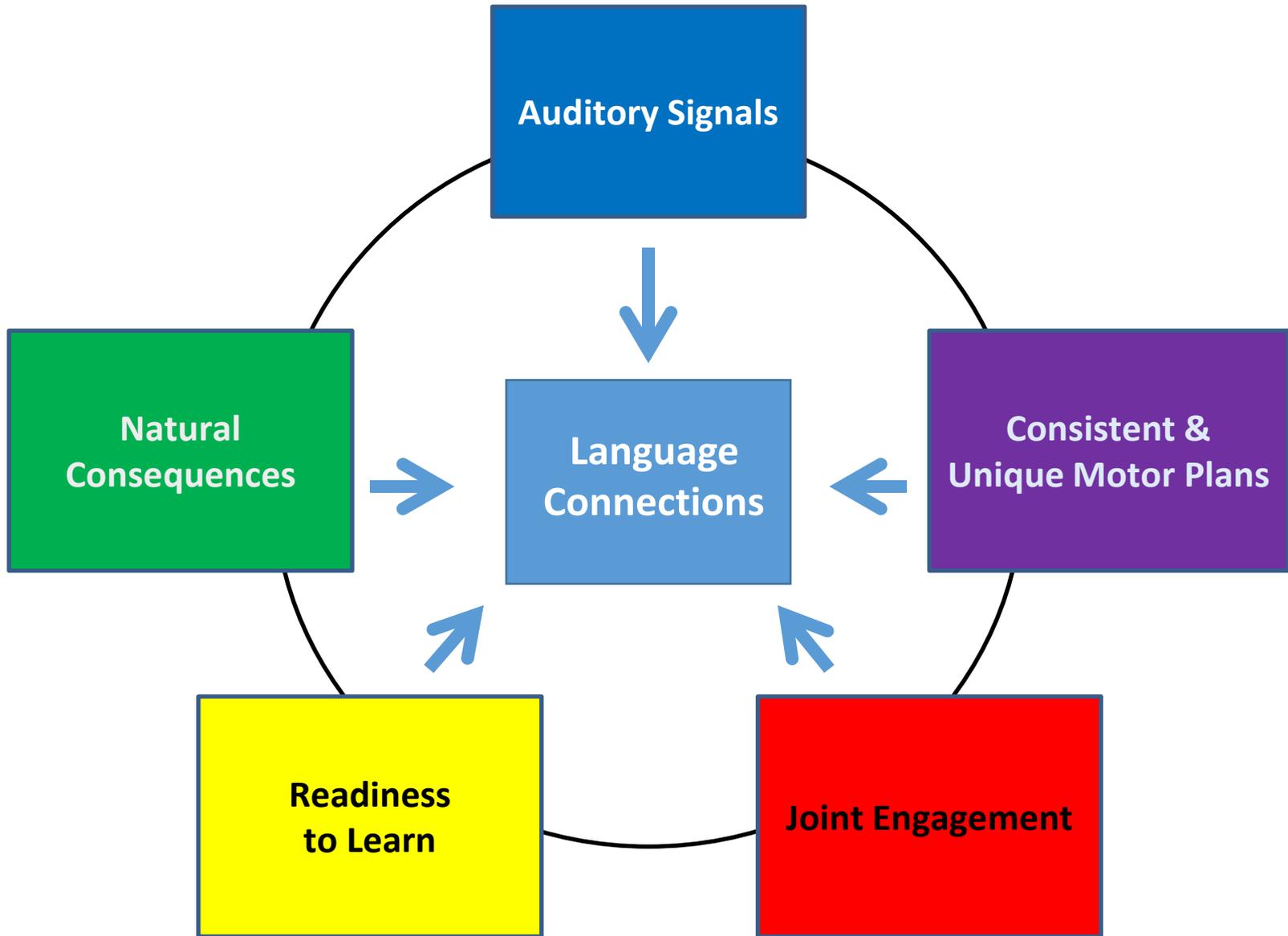
Any attempts to communicate should have natural auditory/verbal, visual, and social consequences.

- Enables the client to attach meaning to the word.
- The natural consequences need to be intrinsically rewarding for the learner.

Natural Consequences

The Device

- When introducing the device, the desired word should be accessed with one touch/one icon (LAMP WFL 1 Hit) so that the learner receives immediate feedback from his actions.
- **Transition as quickly as possible!**
- Text - When a word is spoken on a device, literacy is enhanced by display of the corresponding text. It may be helpful to make the text as large as possible.



We have to MODEL, MODEL, MODEL...LANGUAGE/AAC



Child Age	Average Language Input	Expressive vocabulary
12 months	2920 hours	3 words
18 months	4380 hours	68 words
24 months	5840 hours	200+ words
30 months	7300 hours	540+ words

Mitchell and McMurray (2007)– explaining vocab explosion

1. Words are learned in parallel – the system must be able to build a representation of many words at the same time (i.e. they don't have to finish learning one word before learning another)
2. Words must vary in difficulty – specifically there must be more difficult words (which take longer) than easy words
3. “Acceleration in word learning arises out of the mathematical regularities of parallel learning and variation in difficulty.”

IMPLICATIONS?

Research?

Center for AAC and Autism Website-What is LAMP-Research and References

<https://www.aacandautism.com/lamp/research>



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