

LAMP

Language Acquisition through Motor Planning

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

The Center for
AAC & Autism

Learn. Hope. Share. Succeed.

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Disclosure Statement

I (Julie Butterworth) 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 contracted as a LAMP trainer.

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Thank you:
Children and Parents
Teachers & Therapists

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What is LAMP?

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



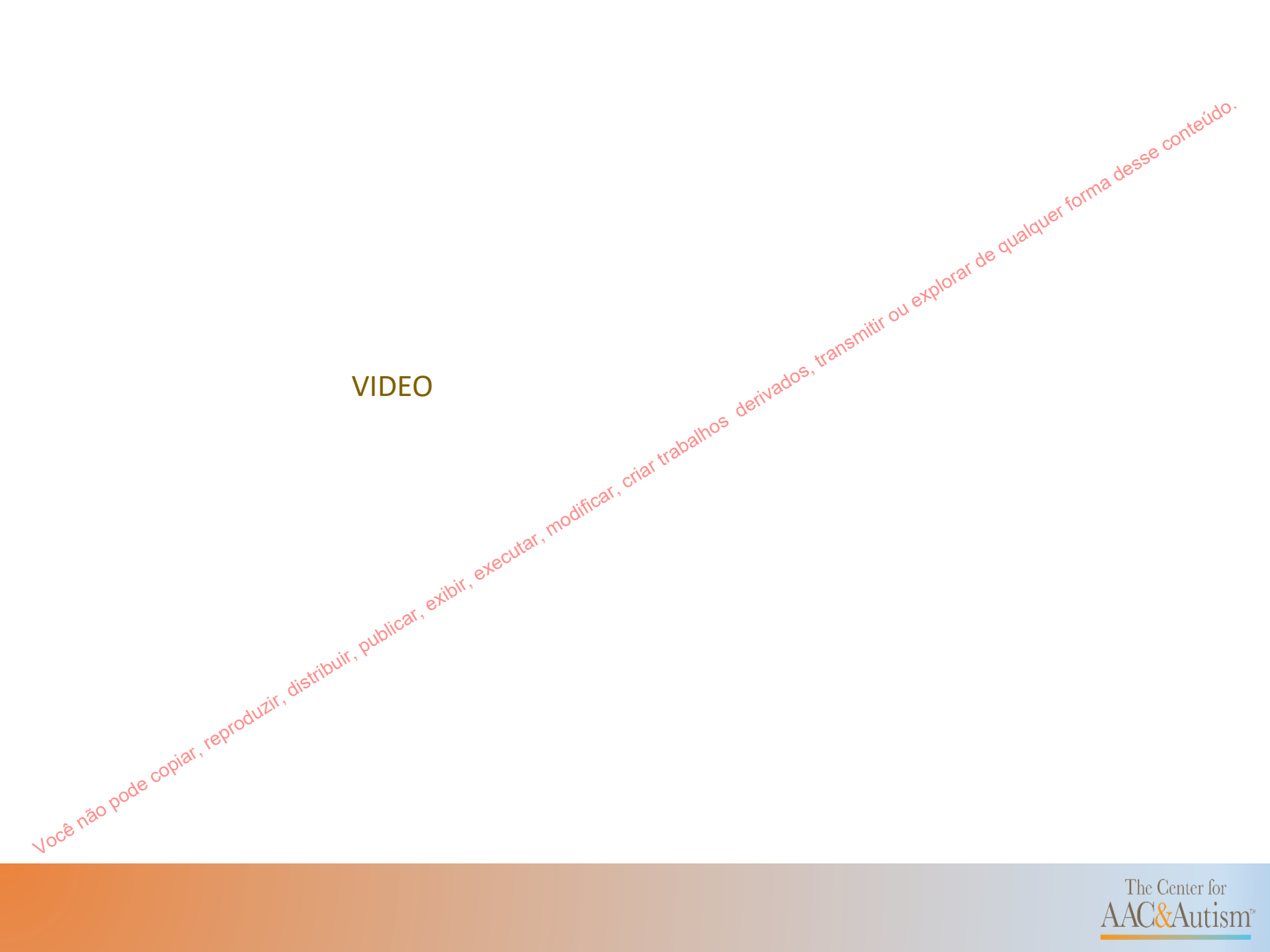
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Who we are...



Parents, Practicing Teachers & Therapists

VIDEO



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

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

1. Describe the five key elements of LAMP
2. Describe how core vocabulary can be taught through the use of motor planning
3. Identify methods of motivating clients with ASD to use AAC through the use of LAMP strategies
4. Identify ways to evaluate and track progress for clients using LAMP

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What works for you?

“The greatest obstacle to discovery is not ignorance, it is the illusion of knowledge.”

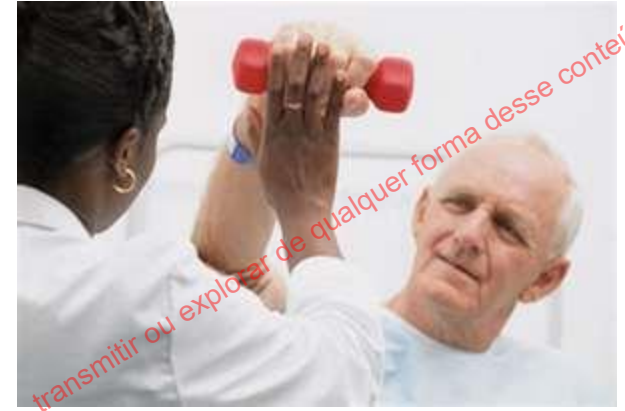
Daniel J. Boorstin

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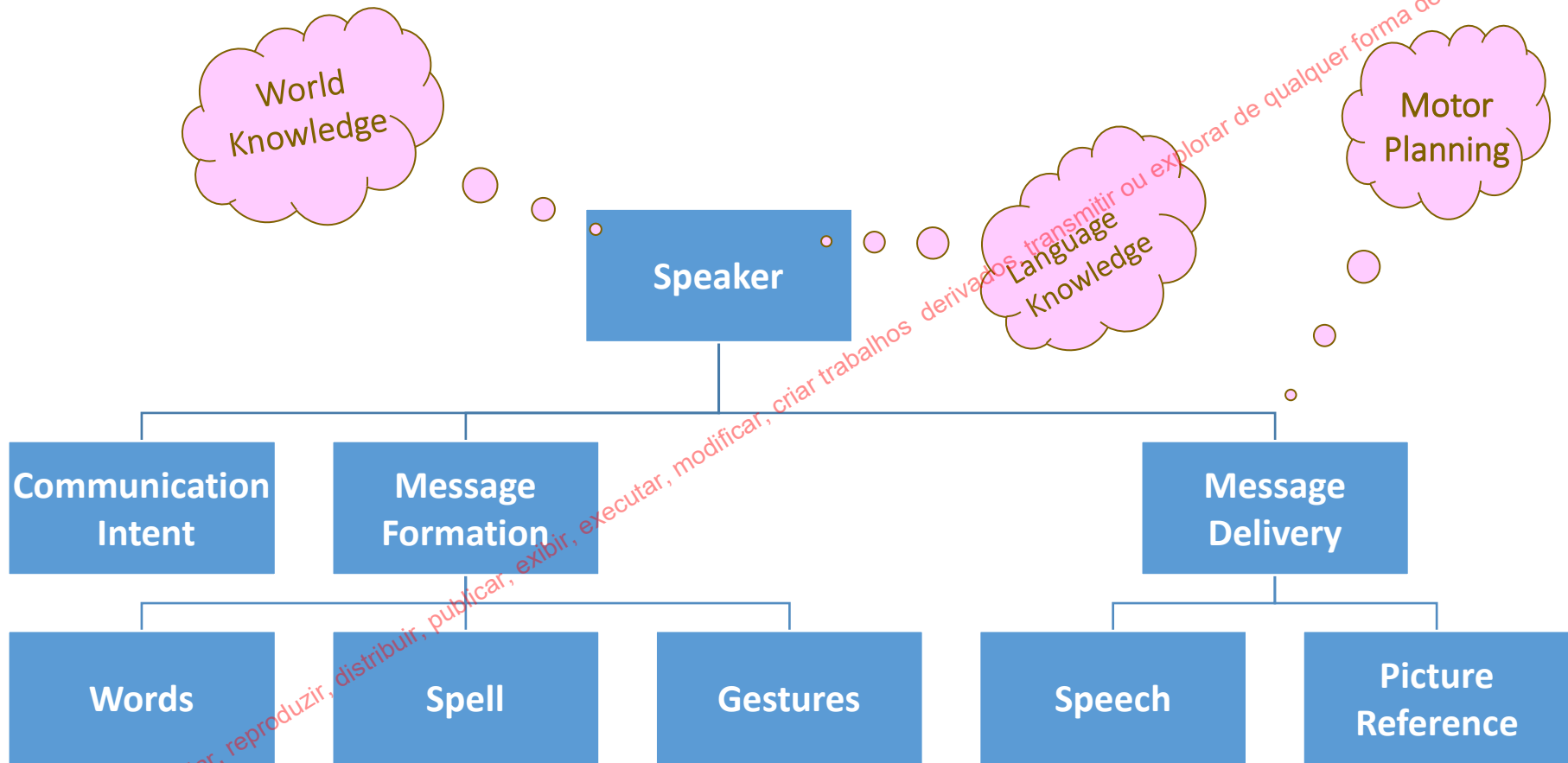
It has been estimated that between 30-50% of individuals with autism will not develop functional speech.

Wodka, Mathy, & Kalb, 2013

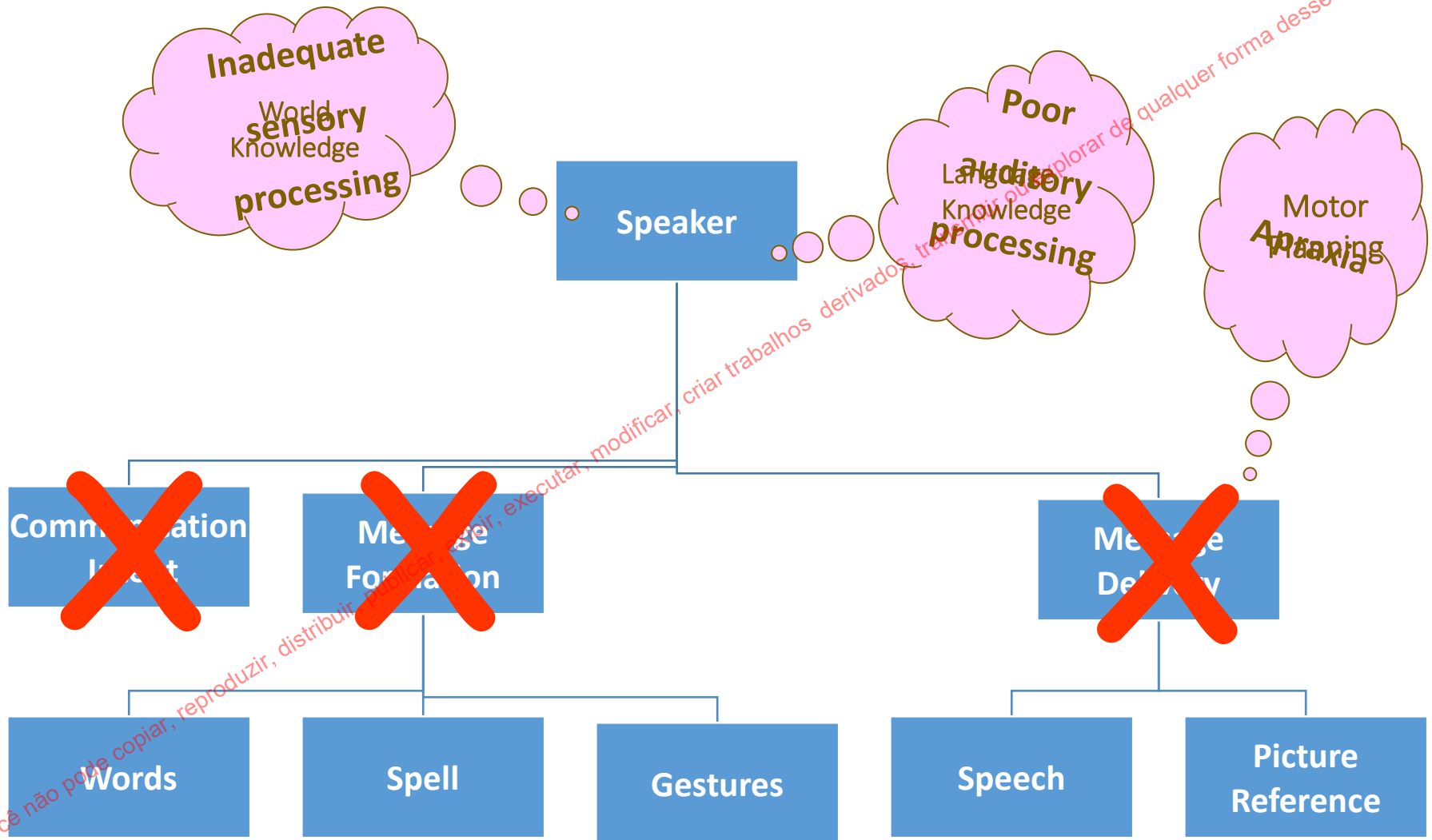
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Normal Communication Process

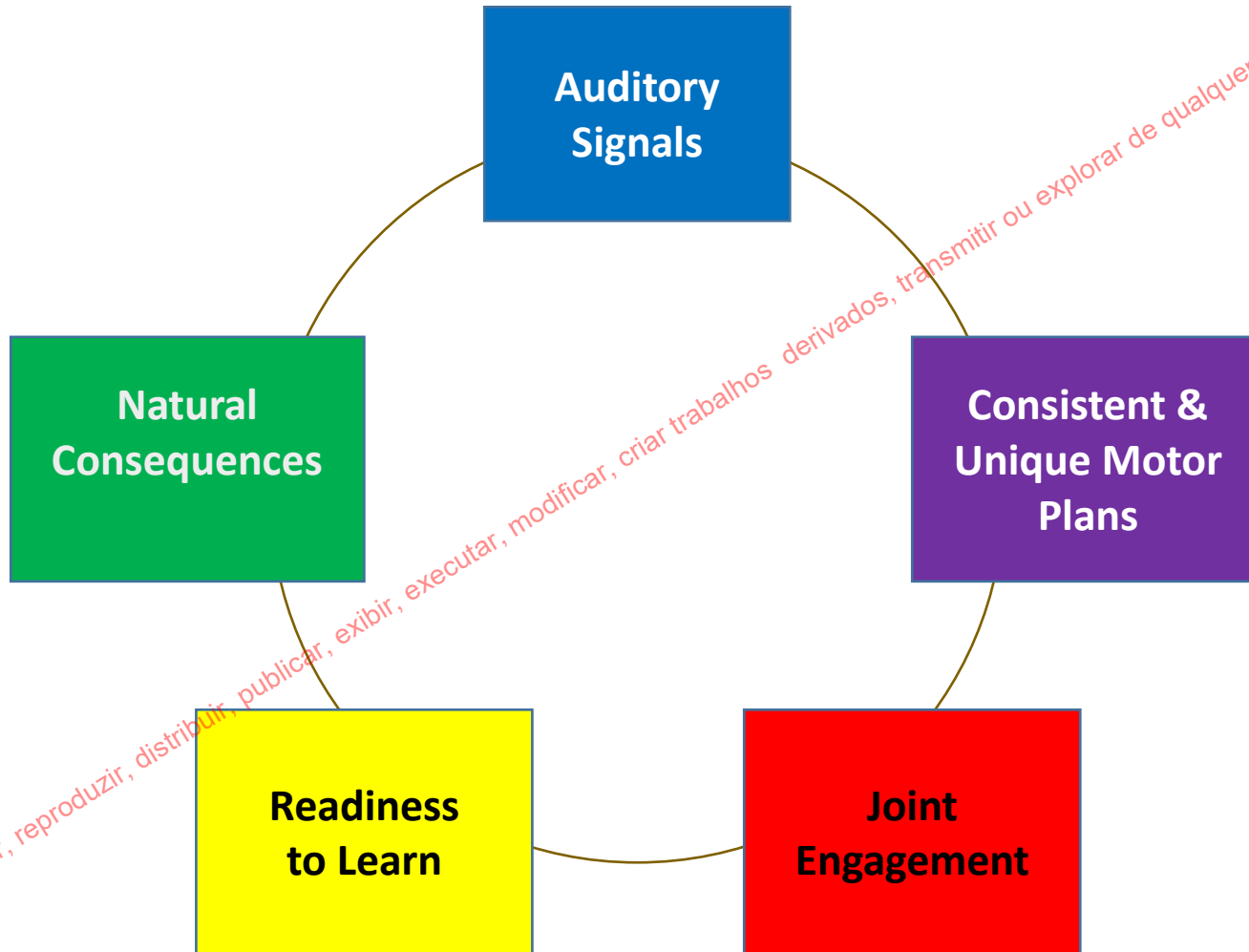


Presumed causes in ASD



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Components of LAMP



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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

LAMP Objective:

- Development of language skills and natural speech –
- For those unable to develop natural speech, spontaneous, interactive communication using an AAC device.

S: Spontaneous

N: Novel

U: Utterance

G: Generation

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LAMP Law:

**Every word has a consistent and
unique motor plan**

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"In the practiced automatic movements of daily life attention is directed to the sense impression and not to the movement. So, in piano playing, the beginner may attend to his fingers but the practiced player attends only to the notes or to the melody. In speaking, writing and reading aloud, and in games and manual work, attention is always directed to the goal, never to the movement. In fact, as soon as attention is directed to the movement, this becomes less automatic and less dependable."

Cattell, J.M

1893

“Children who are to achieve linguistic competence must learn to construct sentences word by word and morpheme by morpheme. These constructed utterances must adhere to the linguistic rules of whatever language they would speak if they were able to rely solely on their natural speech for communication.” (p. 318).

Binger, C., Kent-Walsh, J., Harrington, N., & Hollerbach, Q. C. (2020). Tracking Early Sentence-Building Progress in Graphic Symbol Communication. *Language, Speech, and Hearing Services in Schools*, 51(2), 317-328.

Prerequisites?

Eligibility determinations based on a priori criteria violate recommended practice principles by precluding consideration of individual needs.

2003, National Joint Committee for the Communications Needs of Persons With Severe Disabilities

High Expectations!

Don't lower your expectations to meet your performance. Raise your level of performance to meet your expectations. Expect the best of yourself, and then do what is necessary to make it a reality.

Ralph Marston

Make the *least* dangerous assumptions, presume competence, do not underestimate potential!

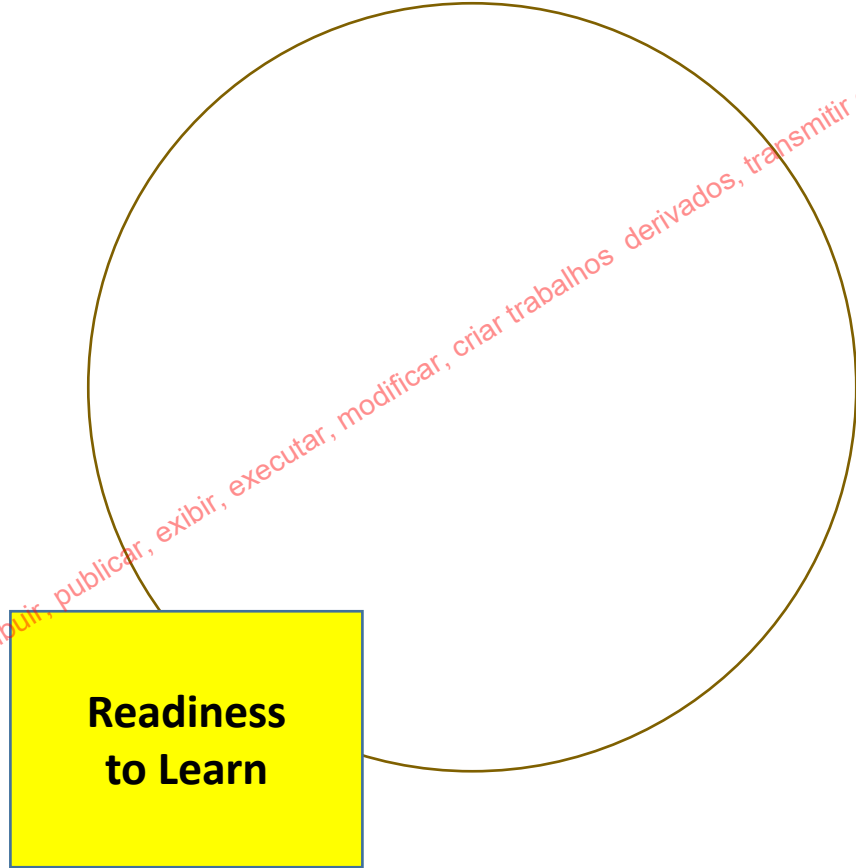


My teacher
thought I was
smarter than I
was – so I was.

Six-year-old

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Components of LAMP



**Readiness
to Learn**

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Weakness: Sensory Processing

Sensory differences make it difficult for the individual to attend to relevant stimuli and process those stimuli to form an adaptive response and can have a significant impact on language and communication development. (Tomcheck, Scott D. and Dunn, Winnie, 2007)

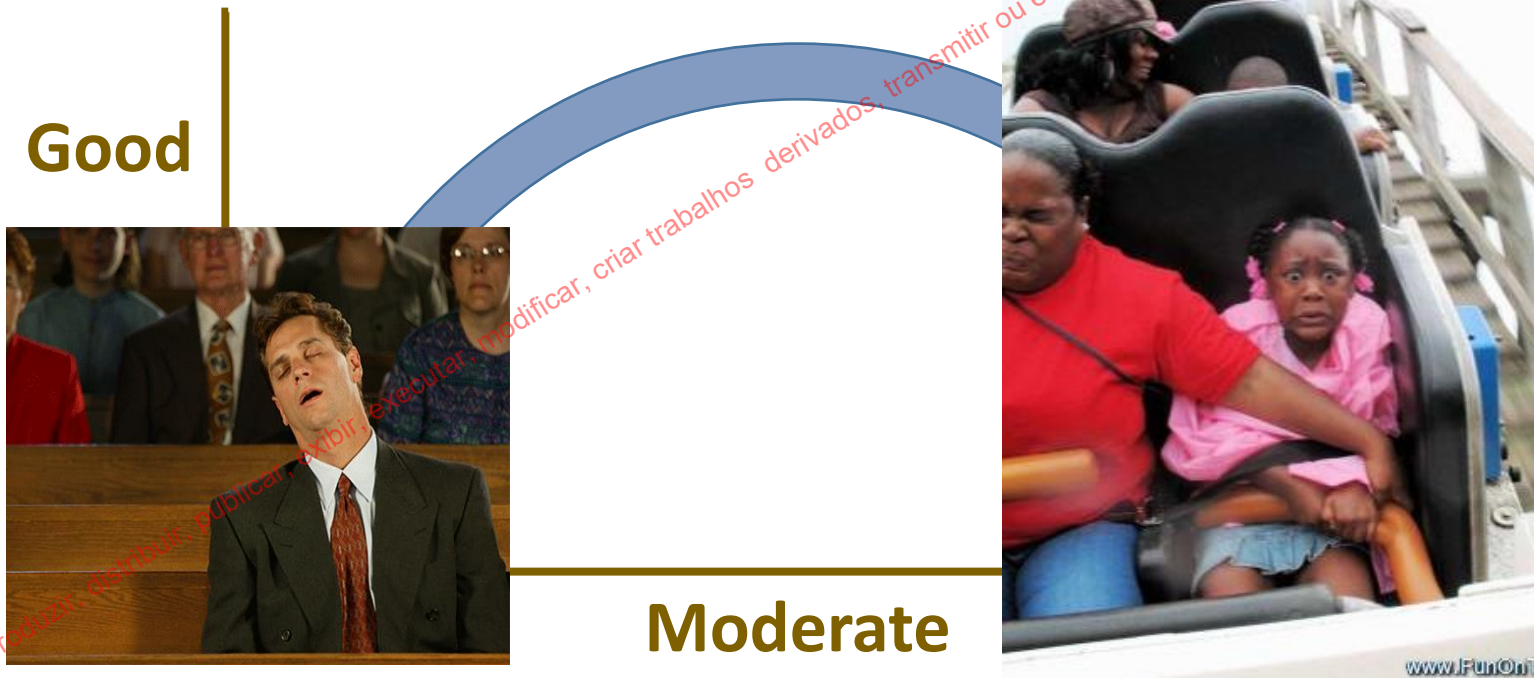
LAMP Goal: Sensory Processing

LAMP addresses the individual's sensory needs throughout language learning opportunities so that the learner can attend and successfully participate in the communication task.

Arousal/Modulation

The Inverted U Principle

Performance



Arousal Level

(Duffy, 1962)

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Readiness to Learn

Some children with ASD need to be calmed in order to be in a state of readiness to interact. Other children need to have their level of alertness increased to be ready to learn. In either instance, the child must be ready at emotional and sensory levels before learning can occur.

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Readiness to Learn

Additional Considerations:

- **Emotion-** This results in many brain systems being activated simultaneously so information is processed more effectively.
- **Motivation-** It is 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)

Readiness to Learn

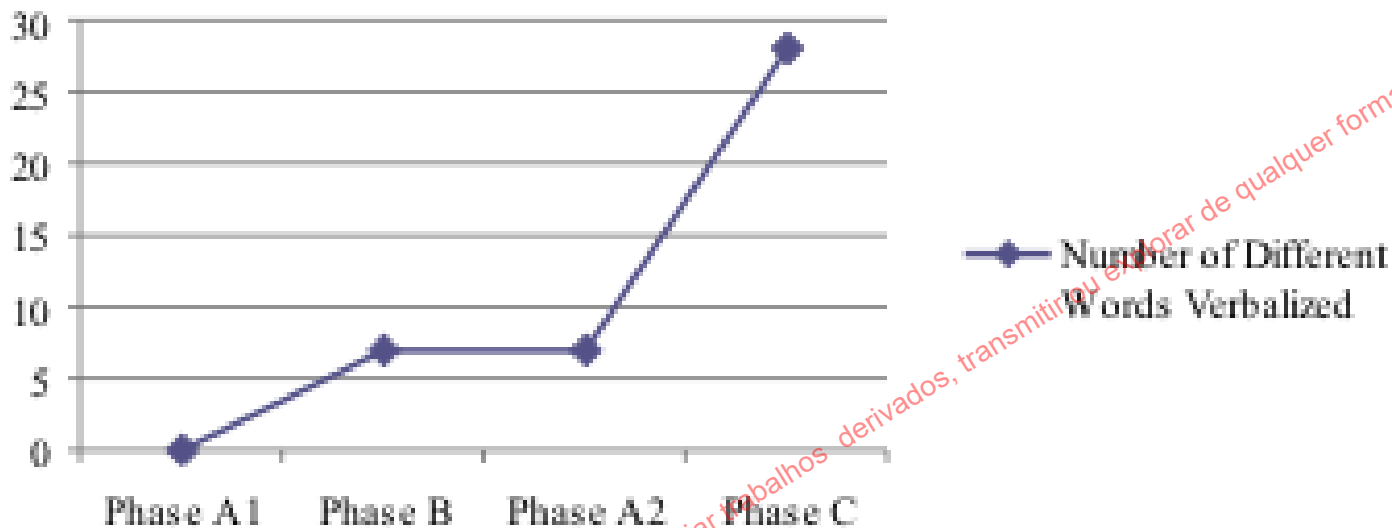
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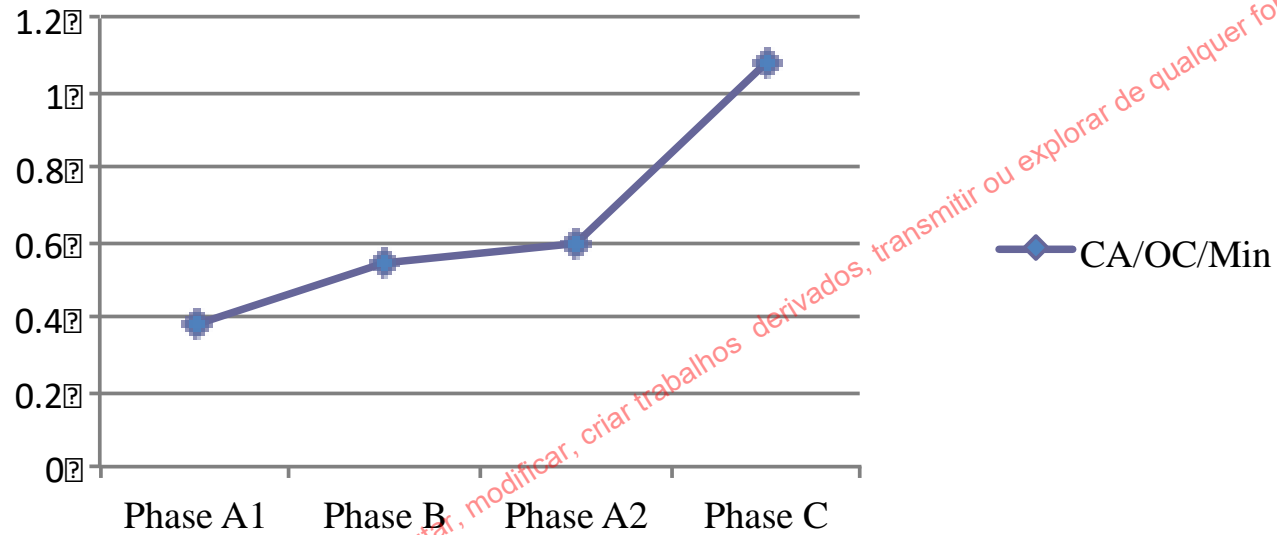
The Impact of Interrupted Use of Speech Generating Device on the Communication Acts of a Child with Autism Spectrum Disorder: A Case Study

The results from this study indicated the training and ongoing use of a speech generating device positively impacted the child's ability to expressively communicate. Specifically, the results revealed that the child's communication acts (CAs) per obligatory context (OC) per minute increased for both sampling periods during which the speech generating device was utilized.

Education Vol 135. No3



Count of Number of Different Words Verbalized by Participant



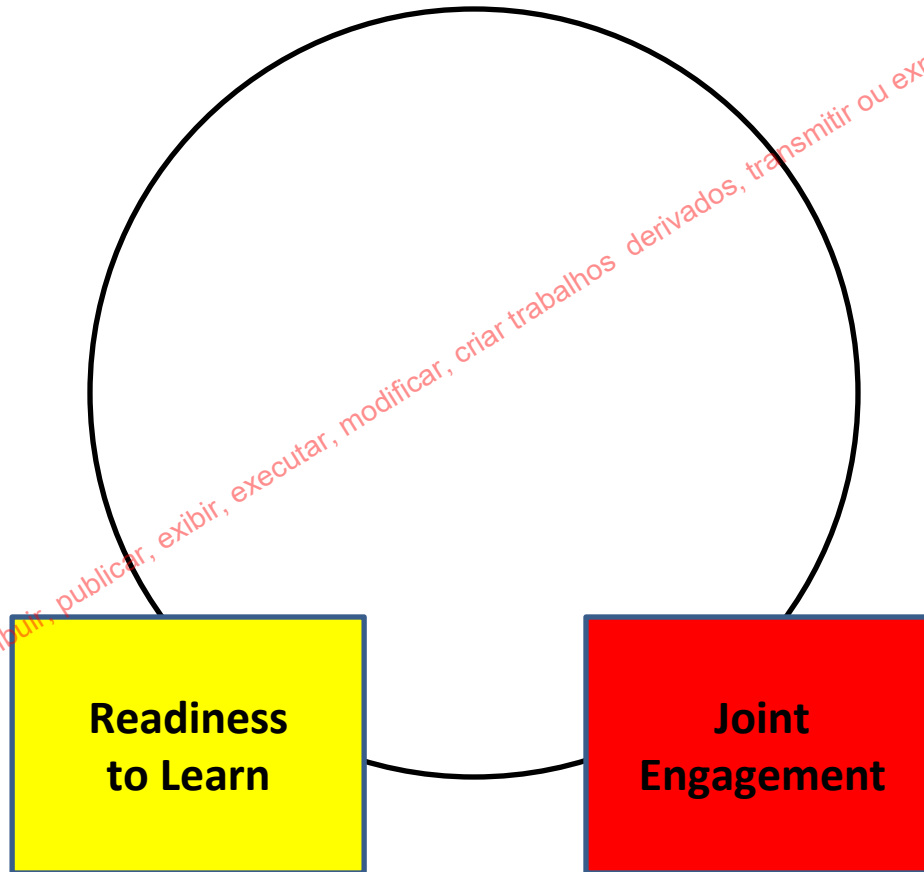
*Participant's Communication Acts
(CA) per Obligatory Context (OC) per
minute*

Readiness to Learn

The Impact of Interrupted Use of Speech Generating Device on the Communication Acts of a Child with Autism Spectrum Disorder: A Case Study (cont.)

Perhaps the most interesting findings from this case study for these investigators were 1) the lack of language progress in all communication behaviors tracked in this investigation during the two-year sampling period in which the child did not have access to a speech generating device, and 2) an increase in all targeted expressive communication behaviors after the reinstatement of the speech generating device when paired with guidance and support from the speech-language pathologist.

Components of LAMP



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Weakness: Joint Engagement

Participating with the same object or event with another

- Core deficit in autism
- Important for language development

LAMP Goal: Joint Engagement

LAMP uses a learner directed/therapist guided approach to develop interactions with the child and improve that child's capacity for joint attention and engagement

Joint Engagement

Siller & Sigman (2002)

- Strongest predictor of a gain in joint engagement was the amount of time the caregiver synchronized their verbalizations to the activity in which the child was engaged rather than directing the child.
- Also found that caregivers who more frequently synchronized their interactions with the interests of the child during play had children who developed more advanced communications skills over a period of 1, 10, and 16 years.

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

As suggested by Stanley Greenspan, enter the child's activities and follow the child's lead. If the child wants to line up cars in a row or twirl a top, the parents will join the child in his or her preferred activity (with the intent of developing this action into an affective interaction) rather than demanding that the child join them in their preferred activity (a process which, at best, will produce no more than rote action and reaction).

From Autism National Committee <http://www.autcom.org/behaviorism.html>

Joint Engagement

Learner-Directed:

- Follow the child's lead.
- Join with the child.
- Build on the child's interest.
- It is acceptable to gently guide the activity to build complexity, change routines, and introduce new concepts as long as the learner stays engaged.

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Joint Engagement

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

Joint Engagement

Use Movement

- Movement helps maintain a shared focus and also allows language to be used more easily. Be prepared to move, providing the child with a full compliment of appropriate sensory input.

Carefully Use Barriers

- Barriers can be an effective way to encourage communication to solve a problem

Joint Engagement

Language Expansion

- LAMP intervention builds on the individual's interests. If interested in swinging, choose words that can facilitate interactions during swinging such as requesting (more, help) or commanding (go). Be prepared to introduce words that can be used in each situation.

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.

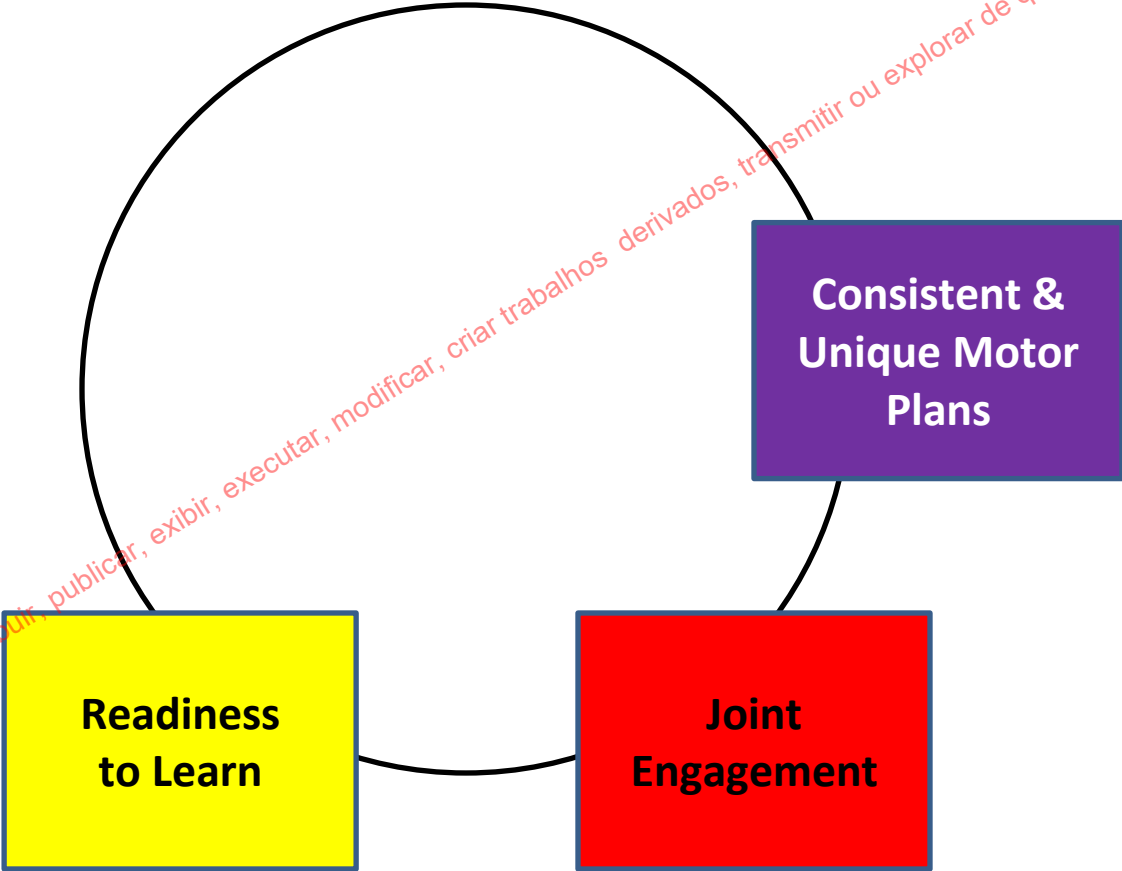
Joint Engagement

Look for...

Social Exchange
or
Moment of Joy

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Components of LAMP



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Weakness: Apraxia

A growing number of studies have indicated motor impairments to be prevalent in children with autism...

Dzuiik, et al. (2007) found children with autism have significantly poorer praxis than typically developing peers and dyspraxia was strongly correlated with the social, communicative, and social impairments.

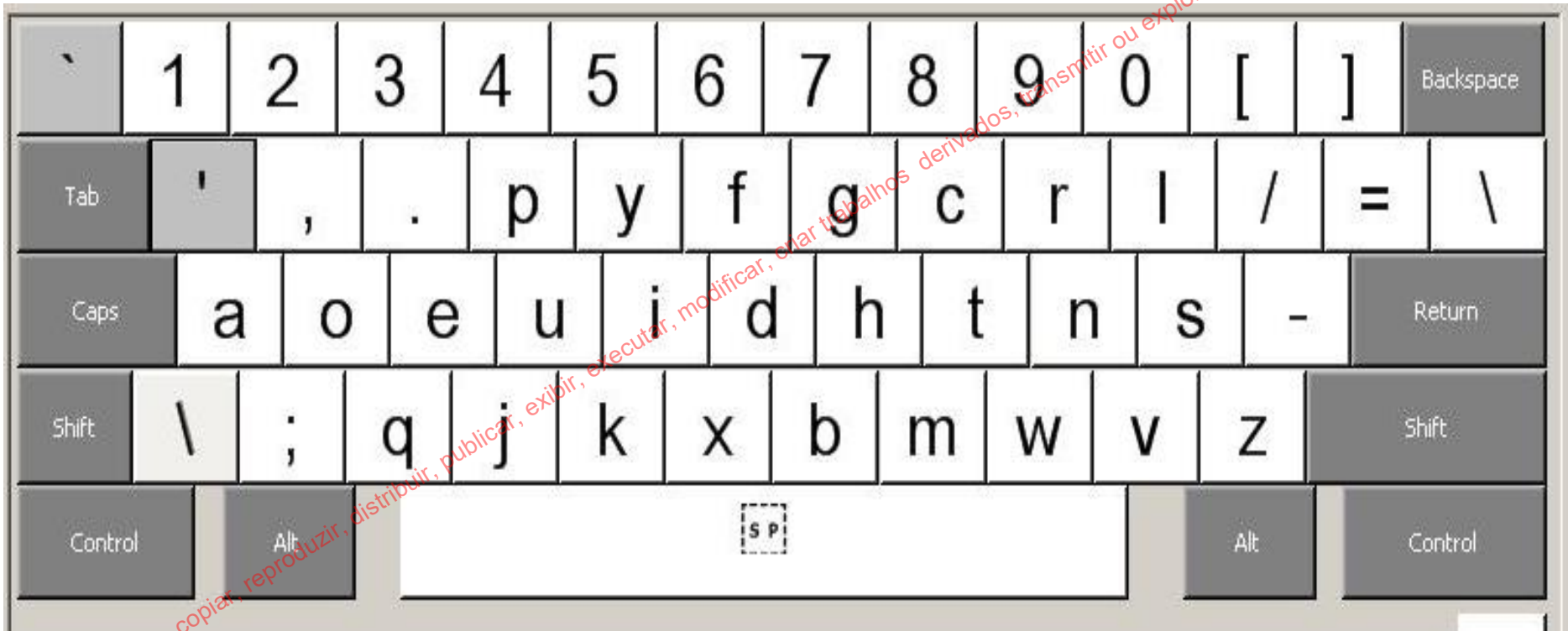
LAMP Goal:

Apraxia

- Pressing a button is easier task to motor plan than articulating a word.
- Utilizing consistent motor patterns to access words leads to automaticity decreasing the need to cognitively motor plan each time they speak.

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Consistent & Unique Motor Patterns



Consistent & Unique Motor Patterns

Natural Speech Levelt (1989)

- “Normally speakers have no conscious access to language encoding or articulation. For most speakers, language production is relatively effortless.” The speed and complexity of the motor process demands that it be carried out automatically and without conscious awareness.

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Consistent & Unique Motor Patterns

Communication with AAC

- For natural and fluent communication using AAC the individual needs to be able to focus on the content of their communication rather than cognitively attending to meanings of icons, categories, locations of vocabulary and the motor planning required for access.

Stages of Motor Learning

(Fitts and Posner, 1967)

Cognitive stage :

Learner has to attend to the process of learning a motor action

Associative stage:

He works on refining his skill.

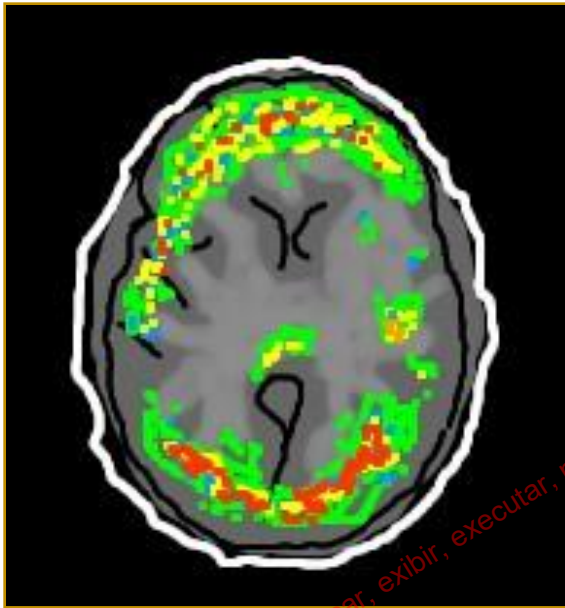
Autonomous stage:

The learner does not have to concentrate on the movement and can attend to other aspects of the activity.

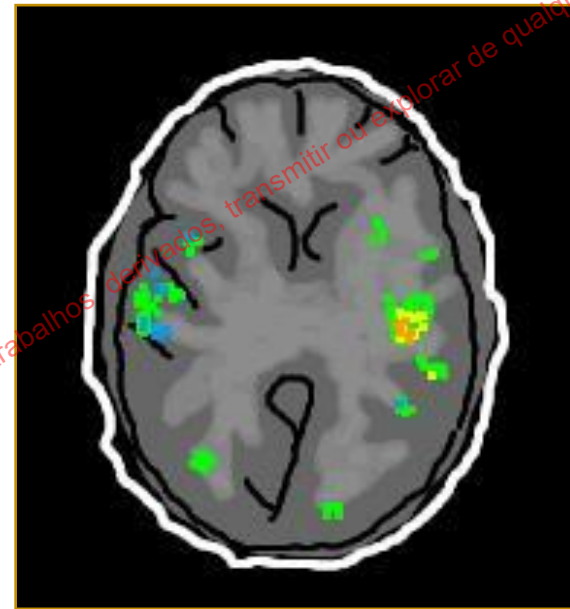
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Consistent & Unique Motor Patterns

Automaticity



New Task



With Automaticity

- Habitual movements become subcortical
- Cortical areas can then be put to “better use”

Consistent & Unique Motor Patterns

Automaticity: The Great Equalizer

Natural Language...

- Cognitive activity: Formulation of thoughts
- Motor activity: Speech & Gesture (automatic)

AAC Language...

- Cognitive activity: Formulation of thoughts
- Motor activity: Device activation (automatic??)

Consistent & Unique Motor Patterns

The Device

- The same vocabulary should be consistently available in all settings.
- Teach motor pattern, NOT metaphor

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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

Core vocabulary is powerful because...

- It allows communicators to express a wide variety of concepts with a very small number of words.
- Core words can be used in many ways; the meaning changes based on the context or the words that preceded or followed the core word
- Core words can be taught and reinforced in a variety of sensory rich-activities and allow for quick and easy two-word combinations.

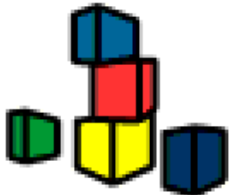


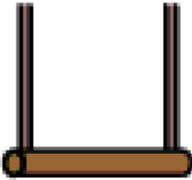




Consistent & Unique Motor Patterns

- Start with a system than 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

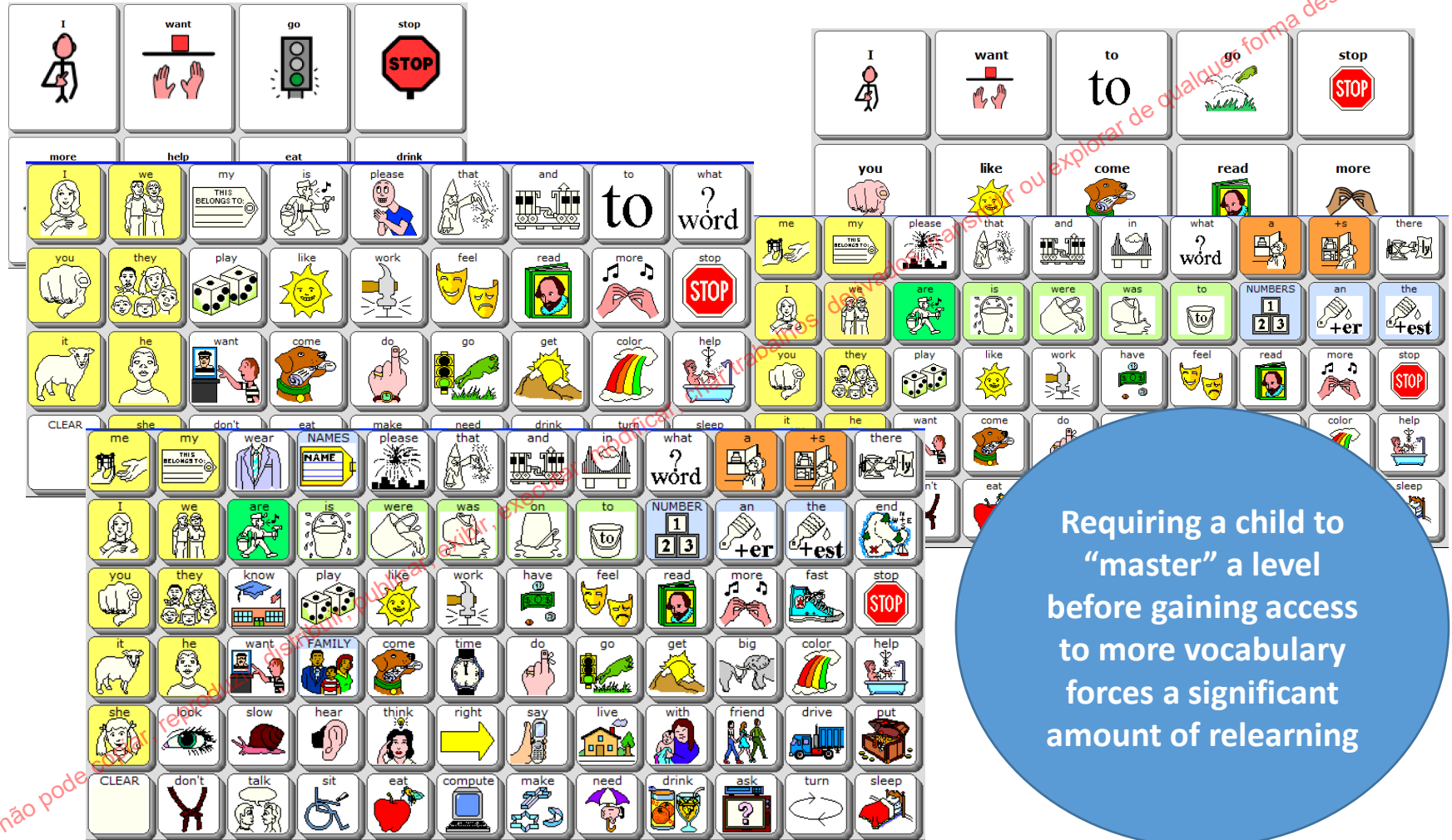
eat more feel |

3/1/10 4:17PM Caps Lock Ctrl Output Speech

<p>blocks</p> 	<p>ball</p> 	<p>writing</p> 	<p>trapeze</p> 
<p>swing</p> 	<p>tunnel</p> 	<p>brush</p> 	<p>puzzle</p> 

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Consistent & Unique Motor Patterns



Requiring a child to “master” a level before gaining access to more vocabulary forces a significant amount of relearning

Você não pode clicar aqui

Consistent & Unique Motor Patterns

How to Model Vocabulary to Achieve Motor Automaticity

Levels of motor assistance:

- Hand over hand
- Point to icon
- Point to general area of icon
- Point to device
- Wait for child to activate

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Consistent & Unique Motor Patterns

- Avoid temptation to “check comprehension” by shifting locations of pictures because ...?
- Perseveration?

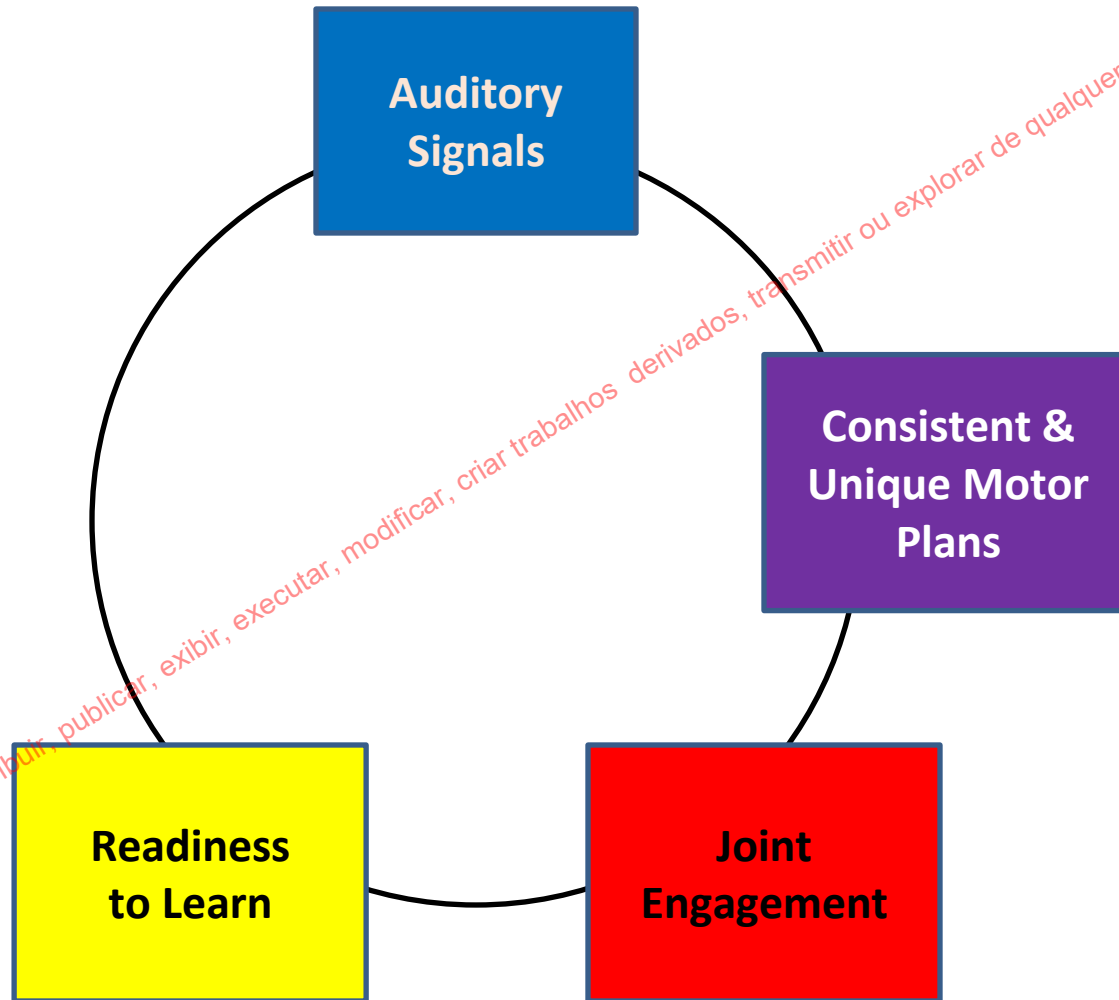
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Consistent & Unique Motor Patterns

VIDEO

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Components of LAMP



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Weakness:

Auditory Processing

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

Several researchers have found evidence of auditory processing delays and differences in individuals with autism (Boddaert et al, 2004; Courchesne, 1984; and Tecchio et al, 2003.)

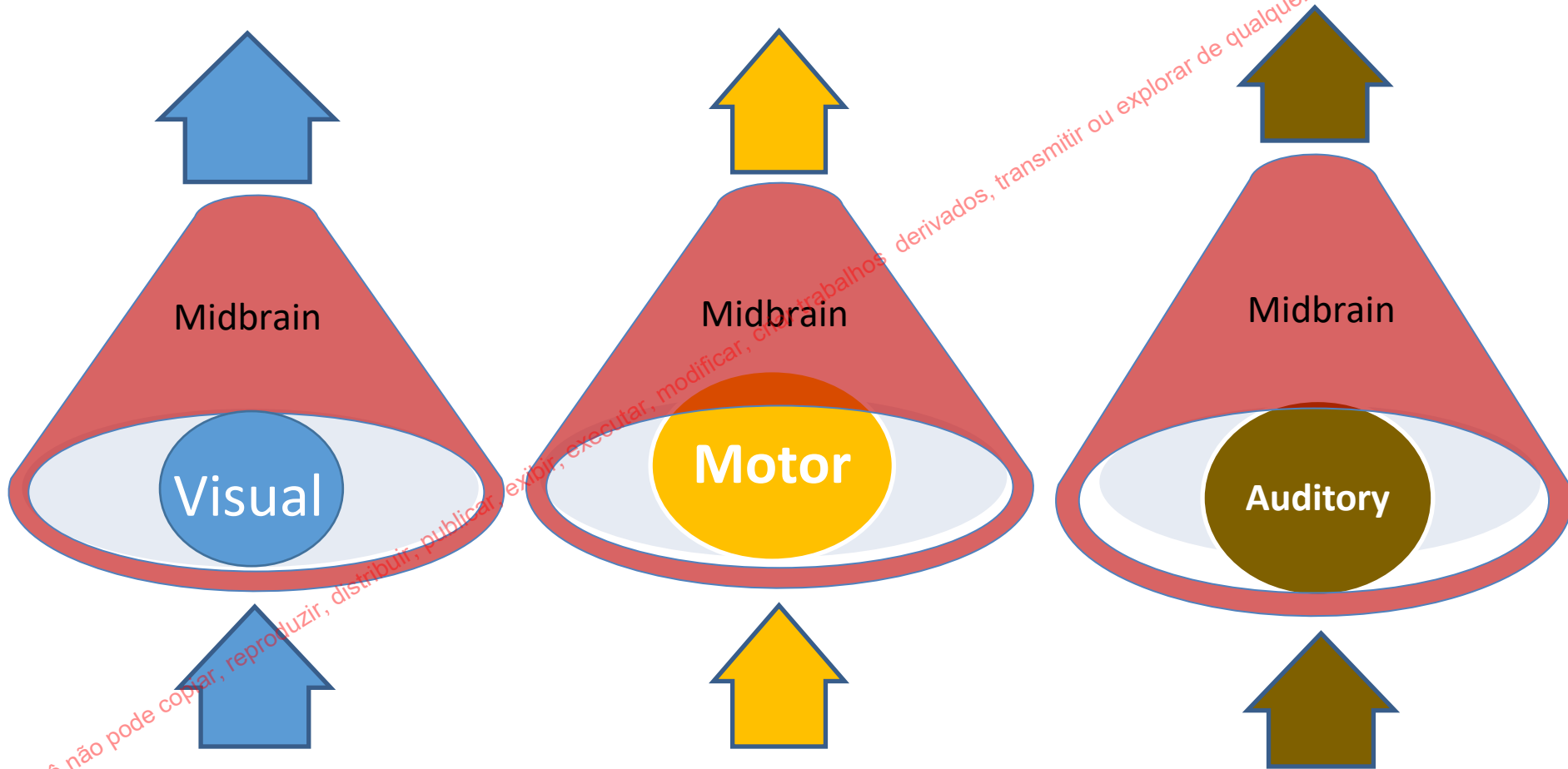
LAMP Goal:

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.

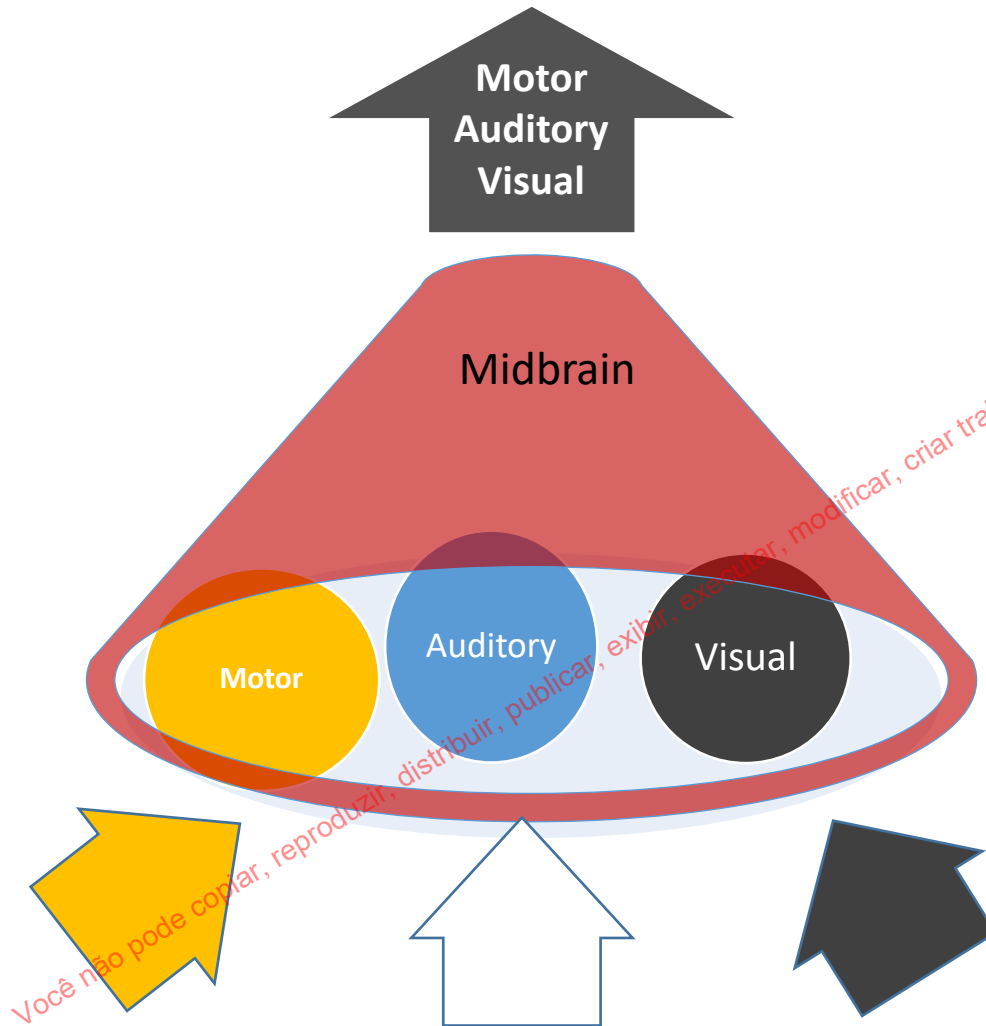
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Funnel Model of Convergence (Halloran, 2011)



Auditory Signals

Multi-sensory Convergence



- Neurons that fire together wire together
- Multiple sensory inputs emerge as one experience
- Proximity in time and space enhances behavioral response

Auditory Signals

Evidence of Convergence

- McGurk Effect

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Auditory Signals

Children with autism.....showed a lower rate of the McGurk effect compared with the Asperger, Down and typical samples. These results suggest that children with autism may have unique intermodal speech perception difficulties linked to their representations of speech sounds.

Bebko, J.M., Schroeder, J.H., Weiss, J. A. The McGurk Effect in Children With Autism and Asperger Syndrome. Autism Research. Oct 17 2013

Auditory Signals

- Through the consistent pairing of motor and auditory input, the motor areas of the brain begin to play a role in speech perception.
- As early as 18-20 weeks of age, prefer to look at films where the lips of the speaker and the sound heard match.

-Westermann and Miranda, 2004

Auditory Signals

- Nashville's Vanderbilt Brain Institute, enrolled 64 children ages 6 to 18. Half had autism without intellectual disability or other severe impairment.
- Analysis showed that the children with autism were significantly less precise than the typically developing children when discriminating simultaneous versus out-of-sync audiovisual cues. This difference became most pronounced with cues involving speech

Autism Speaks 1-15-2014

Auditory Signals

Results of recent fMRI study comparing segmentation ability in children with and without autism found “Unlike traditionally developing children, children with autism did not show a facility effect of increasing clues to word boundaries...These findings suggest that in autism the brain is not as sensitive to the statistical structures...”

Scott-VanSeeland, McNealy et al. (2010)

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Auditory Signals

Prizant (1983):

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

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Auditory Signals

- 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: Theiessen @ 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

Pinker (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.”

Auditory Signals

- Virtually every sentence that a person utters or understands is a brand new combination of words appearing for the first time in the history of the universe.
- Language cannot be a repertoire of responses. The brain must contain a recipe or program that can build an unlimited set of sentences out of a finite list of words.

Auditory Signals

Additional Benefit of Core Words

To improve auditory processing of speech, it would seem imperative to teach vocabulary on the device reflective of the words frequently heard in speech.

LAMP: Each Unique Motor Pattern = Specific auditory signal - A specific word

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.

Auditory Signals

Device Considerations

- The voice selection on the device should provide a good auditory model for the client.
- There must be almost simultaneous voice production between key selections and the vocal output on the device

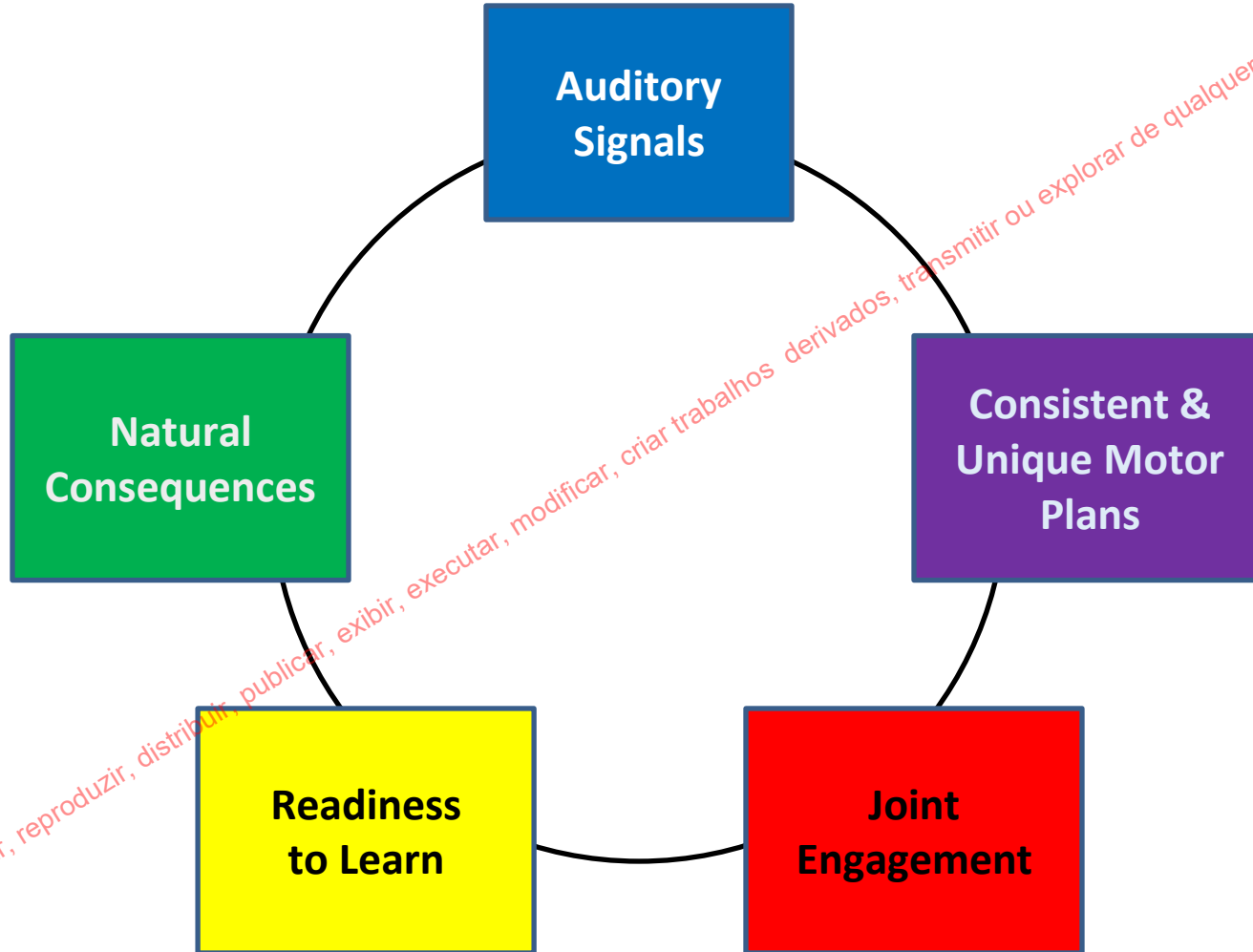
Auditory Signals

Random Selection

- Responding to miss-hits allows the opportunity to teach new words through converging that set of motor, auditory, and visual inputs.

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Components of LAMP



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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

Word meanings are illustrated and language enhanced when the nervous system has the opportunity to:

- integrate motor (accessing the device),
- auditory (speech output), and
- visual (natural consequences) input.

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Natural Consequences

Positive and Animated

- Respond in an animated manner to help illustrate the meaning of the word and to keep the learner engaged.
- Individuals are more apt to participate and communicate with shared attention when an activity is interesting and meaningful to them.

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Natural Consequences

Generalize

When responding, don't always provide the same response for a word. To help the individual generalize the meaning of a word, provide different appropriate responses.

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Natural Consequences

Core words have many meanings

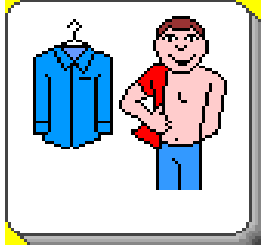
Back

Up

Meanings of words are continually revised as they are used in different contexts.

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Natural Consequences



To match or harmonize
The shirt **goes** with the pants.



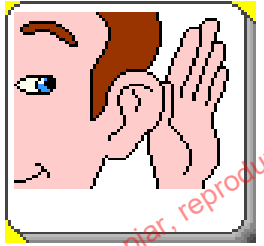
To come into a condition:
Time to **go** to sleep.



To function:
The engine is **going**.



To make a sound:
The dog **goes** "bow wow".



To circulate:
The rumor **goes** around the school.



To fit:
The belt won't **go** around my waist.

go

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Natural Consequences

- Timing - The timing of the motor and auditory input is critical for the integration of those senses. Some device voices require more processing time and therefore delay the auditory output.
- Initially, timing of the visual output is equally important

Natural Consequences

The Device

- When introducing the device, the desired word may need to be accessed with one touch/one icon so that the learner receives immediate feedback from his actions.
- **Transition as quickly as possible to a sequence level!**

Natural Consequences

The Device

- 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.

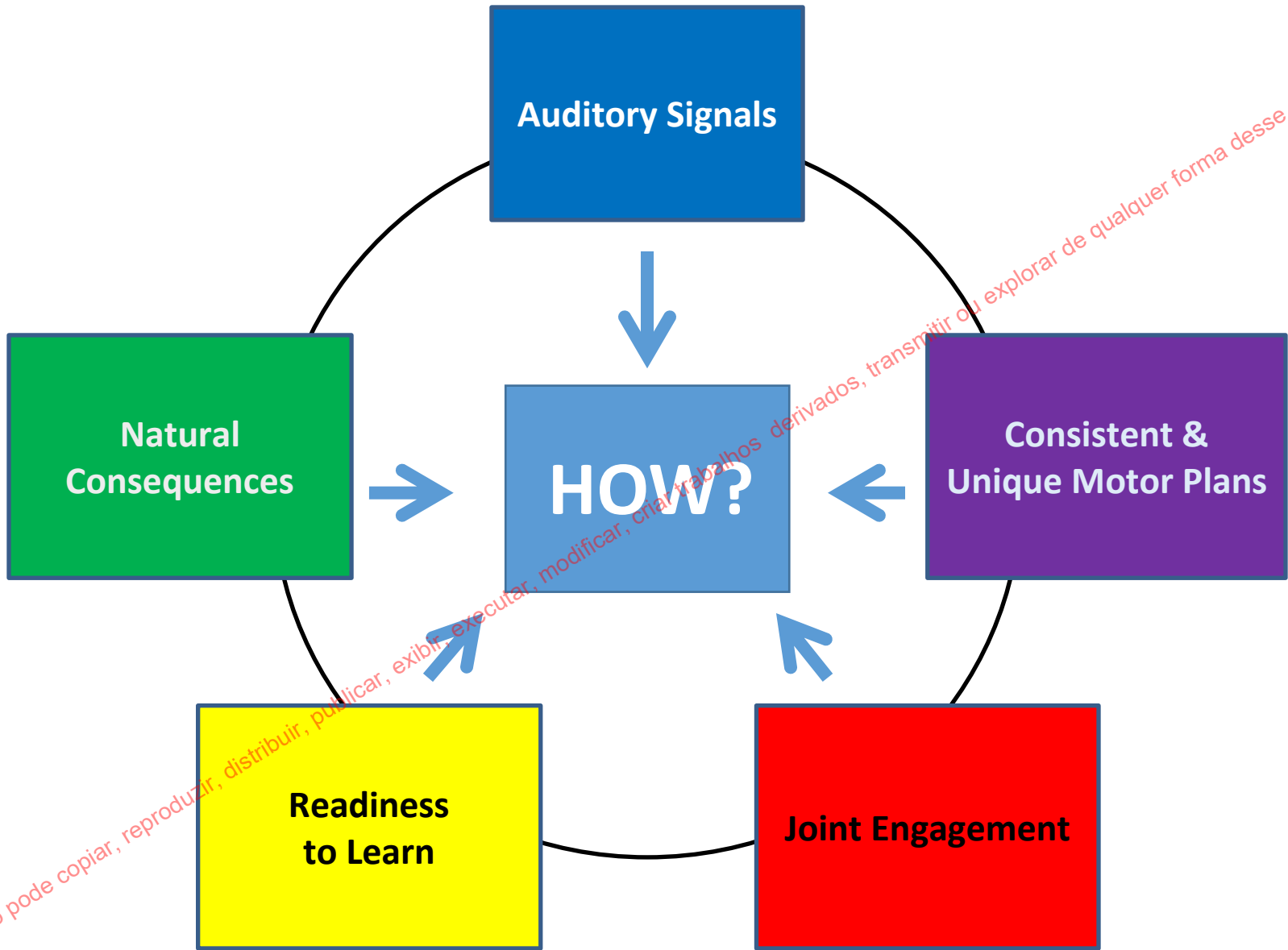
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Natural Consequences

High Expectations

- Presume competency
- Respond as if utterance were purposeful
- Positive attitude/believe they can

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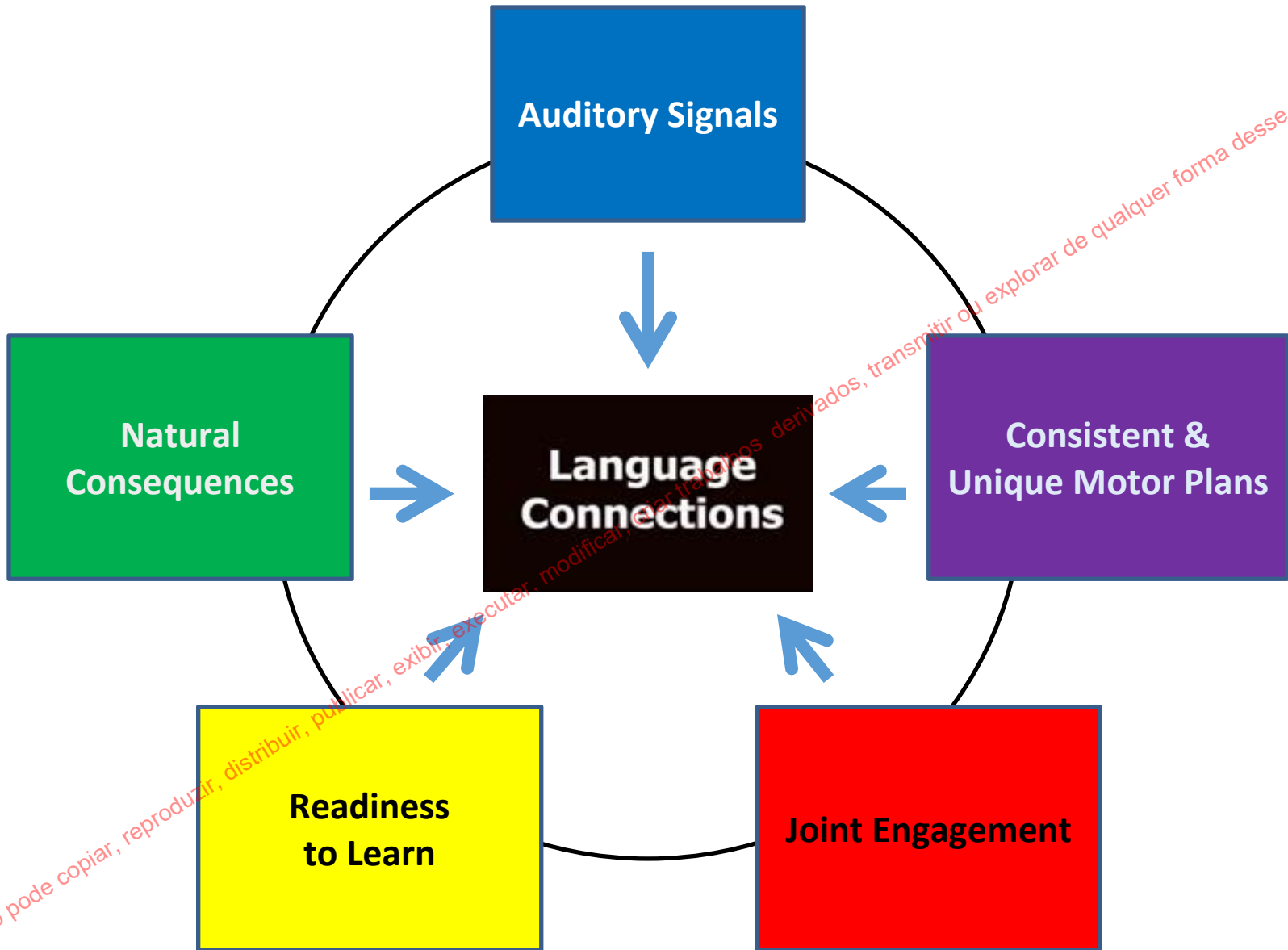
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Therapy Strategies

- Use a large vocabulary set, so intervention can be child centered. Start with the most available icons that the child can physically access (minimizes re-learning)
- Start at the appropriate level for the child but look to the future. System should be able to grow with the child.
- Make the “least dangerous assumptions” by not underestimating the child’s ability and potential.

Therapy Strategies

- Explore what motivates the child, follow the child's lead. Build language around their passions
- Minimize distractions while keeping the motor plan the same
- Remember ... Words not phrases, watch for “carrier phrases”
- Accept any form of communication
- Know the vocabulary yourself



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Language Connections

- The AAC device is a tool that allows the child to “babble” and learn about language.
- As the child learns with the AAC device, he/she is learning consistent motor patterns that result in an auditory signal.

Language Connections

Symbols

- The intrinsic value of the reinforcer is more important than the symbol
- One icon or icon sequence to represent all meanings of the word
- The more iconic, the harder it may be to generalize
- “Sometimes the person with autism finds a symbol line drawing less confusing than a detailed photograph. People with autism tend to perceive details more powerfully than the whole.
Angermeier, et al (2008)

Language Connections

Core Vocabulary has few picture producers

- I
- Like
- You
- When
- Give
- Me
- Cookies
- Yeah
- No
- But
- Only
- For
- Love
- Too
- But
- Don't
- All
- The
- Time



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Conexões de Linguagem

- Figuras produzindo palavras RARAMENTE proporcionam poder de comunicação
- Amostras de vocabulário precoce têm muito pouca, se alguma, figura produzindo palavras
- Qualquer método de representação requer aprendizado

Conexões de Linguagem

Foco no vocabulário “principal” ao invés de nomes porque

- Generalização ocorre através do principal
- Expansão segue a generalização
- A linguagem expressiva pode vir antes da linguagem receptiva com o uso repetido de uma palavra (com equipamento de CAA), seguida pelo feedback apropriado e consequências naturais, ensinando o significado da palavra.

Conexões de Linguagem

Primeiras Palavras

- Algumas palavras como “mais”, “vai”, “sobe” e “desce” são fáceis de ilustrar com uma resposta sensorial e são um ponto de partida recomendado para o aprendizado da linguagem.
- Palavras que não são facilmente ilustradas por reações animadas como “quarta-feira”, “amanhã”, “de algum modo (*somehow*)” e “é” podem ser difíceis enquanto as habilidades linguísticas são desenvolvidas.

Conexões de Linguagem

Pense sobre Desenvolvimento Natural da Linguagem

- Ensinar palavras simples
 - Vez, ir, parar, comida, bebida, meu/minha, mais
- Combinar 2 palavras simples, combiner elas de formas diferentes
 - Minha vez, meu brinquedo, eu vou, você vai, ir (*para*) casa, mais bebida, mais comida, minha bebida, beber água, beber leite
- Combinar 3 palavras

Conexões de Linguagem

Causa/Efeito

- Começar por mirar uma core word que possa ser incorporada numa atividade motivadora.
- Inicialmente, aprendizado sem erros - Um toque/ocultar outros ícones - diminuirá os requisitos de planeamento motor e permitirá um feedback consistente para a tarefa motora

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Conexões de Linguagem

Generalização/Discriminação

Uma vez que o aprendiz saiba que quando ele aperta o botão algo irá acontecer...

- Generalizar para uma variedade de atividades em sessão única. Adicionar palavras para aumentar vocabulário e possibilitar discriminação, resolução de problemas
- Extender o padrão motor para versão sequenciada

Conexões de Linguagem

Expandir Aprendizagem de Vocabulário

- Adicionar novas palavras com o desenvolvimento de automaticidade
- Adicionar palavras marginais
- Permitir aprendizado através de “tentativas-erradas”

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Conexões de Linguagem

Funções Comunicativas

- Protestar
- Comentar
- Cumprimentar
- Perguntar
- Dirigir
- Sugerir
- Contar
- Escolher

Conexões de Linguagem

Dê atenção para...

- Modelagem de Linguagem
- Suporte Verbal e Reforço
- Seleção de Voz

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Conexões de Linguagem

Coisas para saber: Plano de Participação

<i>Activity/Class</i>	<i>Communication</i>	<i>How</i>	<i>Who</i>
Entry	Greeting	Accent/WFL	Aide/Teacher/Peer
Morning Message 😊	Go + ()	Accent/WFL	Teacher
Snack 😊	More + ()	Device/Sign/ PECS	
Bathroom		Accent/iPad/ Sign	
Group Lesson 😊		Accent/iPad	
Journal			
Lunch			
Recess			
Mainstream/Inclusion*			

* High academic demands = low device use; 😊 Low demands = high device use

Conexões de Linguagem

Coisas para saber: Equipamento

- Configurar “chave”/ Armazenar uma mensagem
- Esconder e mostrar
- Mudar a cor de uma “chave”
- Travar e destravar
- Economizar memória

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Learn. Hope. Share. Succeed.

Qualquer pessoa tem o desejo e a habilidade de comunicar-se apesar de desafios físicos ou neurológicos.

LAMP Resources Network

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LAMP Words for Life™

A Full Vocabulary AAC Language App


Available on the iPad

The LAMP Words for Life app, based on the Unity® language system, is now available on the iPad in the United States and Canada. Unity is a language system used by thousands of clients around the world to enable independent communication for people with disabilities.



Designed to Meet the Communication Needs of Children with Autism

LAMP Words for Life is designed to meet the communication needs of children with autism. Furthermore, it was created to use in conjunction with Language Acquisition through Motor Planning (LAMP), a proven therapeutic approach that uses consistent motor plans for accessing vocabulary.



Informações sobre o aplicativo Words for Life:

<https://lampwflapp.com/>

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The two words 'information' and 'communication' are often used interchangeably, but they signify quite different things. Information is giving out; communication is getting through.
- Sydney J. Harris

AAC & Autism

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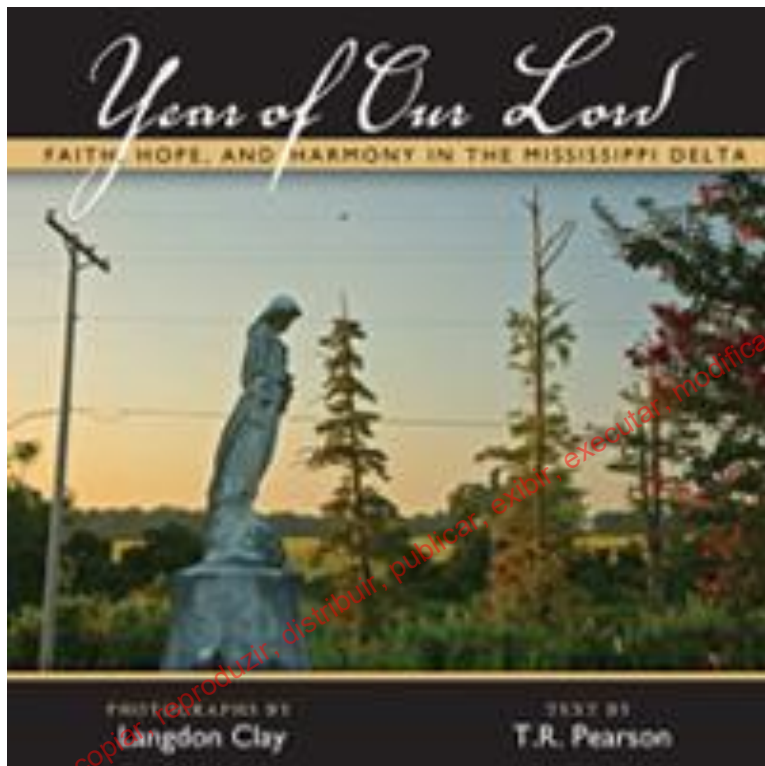
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Lucas

VIDEO

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Year of Our Lord



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