

# Research Insights Into LAMP

(Language Acquisition through Motor Planning)

Ben Satterfield  
Center for AT Excellence  
*GA Tools for Life*  
[www.gatfl.org](http://www.gatfl.org)



Handout available at:  
<http://www.c4atx.com>

# Agenda

- Research Background
- Four Studies
  - Texas Study
  - Australian Study
  - Washington DC Study
  - Arkansas State Study
- Conclusions & Questions

# RESEARCH BACKGROUND

A framework for considering the LAMP approach.

# Research Background

- Many individuals with autism do not produce natural speech that is adequate to meet their daily needs (Weitz, Dexter, & Moore, 1997).
- The level of competence in communication has been found to be a predictor for positive outcomes for individuals with autism (Lord & Paul, 1997).
- Schlosser, et al., (2007) observes that support for these communication deficits has often been sought from AAC systems, especially those which provide an auditory component, or speech-generating devices (SGDs).

# Research Background

- Prizant & Wetherby (1993) found that nonverbal systems may actually facilitate speech acquisition in children with disabilities.
- Therapy employing SGDs can promote the production of speech (Frost & Bondy, 2002; Blischak, Lombardino, & Dyson, 2003).

# Research Background

- Millar, Light, & Schlosser (2006) performed a meta-analysis upon research on low-tech AAC interventions and speech production from 1975 to 2003. (Participants largely ASD).
- They found that:
  - Speech development showed modest improvement in 89% of the participants.
  - Remaining 11% demonstrated no change.

# Research Background

- The main thrust of interventions that employ AAC is to enhance the client's communication ability by means of the multi-modal capabilities inherent in AAC systems themselves:
  - tactile interaction
  - visual symbols/devices
  - auditory feedback

(Light, Beukelman, & Reichle, 2003).

# Research Background

- The introduction and acquisition of an AAC system is one aspect of the intervention.
- Another aspect relates to *how* the SGD is used with the client: therapy approach.
- Most studies did not distinguish approach (diverse strategies).



# STUDY # 1: TEXAS STUDY

Three year study of seven young children with autism or PDD-NOS.

From: Potts, M., & Satterfield, B. (2013). Studies in AAC and Autism: The Impact of LAMP as a Therapy Intervention. (White Paper) Prentke-Romich Company. Available at:

[http://www.prentrom.com/research/research\\_reports](http://www.prentrom.com/research/research_reports)

# Texas Study

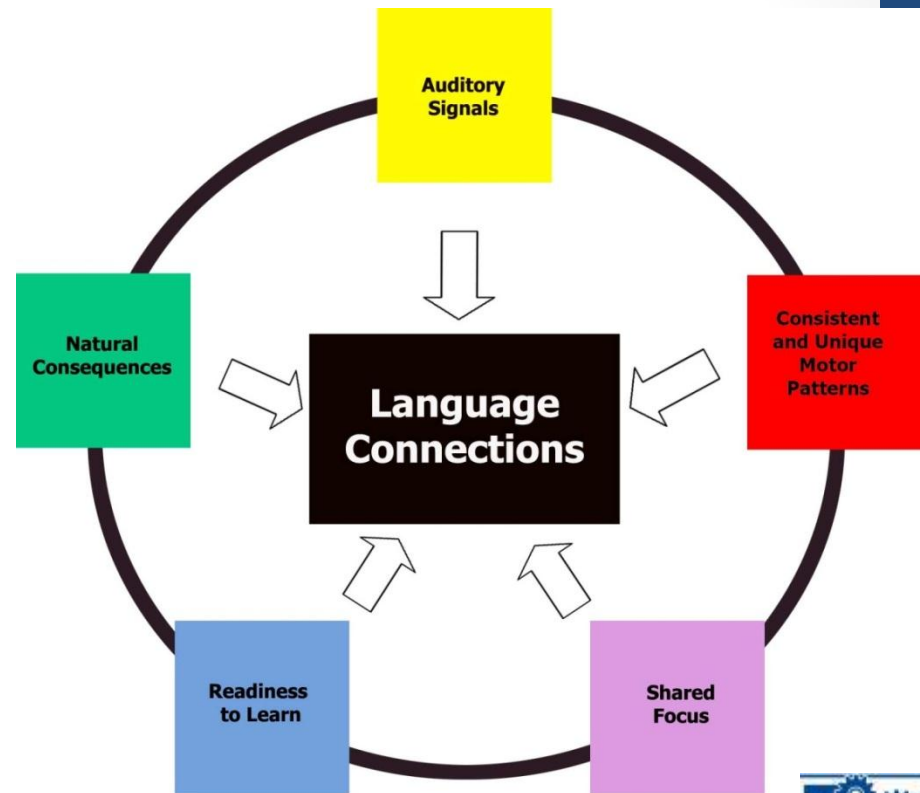
- This study examined the Language Acquisition through Motor Planning (LAMP) approach to implementing an AAC device as an intervention.
- Small group (Case study/Single Subject Research Design)

# Participants

- Study took place from 2009-2012
- Seven clients in a private practice setting
- Four boys, three girls
- Ages 3 to 7
- Each with diagnosis of ASD or PDD-NOS
- Nonverbal
- Disruptive, some self-injurious behaviors
- Short attention spans
- All seven were found to have expressive-receptive language disorder.

# Intervention

- Each obtained a Vantage-Lite speech generating device (SGD)
- Each received Language Acquisition through Motor Planning (LAMP) therapeutic intervention.



# Methodology

- Each child was given an AAC evaluation and trialed multiple devices for extended periods (two to six months).
- The SLP recommended a device for each child.
- Funding was obtained for each device based upon each child's eligibility for Medicaid and private insurance or grant funding.

# Implementation

- LAMP therapy with the SGD involved one to three sessions per week with private practice SLP, depending upon the subjects' family schedules.
- Training was provided to families in the LAMP approach with the expectation that the family would support the LAMP approach at home as well.

# Data Collection

- The primary measure of gains in communication for this study was mean length of utterance (MLU).
- The Systematic Analysis of Language Transcripts (*SALT*) was applied to language samples taken from subjects at various intervals.
- Data collected was matched to Brown's Stages to provide a frame of reference for therapy and to help identify progress.

# Data Collection

- In addition, instruments such as the Preschool Language Scale, Fourth Edition (PLS-4) (Zimmerman, Steiner, & Pond, 2002) were used where possible to measure aspects of expressive and receptive language.
- Type-token ratio (TTR) was used in selected cases as a measure of vocabulary diversity within a child's speech.
- The therapist in this study sought to collect informal data on behavior as well as upon attention and focus.
- Anecdotal data was collected on each subject. Data was supplemented from parent reports and informal measures.



# Results

- It was clear from therapy observation, notes, and from parent reports that all seven participants demonstrated communication progress.
- To the degree that performance could be measured, it was apparent that each child made gains in both expressive and receptive language.
- However, each demonstrated different levels of progress.

# Results

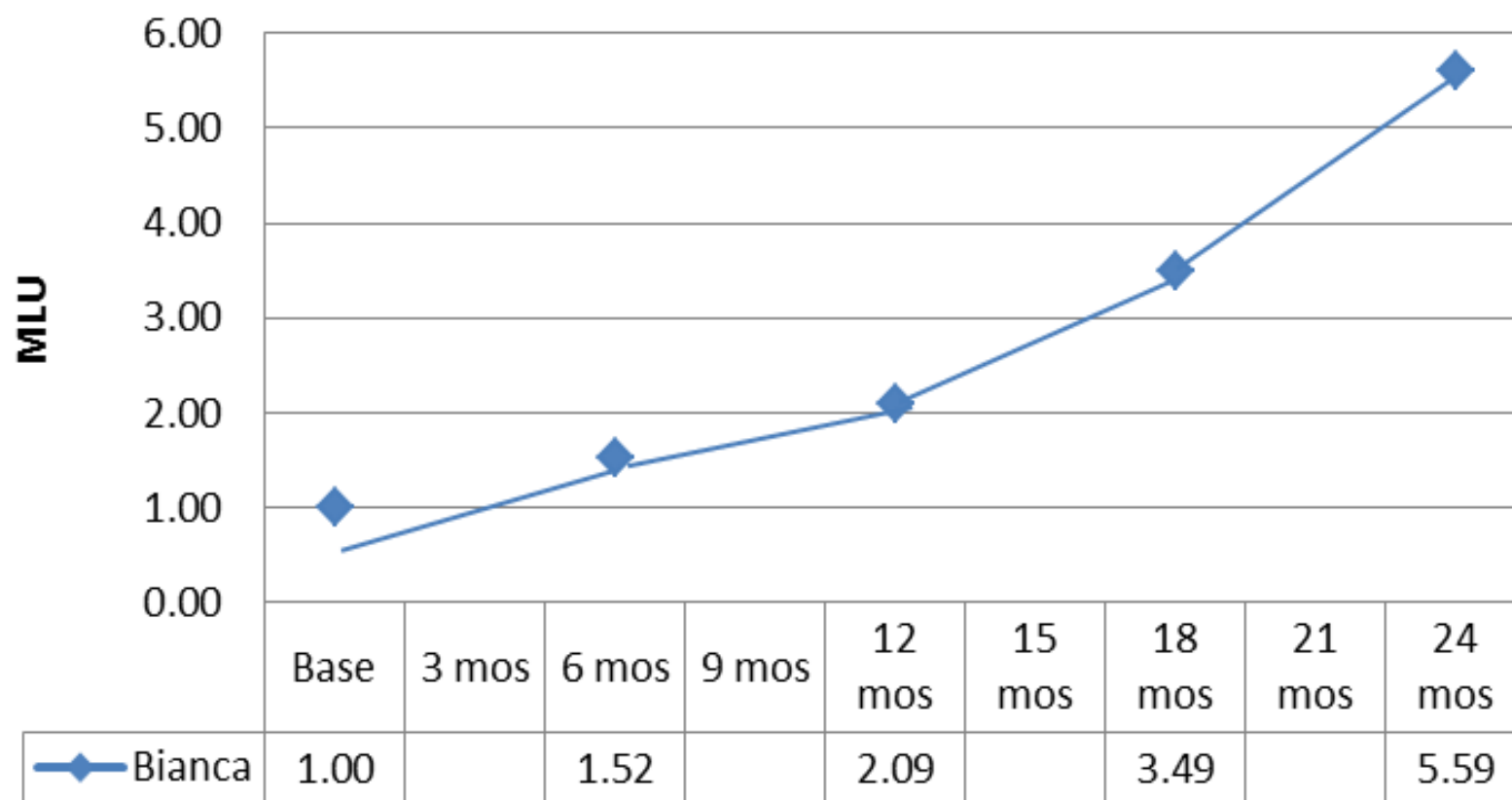
- The size of the vocabulary used by each subject increased.
- Six of the seven used the SGD to spontaneously generate communication.
- All seven used the AAC device to respond to questions and to make choices.
- Four subjects have demonstrated some level of natural vocalization in addition to using the SGD for communication.
- Two of the four had very limited vocalization at baseline, and their vocalization increased notably while using their AAC devices.

# Behavior, Attention and Focus

- All participants demonstrated gains in shared engagement and attention and a reduction in problem behavior was observed.

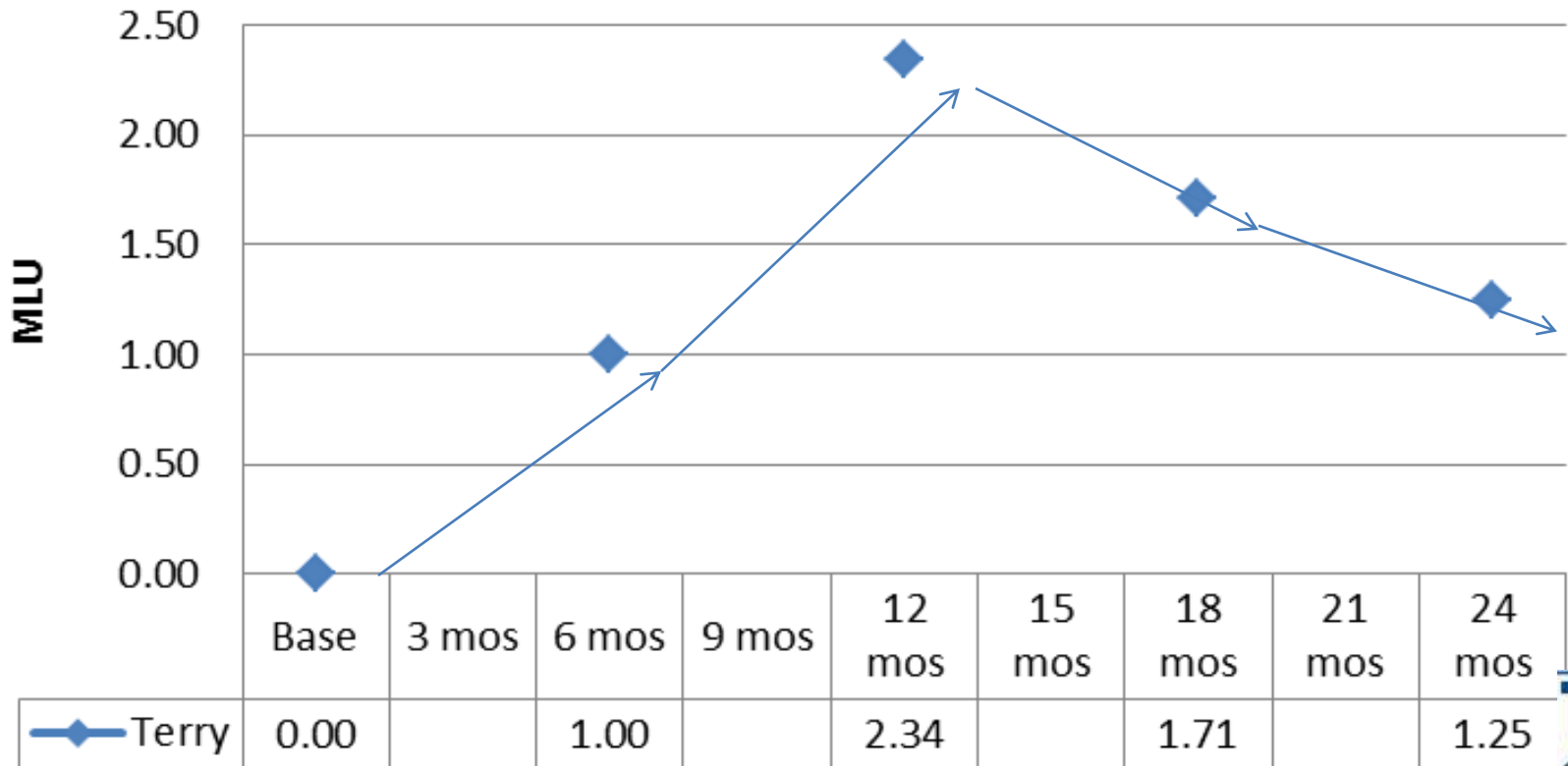
# Results

## MLU Samples: Bianca



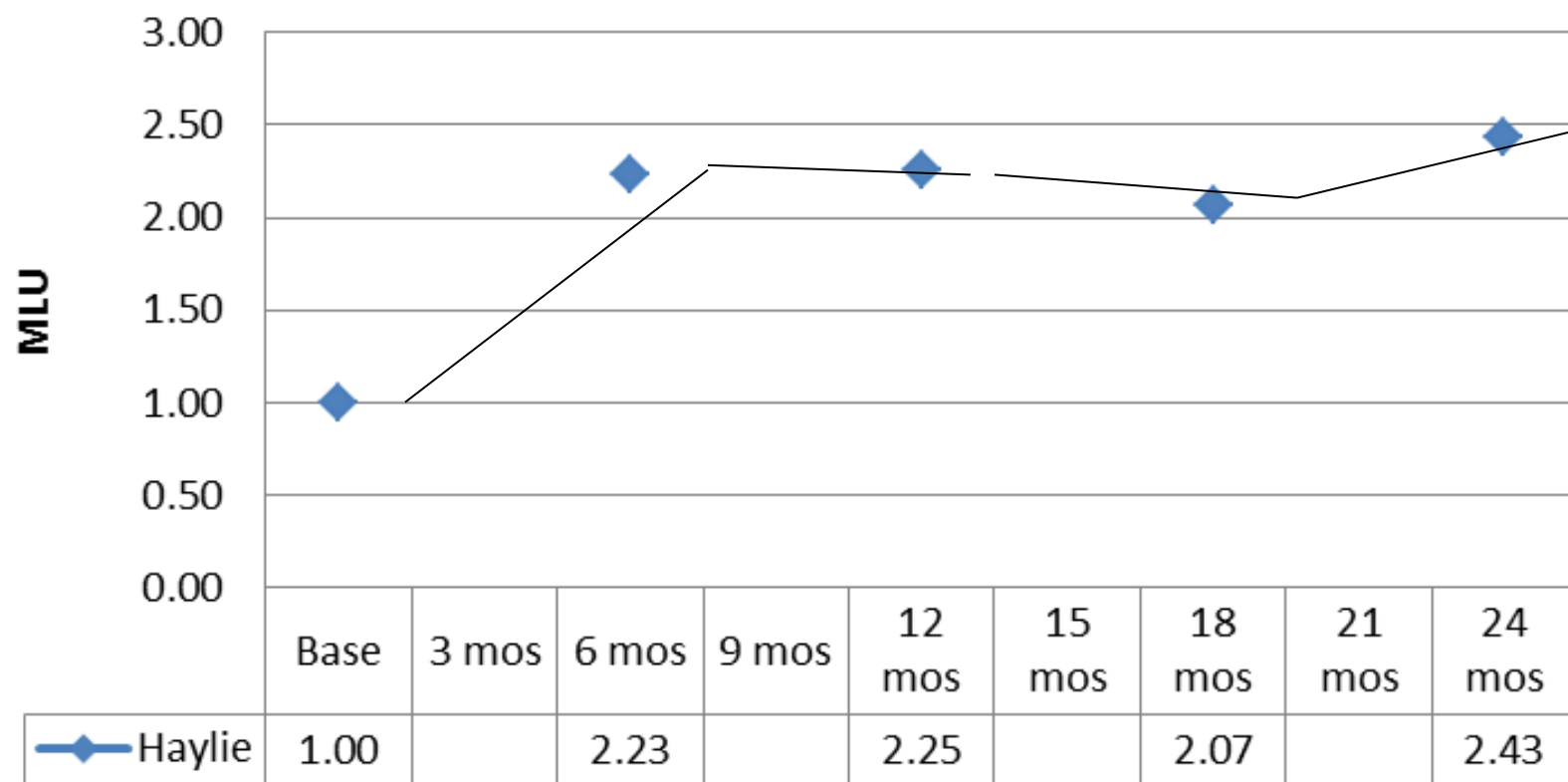
# Results

## MLU Samples: Terry



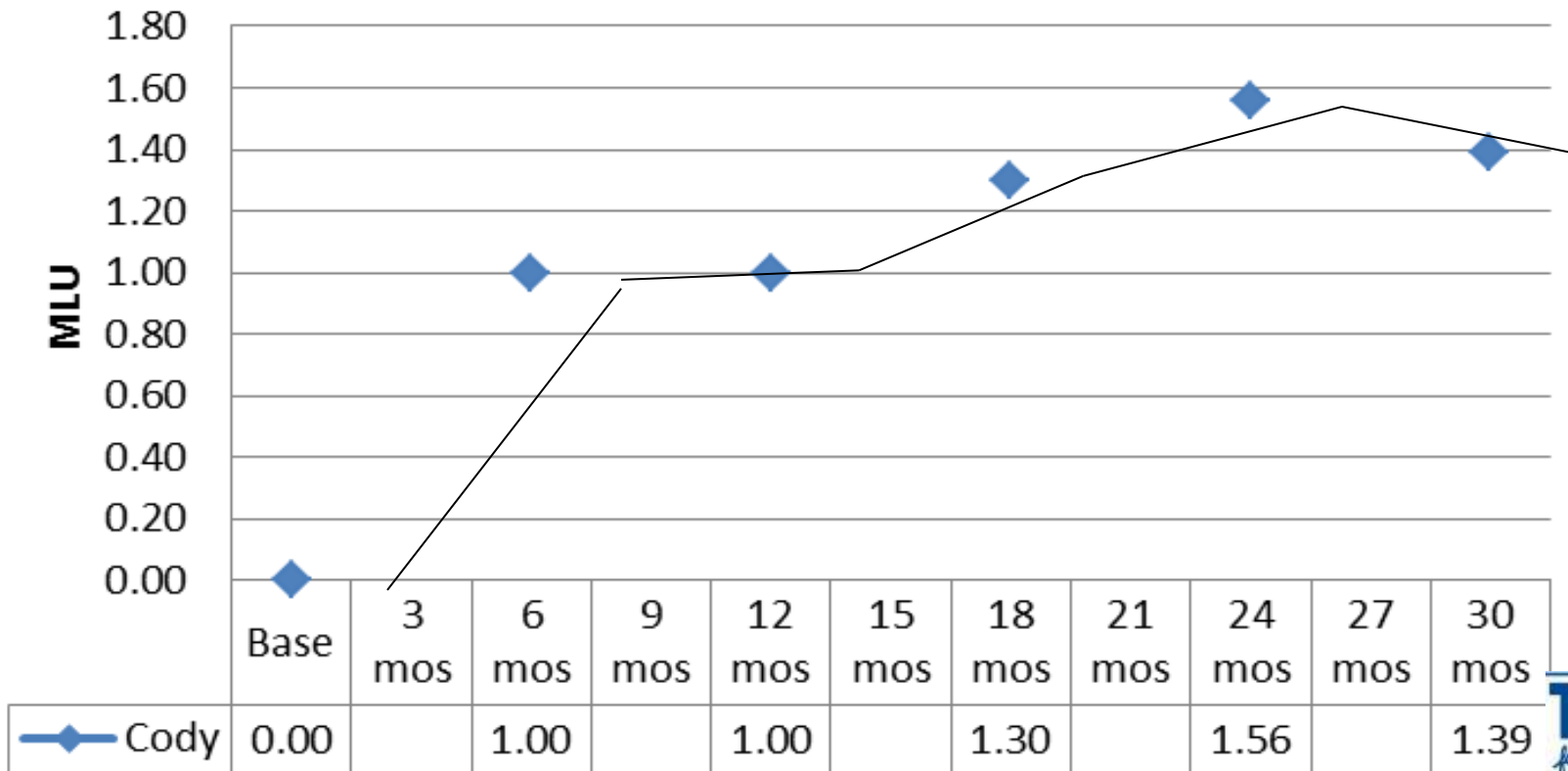
# Results

## MLU Samples: Haylie

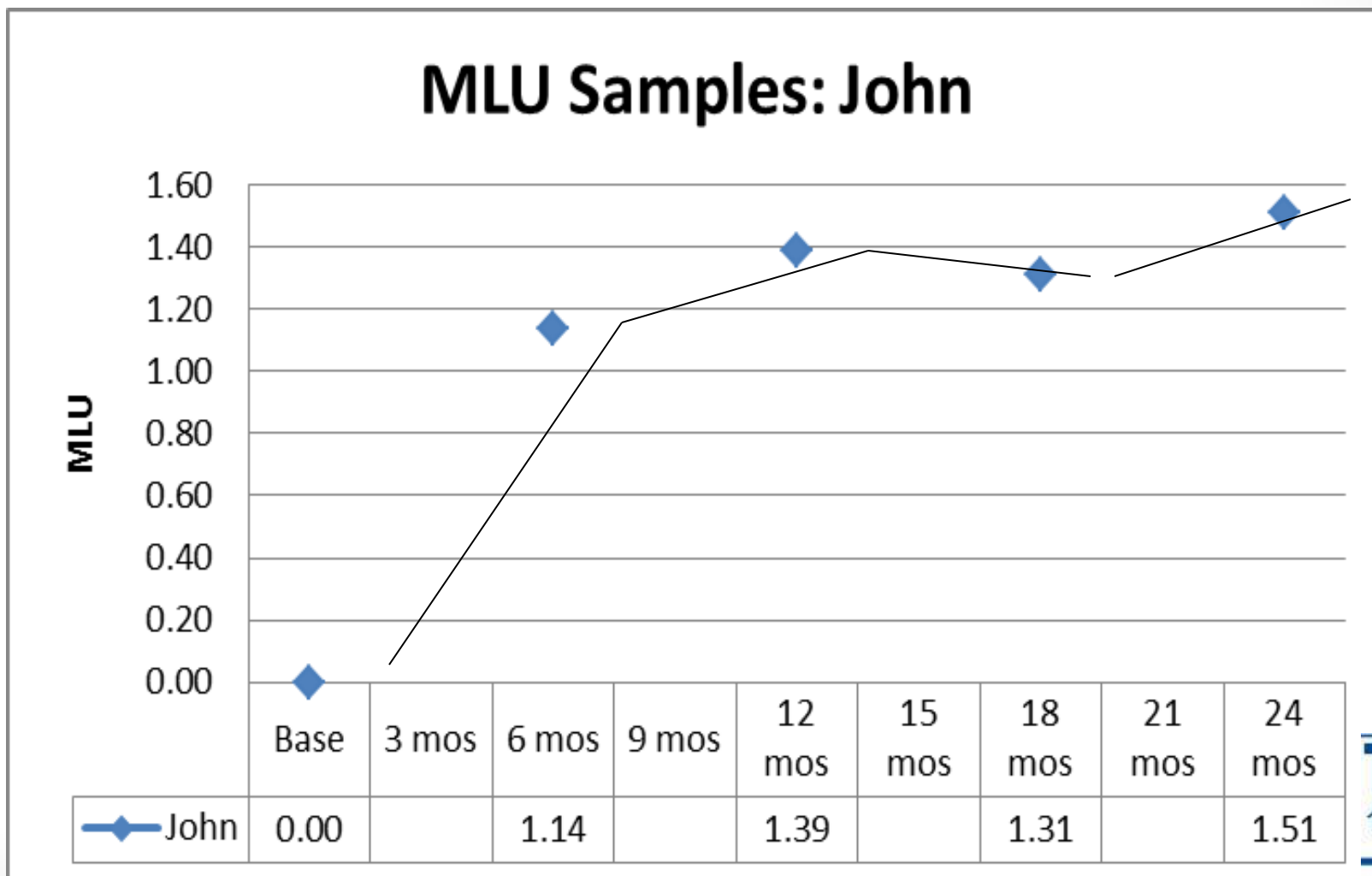


# Results

## MLU Samples: Cody



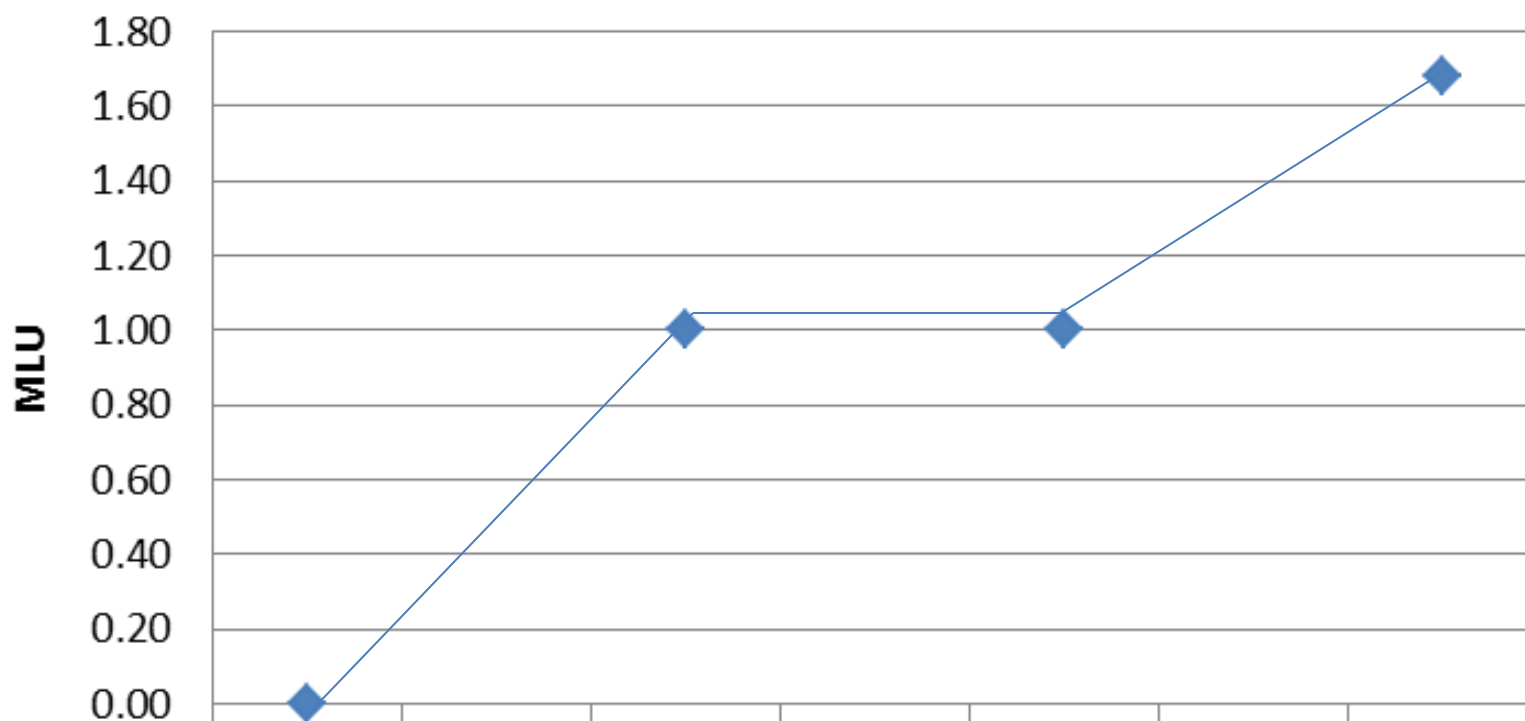
# Results





# Results

## MLU Samples: Zoe



	Base	3 mos	6 mos	9 mos	12 mos	15 mos	18 mos
Zoe	0.00		1.00		1.00		1.68



# Conslusions

- *The LAMP therapy approach appears to have been important in each student's communication progress.*
- *The LAMP technique appears to have contributed to the participants' gains in terms of behavior and attention.*
- *The Vantage Lite with "Unity-modified" vocabulary appears to support the LAMP therapy effectively.*

# STUDY # 2: AUSTRALIAN STUDY

Two month study of nine children with autism

From: Bedwani, M., Winchester, E., Simmons, T., Robertson, J. & Costley, D. (2012). Evaluation of the Language Acquisition through Motor Planning (LAMP) Program. Autism Spectrum Australia.

<http://www.autismspectrum.org.au/content/evaluation-language-acquisition-through-motor-planning-lamp-program>

# Australian Study

- Case studies of 9 children with ASD
- Ages 4 to 12
- 3 locations
- Each had AAC in place, but not using spontaneously
- LAMP Training provided for family & therapist
- Five weeks of LAMP intervention followed by two weeks of Maintenance

# Australian Study Outcomes

- All participants made progress (differing levels)
- Anecdotal evidence supports statistical data.
- Greatest gains: expressive communication
  - Four out of the eight participants went from being mainly in the pre-intentional/intentional stages of communication, to using intentional and symbolic communication using SGD
  - other four participants who were already using both intentional and symbolic communication, increased their use of symbolic communication across the functions of communication, and as a consistent method of communicating.

# Australian Study Outcomes

- Prior to the research:
  - 87% of participants were using a method of communication to protest;
  - 62% were able to gain attention, greet and farewell or express feelings using some sort of communication or physical behavior (e.g. hugging another person).
  - Only two of the participants (25%) were commenting in some way
- At the post-assessment and maintenance stages,:
  - All the participants were requesting using a symbolic means of communication (device or spoken language)
  - 100% of participants were developing social communication through commenting.
- Other improvements in functional communication were:
  - An increase of 75% of participants developing communication to gain attention and express feelings
  - 87% using communication to greet or bid farewell to others.

# Australian Study Outcomes

- Most Impressive Increases in expressive communication:
  - range of vocabulary
  - length of utterances used by participants.
- Specifically:
  - Fifty per cent of participants had up to 10 words by session five.
  - The other 50% had greater than 30 words being used spontaneously on the device, by session five.
  - Three of these had a vocabulary of between 40 to 65 words at this stage.

# Australian Study Conclusions

- Effective teaching of motor plans, using the LAMP theory, can be seen to:
  - allow for increased storage and retention of symbolic information,
  - resulting with more automatic communication over time,
  - reducing the cognitive demands associated with analyzing and choosing from different symbol sets
- The results of this research add to the evidence regarding the effectiveness of using AAC with people with an ASD



# STUDY #3

## WASHINGTON, D.C. STUDY

Two multiple month case studies with students with autism.

From: Stuart, S., & Ritthaler, C., (2008). Case Studies of Intermediate Steps/Between AAC Evaluations and Implementation. SIG 12 Perspectives on Augmentative and Alternative Communication, December 2008, Vol. 17, 150-155. :

# DC Study

- Two case studies
- Ages 3 (boy) & 7 (girl)
- Autism and Autism with Q22 deletion
- Both basically nonverbal, used gestures & behavior to attempt communication
- Initially tried PECS and sign

# DC Study

- Parents & educational teams see child's communication skills and needs differently.
  - Can result in conflict
  - Often helpful to seek additional clinical insight
- Candidacy Model applied to these children
  - Child not “ready” for AAC until progress evident
    - cognition
    - Behavior
  - Parents disagree, request a second opinion

# DC Study

- Client 1 (Girl: 7 y.o. with autism)
  - School refused to try AAC, suggested ABA plan
  - Parents opt to try LAMP with 2<sup>nd</sup> Evaluation Center
  - After 10 1-hr sessions (using PRC Vantage) child:
    - added 10 new vocabulary words
    - was able to request toys
    - engage in turn-taking activities.
  - Behavior issues at school increasing while diminishing at home

# DC Study

- Client 1 (continued)
  - After IEP stalemate and several requests school reached out to 2<sup>nd</sup> Evaluation Center
  - Student demonstrated ability to construct 2 and 3 word utterances with SGD
  - School agreed to use SGD but strictly for academics
  - Provided a Mini Mo with academic & food messages
  - Student refused to use the school's SGD

# DC Study

- Client 1 (continued)
  - Parents appealed to 2<sup>nd</sup> Eval Ctr.
  - Incorporate Mini Mo into LAMP therapy approach
  - In 3 weeks skills transferred to Mini Mo
  - Able to generate spontaneous messages
  - After 34 LAMP session with private therapist
    - Able to navigate 4 & 5 pages to reach desired words
    - Communicates with 80%+ accuracy & requires no prompting
    - Participates in class (greetings, comments, etc.)
    - Behaviors significantly reduced.

# DC Study

- **Client 2** (Boy 3 y.o. with autism & q 22 deletion)
  - Limited vocalization
  - AAC Eval suggested to supplement
  - Immediately began requesting with limited cueing
  - Quickly moved to spontaneous requesting
  - Not in school so began sessions with Second Opinion Ctr.

# DC Study

- Client 2 (Continued)
  - In 4 session, began to produce 3 word phrases using device (minimal cuing)
  - 24<sup>th</sup> session: mastery of subject-verb-object so added descriptors
  - Began vocalizing more & using AAC device for self correction
  - 40<sup>th</sup> session:



# DC Study

- Client 2 (Continued)
  - School SLP was unfamiliar with technology
  - School did not have access to SGD
  - Family customized a 32-location with flip chart attached by Velcro at top (activity row)
  - Student now progressed to commenting, asking novel questions, & humor (not possible at school)

# DC Study

- Client 2 (Continued)
  - After 48 sessions became increasingly verbal
  - Still used AAC device to learn vocabulary
  - Sometimes compose phrase on device then speak out
  - Eventually SGD was discarded.
  - Client 2 is now exclusively verbal.

# DC Study

## Observations:

- LAMP approach helped these two students improve communication skill.
- Behavior issues reduced
- Vocalization was supported

# DC Study

## Conclusions:

- Cases illustrate the impact of the lack of understanding of technology and support.
- Importance of advocacy
- Importance of including all team members in planning for implementation

# STUDY #4

## ARKANSAS STATE STUDY

Four year case study with young boy with autism.

From: Pulliam, H. (2010). The Initial and Renewed Impact of an AAC Device, Using the LAMP Approach, on an Individual with Autism Spectrum Disorder. (Master's Thesis) Arkansas State University.

:

# Arkansas State Study

- One client with ASD
- Single subject research design
- Pathfinder with LAMP therapy introduced at age 4 thru Age 8
- At age 8 - two year hiatus (used PECS & gestures)
- At age 10 resume working with AAC +LAMP (Vantage Lite)

# Arkansas State Study

- Video recordings taken at several stages
- During therapy sessions
  - Without device baseline,
  - With device at 6 mos, 1 year
- Video resumed at age 10
  - Without device baseline,
  - Again at six months
- Videos analyzed by trained observer
  - Identify communication acts by client

# Arkansas State Study

## Results

- CA per OC
  - Baseline - 1<sup>st</sup> Treatment (0.55 – 0.60)
  - Baseline - 2<sup>nd</sup> Treatment (0.60 – 1.08\*)
    - \* includes spontaneous CAs
  - Little change observed between end of first treatment and start of second treatment



# Arkansas State Study

## Results (Continued)

- Verbalizations
  - Baseline - 1<sup>st</sup> Treatment (7 words/ representational)
  - Between Treatment 1 & 2 (7 words/ representational)
  - Baseline - 1<sup>st</sup> Treatment (28 words):
    - 22 representational
    - 6 functional

\* includes spontaneous CAs

# Arkansas State Study

## Observations

- Communication progress evident over time
- Case study resulted in spontaneous generative utterances by client
- Case study resulted in client vocalization

# Conclusions



# Observations

- Candidates come largely from groups of students for whom other therapies have not worked
- Some case studies resulted in vocalization
- Model for capturing use of language:
  - Video recording + language monitor

# Questions & Discussion



# Contact Information

- John Halloran, M.S., CCC-SLP is speech-language pathologist, is the Senior Clinical Associate for The Center for AAC and Autism.

[John@aacandautism.com](mailto:John@aacandautism.com)

- Ben Satterfield, Ed.D. is an Assistant Professor at UGA in Communication Sciences and Special Education in the School of Education and a research consultant for GA Tools for Life/AMAC at GA Tech.

[Ben@GATFL.org](mailto:Ben@GATFL.org), [Ben@c4atx.com](mailto:Ben@c4atx.com)

## *Disclaimer*

*This presentation is produced by Tools for Life which is a result of the Assistive Technology Act of 1998, as amended in 2004. It is a program of the Georgia Institute of Technology, Enterprise Innovation Institute [EI2], Alternative Media Access Center (AMAC) and is funded by grant #H224C030009 of the Rehabilitation Services Administration (RSA), Department of Education. The contents of this presentation were developed under a grant from the Department of Education. However, those contents do not necessarily represent the policy of the Department of Education, Georgia Tech, EI2 or AMAC and you should not assume endorsement by the Federal government.*

# Studies

- Bedwani, M., Winchester, E., Simmons, T., Robertson, J. & Costley, D. (2012). Evaluation of the Language Acquisition through Motor Planning (LAMP) Program. Autism Spectrum Australia.  
<http://www.autismspectrum.org.au/content/evaluation-language-acquisition-through-motor-planning-lamp-program>
- Potts, M., & Satterfield, B. (2013). Studies in AAC and Autism: The Impact of LAMP as a Therapy Intervention. (White Paper) Prentke-Romich Company. Available at: [http://www.prentrom.com/research/research\\_reports](http://www.prentrom.com/research/research_reports)
- Pulliam, H. (2010). The Initial and Renewed Impact of an AAC Device, Using the LAMP Approach, on an Individual with Autism Spectrum Disorder. (Master's Thesis) Arkansas State University.
- Stuart, S., & Ritthaler, C., (2008). Case Studies of Intermediate Steps/Between AAC Evaluations and Implementation. SIG 12 Perspectives on Augmentative and Alternative Communication, December 2008, Vol. 17, 150-155.  
doi:10.1044/aac17.4.150



# Contact

**Ben Satterfield, Ed.D.**

AT Consultant and Research Coordinator

[Ben@gatfl.org](mailto:Ben@gatfl.org)

[Ben@c4atx.com](mailto:Ben@c4atx.com)

## *Disclaimer*

*This presentation is produced by Tools for Life which is a result of the Assistive Technology Act of 1998, as amended in 2004. It is a program of the Georgia Institute of Technology, Enterprise Innovation Institute [EI2], Alternative Media Access Center (AMAC) and is funded by grant #H224C030009 of the Rehabilitation Services Administration (RSA), Department of Education. The contents of this presentation were developed under a grant from the Department of Education. However, those contents do not necessarily represent the policy of the Department of Education, Georgia Tech, EI2 or AMAC and you should not assume endorsement by the Federal government.*