

# Tools and Resources to Conduct Comprehensive AAC Assessments

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# Learner Outcomes

- Participants will be able to:
  - Identify and describe two evidence-based instruments to use with children when conducting a comprehensive AAC assessment.
  - Identify and describe two evidence-based instruments to use with adults when conducting a comprehensive AAC assessment.
  - Discuss two studies to use as external evidence to support a comprehensive AAC assessment.

# Disclaimer

- We are not recommending for purchase any commercial product mentioned in this presentation. Rather these are tools and resources we have found useful in conducting AAC evaluations and providing evidence to support a Speech Generating Device (SGD) funding request.
- We do not have any financial interest in any products included in this presentation.

# Evidence-based practice & the nature of assessments

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Tools and Resources to Conduct Comprehensive AAC Assessments

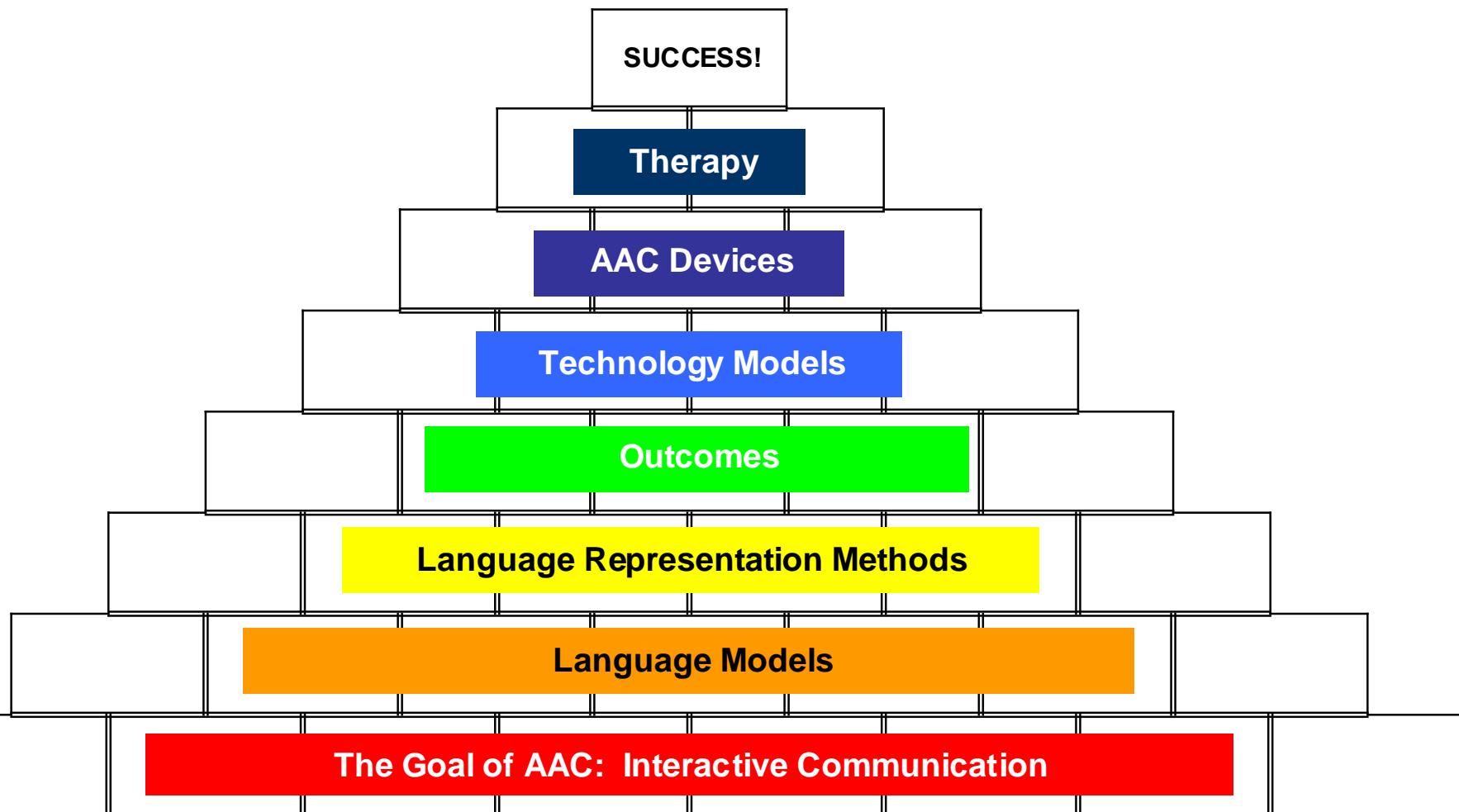
# Evidence for SGD funding

## Initial Assessment Areas

- Vision
- Hearing
- Speech
- Language
- Motor
- Cognition
- Swallowing

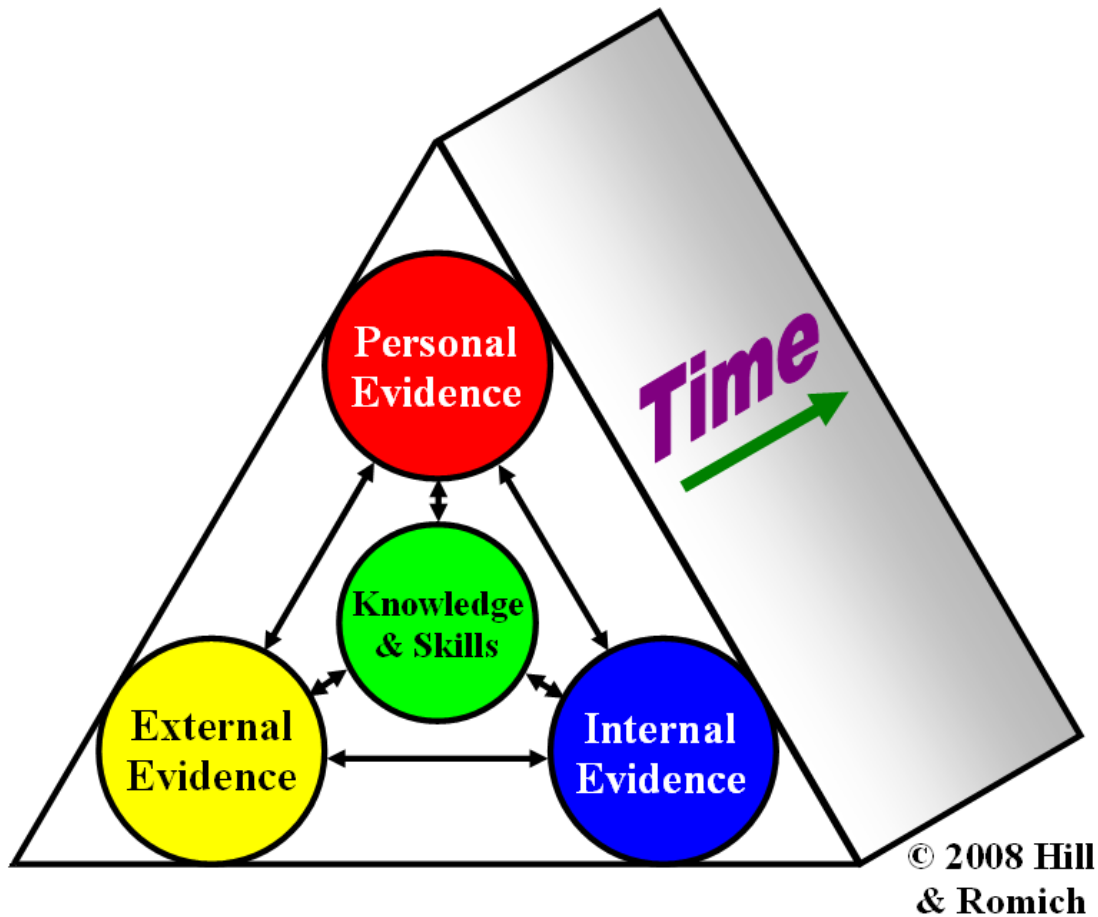
## Secondary Assessment Areas

- Rational for SGD versus non-SGD
- Rational for specific AAC system components/features



**AAC Language Based Assessment and Intervention Model (*Hill, 1998*)**

# The components of EBP





**I don't bother taking temperatures and things like that. I have a lot of experience.**



# Qualitative versus quantitative

## Qualitative Outcomes

- User satisfaction
- User/clinician impressions of effectiveness or improvement
- Surveys – Likert-type scales
- Interviews – structured, unstructured, and open-ended questions



## Quantitative Performance

- Standardized and norm referenced instruments
- Criteria referenced instruments
- Performance measurement
- Language sampling measures



# Matching Persons & Technology

Primary Components		
Language Representation Methods	Vocabulary	Methods of Utterance Generation
Single Meaning Pictures Alphabet-Based Methods Semantic Compaction	Core Extended	SNUG (spontaneous novel utterance generation) Pre-stored sentences
Secondary Components		
User Interface	Control Interface – Selection Methods	Outputs
Symbols Navigation Automaticity Human Factors	Direct Selection <i>Keyboard, head pointing, eye gaze</i> Scanning <i>Switches</i> <i>Physiological (EMG, BCI, etc.)</i> Morse Code	Speech Display Electronic/Infrared/Radio Frequency Data logging
Tertiary Components		
Peripheral and Integrated Features	Training and Support	Telerehabilitation

# Limitations of Assessments

- Knowledge /availability of tools and resources
- Lack of time and resources to identify evidence
- Being able to collect evidence within 48 hours
- Difficulty in predicting long-term outcomes



# Client referral decisions

CHILDREN	INDIVIDUALS WITH DEGENERATIVE DISORDERS	INDIVIDUALS WITH ACQUIRED DISORDERS
Build language – communication competence to use language to learn (literacy skills)	Maintain the most effective communication across the disease process – avoid disuse of AAC interventions	<i>Recover/retrieve</i> language – communication skills.

# Pediatric AAC cases

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Tools and Resources to Conduct Comprehensive AAC Assessments

# Framework for Pediatric Assessments

- Language Transitions
  - Pragmatics to Semantics
  - Semantics to Syntax
  - Phonology to Metaphonology



Paul, 1997; Hill, 2009

# Personal Evidence

- Parent interview
  - Influences to conducting interviews
  - Caregiver burden (Raina, et. al., 2005)
  - Receptive and Expressive Emergent Language Scale (REEL-3; Bzoch, League, & Brown, 2003)
- Values, expectations, beliefs
  - Perceptions of AAC (Bailey, et. al., 2006)
  - Quality of life (Pain et. al. 1998)
- Cultural differences (Huer, 2000; Huer, Parette & Saenz, 2001; Parette, 2000)

What tools are you using?





# Clinical Tools & Resources

- Augmentative and Alternative Communication Profile (Kovachs, 2009)
- MacArthur-Bates Communicative Development Inventories (CDIs) (Fenson et al., 1993)
- Early LAMbaseline (© 2009 Hill, ICAN™ Talk Clinics)
- Test of Early Communication and Emerging Language (TECEL; Huer & Miller, 2010)
- Inventory of speech acts
- Analysis of Brown's morphemes (both receptive and expressive)

# Evidence for Tool Selection

- Response styles that interfere with formal testing procedures
  - Parent/teacher assessments (Luyster, et. al., 2008)
  - Language sampling (Condouris & Meyer, 2003)
  - Tools used in research (Ronski et.al., 2010)
- Functional versus developmental
  - Core vocabulary (Banajee, Dicarlo, & Stricklin, 2003)
  - Developmental language acquisition (Paul, 1997)

# Language Activity Monitoring (LAM)

- LAM tools were developed to support the collection and analysis of language samples.
- The LAM function is the automatic recording of AAC device language events.
  - Content (One or more letters or words)
  - Time (One second resolution time stamp)

- The LAM Intervention

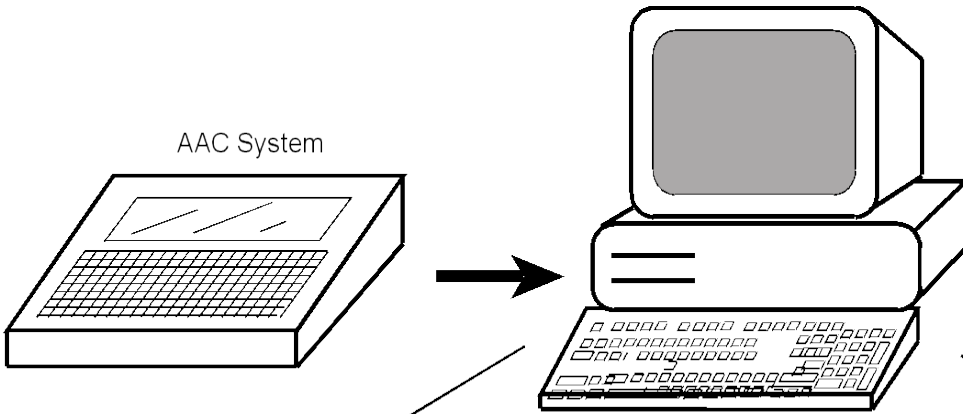


## ***When we know***

the content of language events  
and the time of language events,  
we can deduce how  
communication is generated  
and measure many parameters.

# LAM implementations

AAC System



**AAC Performance Report**

Subject Number: 123      LAM data file: 00021\_La\_enm  
 DOB: 2 May 1977 (Age 25)      Date of Report: 15-Mar-01  
 Language Representation Methods (check all available): X SEM; X SEM; X VPI; X SP; X OV      Location: Wooster, OH  
 Selection technique: Keyboard      Examine: B. Flomich  
 AAC System: Unity 123 (2 mo.) on Pathfinder (5 mo.)      Sample time: 57 minutes  
 Number of selections per letter in spelling: 1      Transcriber: K. Hill  
 Number of total array selections when spelling: 128

Language Sample Context (check )  
 Conversation (w/ Partner)       Natural Environment  
 Interview       Other:  
 Narrative      \*Conducted remotely via AOL Instant Messenger  
 Picture Description

**Section 1: Utterance-Based Summary Measures**

A. Total utterances	27
B. Complete utterances (%)	100%
C. Method of Generating Utterances (M/GU)	100%
D. Mean Length of Utterance in Words (MLU-w)	16.48
E. Mean Length of Utterance in Morphemes (MLU-m)	18.30
F. Average Communication Rate (words / minute)	11.75
G. Peak Communication Rate (words / minute)	14.07

*Example sentence: myoglobin is remembered by myself and it's actually my utility reactor because I taught myself by playing around with it.*

**Section 2: Word-Based Summary Measures**

H. Total Number of Words	440
I. Different Word Roots	175
J. Core Vocabulary Use (%)	

**Section 3: Appendices (attached)**

PL	LAM data	U	Frequency order word list
S	Utterances	V	Word list by method of generation
T	Alphabetic order word list	W	Test version report

For additional information on methods, tools, services, and evidence to support AAC evidence-based practice, visit the web site of the AAC Institute. AAC Institute is a non-for-profit charitable organization dedicated to the most effective communication for people who rely on AAC. Additional analyses of language samples can be performed using Systematic Analysis of Language Transcripts (S.A.L.T.) available at <http://www.waisman.wisc.edu/salt/>.

AAC Institute provides the service of generating this AAC Performance Report from language samples collected using language activity monitoring (LAM).

[www.aac institute.org](http://www.aac institute.org)

Upload → Editing → Coding → Analyzing → Report

# LAM logfile example collected during trial for language

### CAUTION ###

The following data represents  
personal communication.

Respect privacy accordingly.

Language Activity Monitor LAM-1

\*YY-MM-DD = 00-04-12\*

02:17:25 "want "

02:17:27 "baby "

02:18:54 "want "

02:18:56 "say "

02:19:01 "baby "

02:19:40 "sleep "

02:19:51 "baby "

02:19:51 "baby "

02:20:50 "sleep "

02:22:48 "want "

02:22:51 "that "

02:25:47 "baby "

02:33:47 "pick "

02:33:52 "up "

02:34:23 "want "

02:34:31 "I "

02:34:44 "that "

02:37:04 "wake "

02:37:06 "up "

02:38:05 "baby "

02:38:27 "I "

02:38:29 "want "

02:38:37 "baby "

02:41:21 "feed "

02:41:30 "baby "

02:41:31 "baby "

02:42:01 "bottle "

# Traditional and LAM Performance Measures

<u>Domain</u>	<u>Traditional Measures</u>	<u>APM* Summary Measures</u>
Language Representation Skills →	Frequency of multi-modes of communication	Frequency of LRMs**; Communication Rate by LRM
Linguistic Skills - Form →	MLU-w; MLU-m	MLU-w; MLU-m
Linguistic Skills -Content →	Total Number of Words; Different Word Roots; TTR; Core/Extended	Total Number of Words; Different Word Roots; Core/Extended Vocabulary
Access Skills →	Accuracy of key selection	Selection Rate; Rate Index
Operational Skills →	<i>Use of non-language features</i>	<i>Use of non-language features</i>
Strategic/Rate Skills →	Communication rate	Average & Peak Communication Rate
Strategic/Construction Skills →	Partner-assisted responses	SNUG vs Pre-stored; Error Types and Rates
Social Skills →	Turn taking, requests, greetings, comments etc.	Turn taking, requests, greetings, comments etc.

# Language Sampling as Evidence

## Naturalist language sampling

- Parent interactions
- Child-centered play activities
- Joint attention routines
- Spontaneous narratives

## Structured language sampling

- Shared book reading
- Picture elicitation tasks
- Environmental Communication Teaching (ECT) activities
- Instructed narratives



# Evidence for AAC System Rational

- Transitioning to higher language levels
  - Sign language (National Research Council, 2001)
  - PECS manual (Frost & Bondy, 2000)
- Voice versus no voice output
  - Working memory (Sandberg, 2001)
- Increasing skills not directly targeted
  - Speech output (Blischak, Lombardino & Dyson, 2003)
- Participation in classroom
  - State standards

# Adult AAC cases

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Tools and Resources to Conduct Comprehensive AAC Assessments

# Framework for adults assessment

**Health Condition**  
(communication disorder - congenital or acquired etiology)

**Body  
Function & Structure**

Speech  
Language  
Physical  
Cognitive  
Vision  
Hearing

**Activities**

Home/family/friends  
Education  
Work  
Community  
Personal care  
Health care  
Telephoning  
Recreational/social

**Participation**

Speaking  
Conversation  
Discussion  
Greetings  
Requesting  
Informing  
Protesting

AAC INTERVENTIONS AND TECHNOLOGIES

**Environmental Factors**

Support and relationships  
Professionals (e.g. SLPs,  
OT/PTs, teachers, rehab  
engineers, etc.)  
Attitudes of society and  
individuals  
Educational services  
Research-base  
Community services  
Support organizations

**Personal Factors**

Values  
Attitudes & Motivation  
Expectations  
Performance

# Personal Evidence

- Patient interview
  - Loss of patient identity (Shadden & Agan, 2004)
- Spouse/Family
  - Caregiver burden (Pochard, et. al., 2005)
  - Burden of Stroke Scale (BOSS; Doyle, McNeil, & Hula, 2003)
- Quality of life scales
  - ASHA-QCL (Paul, et. al. 2004)

# What tools are you using?



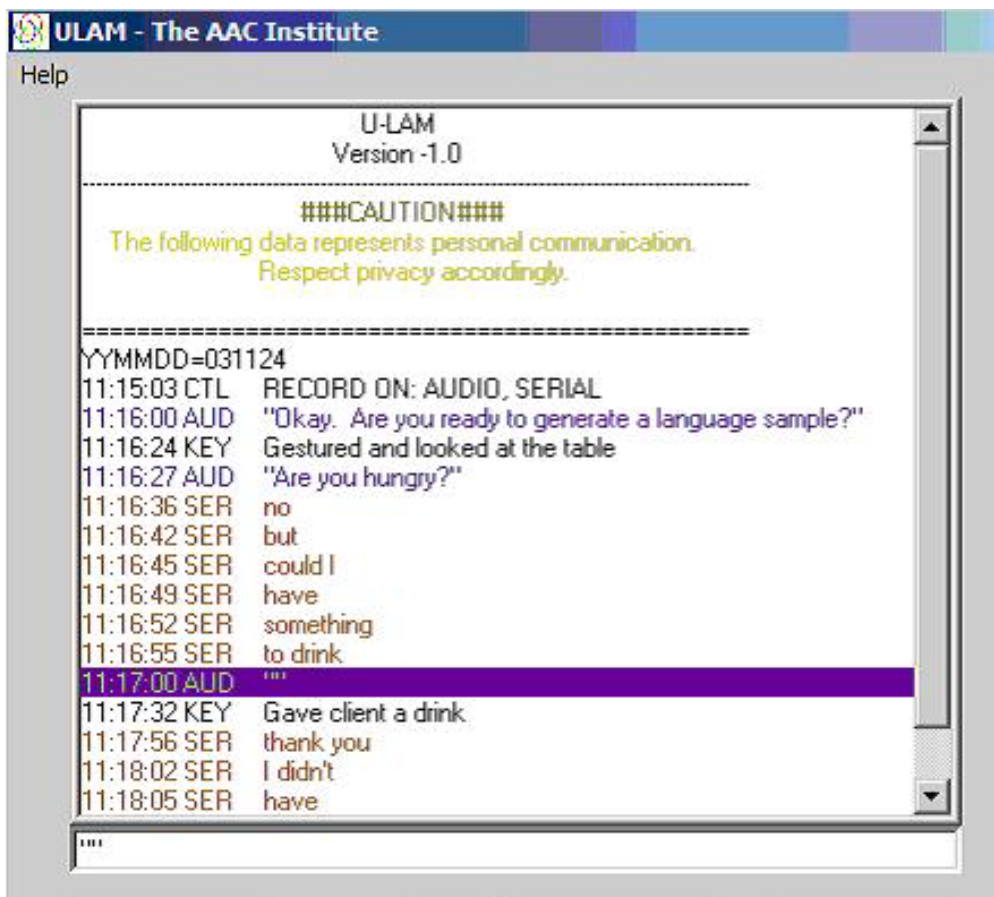
# Clinical Tools & Resources

- Assessment of Intelligibility of Dysarthria Speech (AIDS; Yorkston & Beukelman, 1981)
- Speaking rate/phrase length per breath
- Diadochokinetic rate
- Verbal fluency tasks
- Short Test of Mental Status (Kokmen, Naessens & Offord, 1987)
- Peabody Picture Vocabulary Test – 3rd Edition (PPVT-3; Dunn & Dunn, 1981)
- Boston Diagnostic Aphasia Examination-3rd Edition (BDAE; Goodglass & Kaplan, 1983)

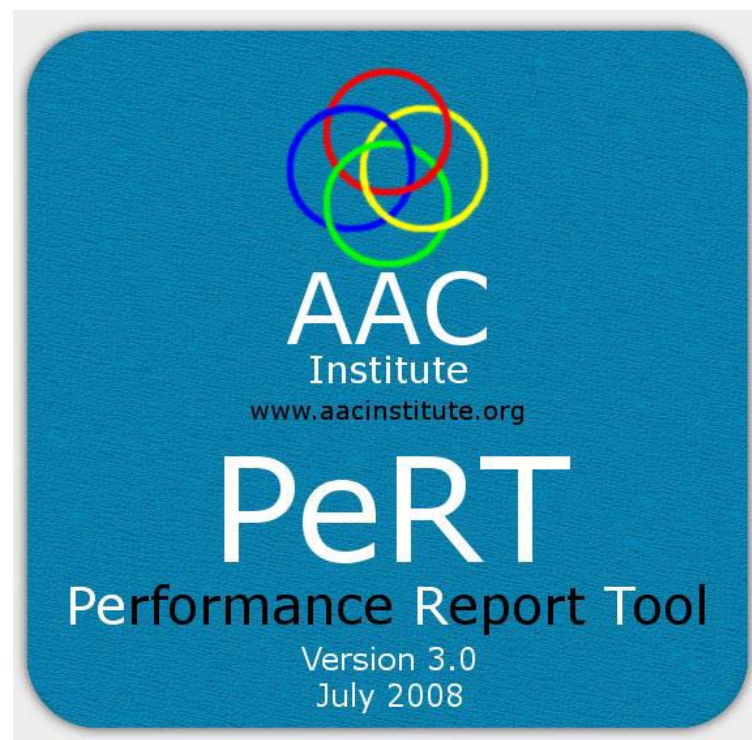
# Evidence to support tools

- Differential diagnosis for some disorders
  - Reason for test selection
- Need for AAC
  - Speaking rate (Beukelman, Fager, & Nordness, 2011)
- Cognitive testing
  - Verbal fluency (Lomen-hoerth, et. al., 2003)
  - Sensitivity of screening (STMS, Tang-Wai, et. al., 2003)

# Collect using U-LAM & KeyLAM



Analyze using PeRT





# LAM Recording Protocol

EXAMPLE: From actual logged sample interview

**“It’s faster than spelling everything out which is what I used to do “**

16:26:05 SEM "It's "

16:26:08 SEM "faster "

16:26:14 SEM "than "

16:26:41 SPE "sp"

16:26:42 SPE "e"

16:26:45 SPE "l"

16:26:45 SPE "l"

16:26:46 SPE "i"

16:26:47 SPE "n"

16:26:48 SPE "g"

16:26:49 SPE " "

16:26:58 SEM "everything "

16:27:02 SEM "out "

16:27:05 SEM "which "

16:27:08 SEM "is "

16:27:11 SEM "what "

16:27:14 SEM "I "

16:27:19 SEM "used "

16:27:22 SEM "to do "

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 Location: Wooster, OH  
 Examiner: B. Flornich  
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 AAC System: Unity 128 (12 mo.) on Pathfinder (5 mo.) Sample time: 57 minutes  
 Number of selections per letter in spelling: 1  
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## Language Sample Context ( *check* )

Conversation (# Partners:     )  Natural Environment  
 Interview  Other:                       
 Narrative  
 Picture description \* Conducted remotely via AOL Instant Messenger

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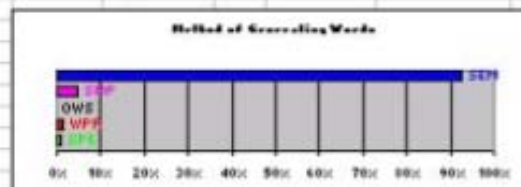
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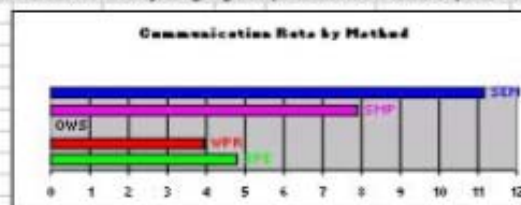
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## K. Method of Generating Words (%)



## L. Communication Rate by Language Representation Method (words / minute)



M. Selection Rate (bits / second) 5.25

N. Rate Index (words / bit) 0.037

O. Errors per Selected Word (%) 2.3%

P. Errors per Spelled and Predicted Word (%) 0%

Q. Deletions per error (%) 0%

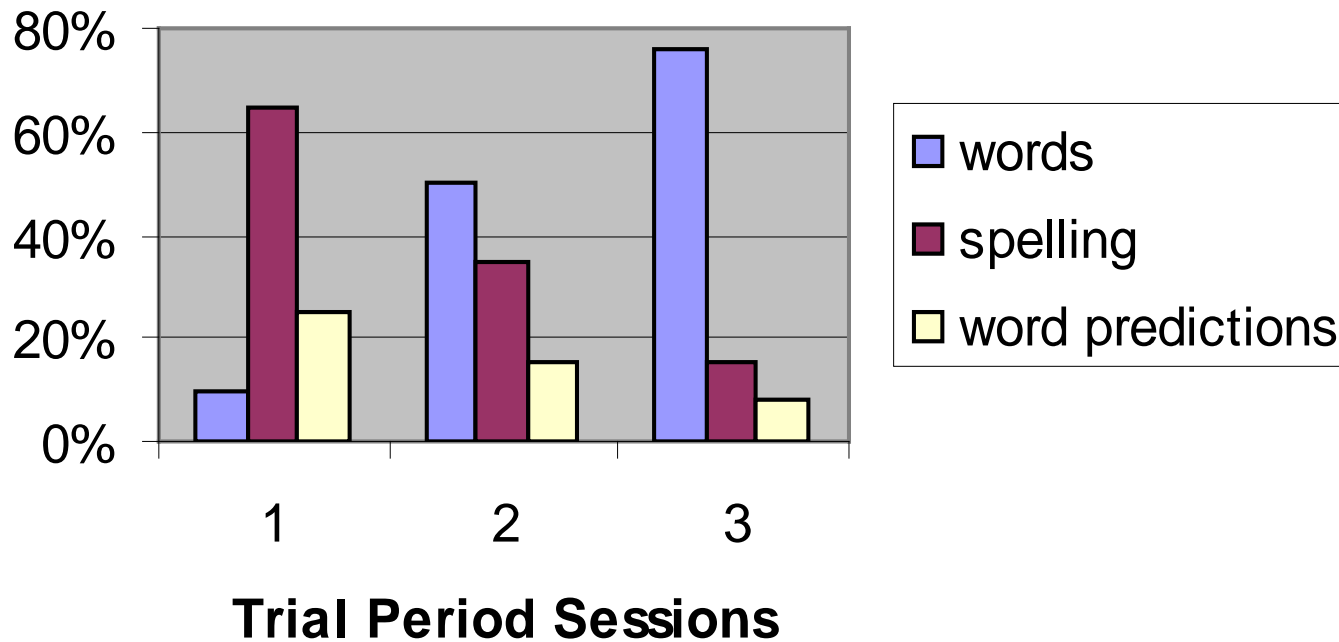
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# Frequency of Use of LRMs Using Orthographic Word Selection Method



Example of Adult w/ TBI for 3 week trial of a core word AAC system

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# Language Sampling as Evidence

## Naturalist language sampling

- Aphasia Bank (part of CHILDES databank)

## Structured language sampling

- Picture description
- Story retell procedure
- Interviews  
(Cherney, Shadden, & Coelho, 1998)

# Evidence to support rational

- Effects on health outcomes
  - Perceived loneliness (Ballin & Balandin, 2007)
- Quality of medical care
  - Reliance on others (Balandin, Hemsley, Sigafos, & Green, 2001)
  - Families perception (Hemsley & Balandin, 2004)
- Vocational needs
  - Critical aspect of employment (McNaughton, Light & Arnold, 2002)

# Considerations across the board

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# Test Accommodations

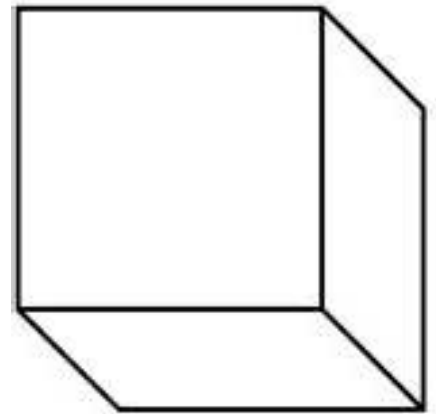
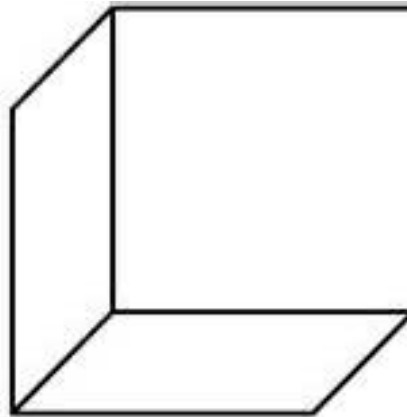
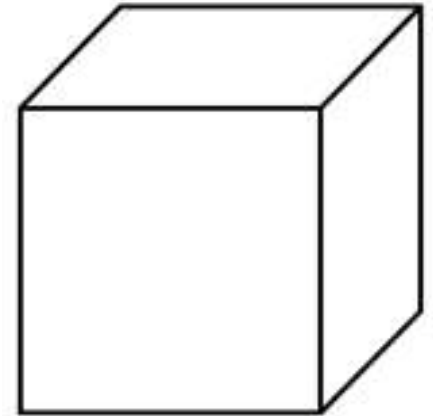
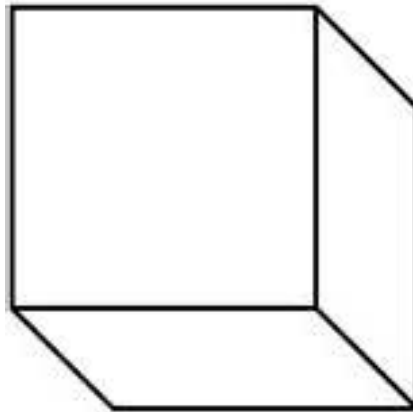
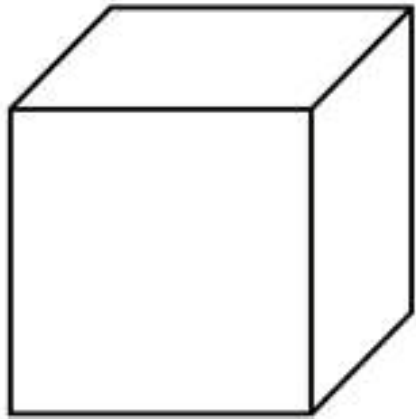
- Flexibility in schedule and time
- Flexibility in setting
- Method of presentation
  - Changes to visual stimuli
- Method of response
  - Use of AAC system
  - Partner assisted scanning



# Assessment Modifications

- Test materials modifications
  - Cutting apart the test plates
  - Use of PowerPoint and scanning
- Test response modifications

# Example of typical motor-perceptual item

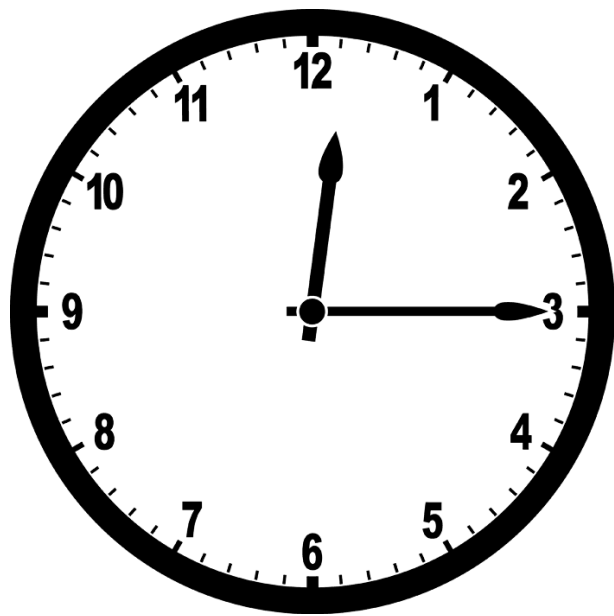


# Test Deviations

- Prompting hierarchy
  - Change of verbal prompt
    - Ex: PPVT: “Show me who is...”
- Type of response
  - Understanding of concept vs. desired response
    - Free response, word blank, sentence completion, multiple choice

# Example of motor task

- Task: Draw a clock that reads 12:15



# Take home

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Tools and Resources to Conduct Comprehensive AAC Assessments

# Be Truthful

- Billable hours
- Acceptable feature-match process
- MPT & primary, secondary & tertiary features
- Quantitative data
- Personal evidence

# Denial resources

- Preferred provider:  
<http://www.aacoinstitute.org/funding/PreferredProviders.html>
- Letter of medical necessity
- Collection of additional data



# SAVE THE DATES!

**15th Biennial Conference of the International  
Society for Augmentative and Alternative  
Communication**

## ISAAC 2012

**July 28-August 4, 2012**

**PITTSBURGH • WOW**



### ISAAC 2012

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# THANK YOU!

Please feel free to contact us by email:

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- Rachel Harkawik at [rharkawik@aacinstitute.org](mailto:rharkawik@aacinstitute.org)

