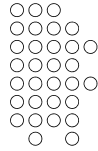


Making AAC Decisions for Clients with Aphasia Using the AAC-Aphasia Assessment Protocol

Joanne P. Lasker, Ph.D., CCC-SLP
Florida State University
Tallahassee, FL
jlasker@fsu.edu



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Disclaimer/Purpose

- This presentation illustrates an assessment protocol (Lasker, Garrett, & Fox, 2007) designed to determine whether people with aphasia can learn to use AAC techniques and devices for the purposes of communication.
- Clinicians implemented a 5-question evaluation process to explore the client's potential for using different communication strategies.
- Tasks are included in the protocol to illustrate and probe specific communication behaviors.
- Clinical judgments as to adequacy of message are made by clinical evaluators and communication partners.
- Data are presented for 3 different communicators (exemplars) with aphasia and discussed in light of their ongoing treatment and status.

Classification of Communicators with Aphasia (Garrett & Lasker, 2005)




Independent Tier



- Are capable of communicating in certain situations with limited or no partner support.
- Breakdowns may still occur due to inefficient or incomplete communication attempts.
 - Specific Need
 - Generative
 - Stored Message

Dependent Tier



- Tend to rely more heavily on cues and supports from a communication partner
 - Emerging
 - Contextual Choice
 - Transitional

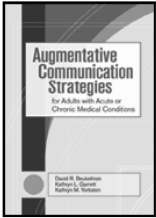
5 Assessment Questions

Can the person with aphasia . . .

- use unaided strategies to communicate?
- ↓
- use partner-dependent strategies to communicate?
- ↓
- use external stored information/messages?
- ↓
- access stored messages on device in a communication task?
- ↓
- formulate/generate messages with device to communicate?

AAC-Aphasia Assessment Protocol

- Lasker, J. P., Garrett, K. L., & Fox, L. (2007). Severe aphasia. In D.R. Beukelman, K.L. Garrett, & K.M. Yorkston, (Eds.), *Augmentative communication strategies for adults with acute or chronic medical conditions* (pp. 207-242). Baltimore, MD: Paul H. Brookes.
- Lasker, J. P., & Garrett, K. L. (to be released). *AAC assessment and intervention for people with aphasia: Clinical tools*. ASHA webcast.




Assessment Tools

Assessment Tool	What to Look For?
Categorical Assessment Tool	<ul style="list-style-type: none"> • communication behaviors • level of independence • where to begin?
Needs Assessment	<ul style="list-style-type: none"> • communication needs • partners, topics, vocabulary
Vision Screen	<ul style="list-style-type: none"> • field cuts • hemianopsia
Standardized Assessment Tools (WAB, RCBA)	<ul style="list-style-type: none"> • decontextualized skills • aphasia severity • reading comprehension
Writing Assessment	<ul style="list-style-type: none"> • functional writing • ability to use first letter cues • propositional writing

Assessment Tools (cont.)


Assessment Tool	What to Look For?
Modified Picture Description Task	<ul style="list-style-type: none"> • use of unaided modalities • gesture • expressive drawing
Multimodal Screening Task for People with Aphasia	<ul style="list-style-type: none"> • symbol comprehension • ability to use external stored systems • ability to navigate through pages
Systems Trials with Partner Supported Strategies	<ul style="list-style-type: none"> • Augmented Input • Written Choice • Tagged Yes/No
Systems Trials with Independent Voice-Output Strategies	<ul style="list-style-type: none"> • whole phrase messages • message formulation via words, letters, phrases • symbol formulation

Needs Assessment



- "What would you like to be doing that you're not doing?"
 - comparison to "pre disease" self
 - multiple informants
 - conducted multiple times? ongoing?
 - needs/wants sometimes easier to identify than social role fulfillment maintenance
 - clinician provides examples
 - encourage "imagined" situations

Needs Assessment



Sorting procedure for prioritizing user's needs.
(Fox, Sohlberg, & Fried-Oken, 2001)

Social Networks
(Blackstone & Hunt Berg, 2003)

Michael Video

Circle of communication partners.
(Lasker & Donham, 2008)

Modified "PACE" Picture Description Task



- provides information about user's ability to use unaided modalities in a communicative situation
 - gesture, drawing, residual speech
- procedure:
 - clinician serves as facilitator for client, as needed
 - someone else (i.e. spouse, friend) serves as partner
 - hand client a picture
 - "How would you tell her what's going on in this picture?"
 - clinician documents client behavior
- how much cueing or modeling was required?
 - stimulability
 - strategy use

RM - Gesture Use

Data Collection

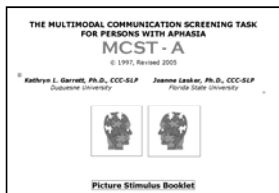
Kelly Example

Message Component	Adequacy (Did the partner understand?)	Modality Used				Cueing
		Speech	Gesture	Writing	Other	
man	+		point to self			min
drinking	~		sipping			mod
coffee	-	/kata/				max

Multimodal Communication Screening Test for Persons with Aphasia (MCST-A)

(Garrett & Lasker, 2005)

- sample communication book
- contains pictures, words, sentences, letters, map, story sequences
- clinician asks client to communicate messages using book and/or natural strategies
- videotaped administration



<http://aac.unl.edu>

Jerry Book Use

Sample Stimulus Page *MCST-A*



Scoring of *MCST-A*

- clients permitted 3 attempts to communicate message
- clinician's cues are recorded and tabulated
 - response adequacy (+, +/-, -)
 - communication mode
 - # symbols used
 - ability to open and navigate through book
 - # of client attempts
- focus on type and number of cues required for success

The image shows a scoring table for the MCST-A. It has columns for 'Item', 'Response', 'Cues', 'Mode', 'Attempts', and 'Score'. The table is used to record the results of each item and the client's performance.

What Does the *MCST-A* Reveal?

- Provides information about client's:
 - ability to think to communicate with external system
 - ability to search through an array of symbolic picture choices
 - ability to search through a limited categorical matrix
 - ability to combine symbols
 - ability to combine modes of communication
 - ability to use external symbols in conversation or storytelling to truly convey a message



Systems Trials for Partner-Dependent Strategies

- Conduct trials of Partner Supported Techniques.
 - Augmented Input Strategy
 - Written Choice Conversation
 - Tagged Yes-No

Augmented Input Techniques

(Beukelman & Garrett, 1998; Garrett & Beukelman, 1992)



- Communication partner supports comprehension of person with aphasia by:
 - supplementing spoken language with:
 - gesture
 - written key words
 - drawing
 - diagrams

Augmented Input

- Partner: So you meet a lot of acquaintances at the dogtrack and at the bars?
- PWA: [looks confused]
- Partner: Oh, I'm sorry I was going too fast.
- Partner: [speaks while writing/drawing] So you meet a lot of people.
 - [writes and draws people]
- at the dogtrack
 - [writes and draws dogtrack].
- and at the bars?
 - [writes and draws bottle and glass]



Written Choice Conversation Strategy

(Garrett & Beukelman 1992, 1995)



- Partner scaffolds conversation by. . .
 - providing topic choices
 - Asking open-ended conversational questions (sincere questions)
 - Writing potential answers in the form of large print word/phrase choices (usually vertical, indicate phrase with bullet)
 - OR offering graphic scales
 - Asking the PWA to point to a choice/scale to communicate
 - Continuing the conversation by asking a follow-up question

Written Choice Conversation Strategy

Andrea: So, you were living with someone in Fort Lauderdale?
[writes Fort Lauderdale]

PWA [nods yes]

Andrea: Who were you living with?

- WIFE
- GIRLFRIEND
- SOMEONE ELSE

PWA: [points to GIRLFRIEND and shows photograph]

Andrea: [laughs] Oh, is that her in this picture? She's pretty!

Graphic Rating Scales



How often did you play basketball?

Never Sometimes All the time

How close were you with William?

Not at all Kind of close Very close

Tagged Yes/No Questions



- Purpose: To facilitate patient's reliable expression of yes/no responses via gestures, head nods, or verbal responses.
- How It Works: Partners add a verbal and gestural "tag" to the ends of "yes/no" questions.
 - "Did you ever serve in the military, YES [nod head up and down, use rising intonation] . . . or NO [shake head side-to-side]?"
 - "Do you like maple syrup, YES [nod head up and down, use rising intonation]. . . or NO [shake head side-to-side]?"

Systems Trials for Independent Voice-Output Strategies

- Prepare at least two representative types of devices, if possible.
 - digitized device with static overlay (and perhaps multiple levels)
 - synthesized device with dynamic screen
- Develop appropriate scenarios and program the vocabulary.
- Conduct role-plays.

How to "Do" a Role Play



- use a meaningful situation
 - i.e. hosting a granddaughter's engagement party, buying coffee, planning a trip, discussing car purchase
- script out the conversation line by line prior to the trial
 - identify modalities that person with aphasia might use
- program vocabulary
- try it with client several times
- take data on performance
 - success, cueing required

A Quick Review: Two Types of Speech Generating Devices

Devices That Enable Formulation (Spelling) (dynamic/synthesized)

- Have the capacity for a greater number of messages.
- Can produce messages sound-by-sound with a computer-generated voice.
- Multiple language formulation options for user (words, letters, icons, phrases, sentences).
- Can provide some users with access to spelling.

Devices That Use Whole-Phrase Retrieval (static/digitized)

- Someone records messages by pushing the message square and record button, then speaking into the device.
- Instant, "real" voice.
- In most cases, little or no formulation required by user.
- Typically can't create novel messages/spell.

Video Kelly

Create the Scenario

- Create a scenario appropriate for your client and program necessary vocabulary.
- Program a digitized device to handle buying a gift at a toy store:
 - Sample Script:
 - I'd like to buy some toys for my daughters.
 - Sheila is 12 and likes unicorns.
 - Angela is 6 and loves "Dora the Explorer."
 - How much do those cost?
 - Do you have anything else?
 - Yes, I'll take those!

Scenario for Dynamic Display

- consumer transaction going beyond 5 prestored messages
 - planning a trip, buying a car, having a "getting to know you" conversation
 - "You are going to plan a vacation trip with a travel agent who will book all of the arrangements. You will use anything you can to communicate with the travel agent. You will need to arrange all of the details – where you are going, how you will get there, where you will stay."

Planning A Trip (page 1)



- 2nd page contains:
 - numbers
 - days
 - weeks
 - months
 - destination
 - keyboard link

Document User's Behaviors

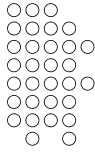
- | <u>Device Features</u> | <u>Client's Behaviors</u> |
|--|---|
| <ul style="list-style-type: none">• dynamic display• multiple messages per page• movement required between pages• return to operational pages to change device features• store/retrieve messages | <ul style="list-style-type: none">• attends to several screens• locates messages successfully• navigates between pages• changes features of the device (speaking rate, voice)• turns device on/off• stores new text under picture symbol |

Videotape and Tally

- # successful turns (%)
- # initiations
- ability to combine items from systems
- ability to integrate unaided strategies
- ability to switch levels manually
- ability to navigate from one level to another on a dynamic device
- ability to use categories to facilitate search for items
- ability to resolve communication breakdowns

Case Examples

Independent - *Generative*
Independent - *Stored Message*
Partner-Dependent




Jan: MCST-A Example

“My sister is coming to visit me from Texas.”


- navigation from calendar to map page
- use of multiple locations on page to supplement and augment her spoken productions
- independent in use of strategies
- independent combination of modalities
- 1 client attempt
- adequacy score: +

Jan MCST-A



Specific Need Communicator: Jan

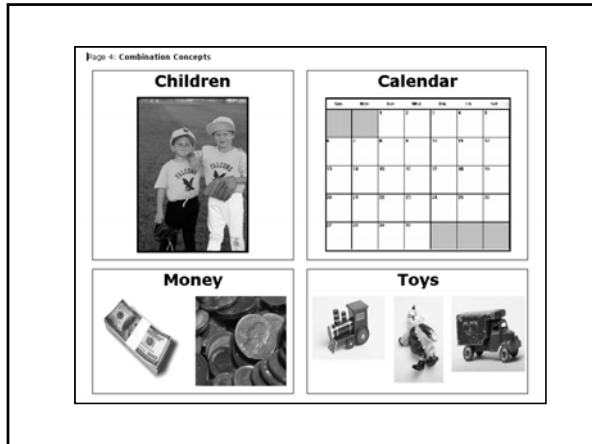
- 54 year old professor
- 4 years post L CVA
- *WAB AQ 79.1*, moderate anomic aphasia
- did not use AAC as a primary communication method
- required AAC for specific communication situations that require specificity, clarity, and/or efficiency



Assessment Tool	Performance
Vision Screen	okay
Standardized Tests	WAB AQ 79.1/100
Writing Assessment	excellent
Picture Description	gesture, writing, speech
Multimodal Communication Screening Task	symbol combinations navigation combined modalities
Partner-Supported Strategies	not needed
Voice-Output Strategies	letter-based

- ### AAC Goals and Outcomes
- Specific Need Communicator
 - Goal: The person with aphasia. . .
 - Utilize SGD to communicate information successfully during her graduate class.
 - client primarily used speech in daily life
 - for creating and delivering lectures, utilized EZ Keys software on a computer system
 - combined speech and computer output delivery during class lectures
 - continued work on refining computer skills and use of word-prediction strategy

- ### Independent Communicator Rod
- 64 year old, retired airport manager
 - 9 years post L CVA
 - WAB AQ 55.4
 - moderate aphasia and moderate-severe apraxia of speech
 - limited speech skills but highly successful communicator with multiple modalities



Rod – MCST-A Example

“I want to buy some toys for my grandkids.”

- initial unsuccessful speech attempt
- successful search for appropriate page
- independently accessed 3 symbols to convey message (money, toys, children)
- independently combined modalities
 - speaks while pointing to symbol
- 2 client attempts to complete the message
- adequacy score: +

Rod MCST-A

Generative Message Profile: Rod

Assessment Tool	Performance
Vision Screen	okay
Standardized Tests	WAB AQ 55.4/100
Writing Assessment	agrammatic with spelling errors, but communicative
Picture Description Task	gesture, tactile cues, writing
Multimodal Communication Screening Task	symbol combinations; some spelling
Partner-Supported Strategies	not needed
Voice-Output Strategies	phrase-based word based letter-based

AAC Treatment Goals: Generative Communicator



- Goals: Person with aphasia will. . .
 - Establish topics prior to communicating complex conversational information using tangible topic setters, topic cards (e.g., "I want to talk about...sports...family, etc."), and verbal skills.
 - Communicate in a variety of situations with familiar and unfamiliar communication partners (e.g., with family members and public places such as stores, banks, government offices, bars and social clubs, lectures).
 - Shift between accessing stored messages and creating novel messages to convey a complete idea.

AAC Outcomes: Independent Communicator (Generative)

- After treatment, client:
 - combined speech, gesture, voice-output device in conversation with unfamiliar partners to convey novel ideas
 - accessed both prestored messages and keyboard page with word prediction to formulate messages
 - lived independently and managed all activities of daily living using his device and other communication strategies
 - participated in ongoing motor speech treatment for his apraxia but acknowledged that he still needed his voice-output device on a daily basis



Rod DynaMyte Conversation

Classification of Communicators with Aphasia (Garrett & Lasker, 2005)



Independent Communicator
Kelly

- 42 years old
- 6 months post L CVA
 - result of arterial dissection after prolonged period of neck extension (root canal)
- WAB AQ 34.8
- speech limited to "oh gosh" and "well"
- accurate yes/no responses
- previously employed as office worker
- two daughters (7 year old twins)
- supportive mother and sisters

Kelly's Examples

Kelly - PACE, MCST-A, spelling

- Voice-Output Trials for Generative Messages
 - Lightwriter and Letter Board
 - unable to spell
 - MCST-A
 - problems combining symbols
- Voice-Output Trials for Stored Messages
 - Digitized Device
 - "buying toys for the girls"
 - Dynamic Display

Independent Communicator
Kelly

Kelly - Digitized Role-Play

Assessment Tool	Performance
Vision Screen	okay
Standardized Tests	WAB 34.8
Writing Assessment	no
Picture Description	gesture pantomime
Multimodal Communication Screening Task	phrase-based navigation
Partner-Supported Strategies	Written Choice
Voice-Output Strategies	phrase-based or word-based

AAC Treatment Goals: Stored Message Communicator



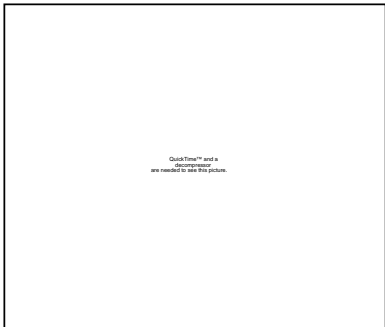
- The person with aphasia will. . .
 - participate in selection and storage of specific vocabulary for a variety of communication situations.
 - practice accessing vocabulary during structured, scripted role playing situations (in therapy).
 - gradually use the system in more demanding situations, such as returning an item to a store serviced by a clerk with no knowledge of aphasia.

AAC Treatment Outcomes: Kelly



- Stored Message but working on improving formulation skills.
 - language formulation skills
 - letter by letter, word-based
 - familiarity with device
 - operational skills (on/off, navigation)
 - access [attention?]
 - programming for real-life situations
- request was pending for voice-output device at time of her relocation to another state
 - phrase-based and word-based
 - dynamic display
 - good quality voice

Classification of Communicators with Aphasia (Garrett & Lasker, 2005)



**Partner-Dependent Communicator:
Max**

- 66 years old
- left CVA
- severe expressive and receptive aphasia
- 2.5 years post
- retired military and postal worker
- lives with wife









Partner-Dependent Profile: Max

Assessment Tool	Performance
Vision Screen	okay
Standardized Tests	WAB AQ 11.2/100
Writing Assessment	only with HOH model
Picture Description	maximal assistance for unaided gestures
Multimodal Communication Screening Task	required multiple attempts and cues; successful at communicating messages if on single page
Partner-Supported Strategies	Augmented Input Written Choice
Voice-Output Strategies	whole-phrase messages on static display (but only "in order")

Max Examples

- | | |
|--|--|
| <ul style="list-style-type: none"> • Unaided Strategies <ul style="list-style-type: none"> • Picture Description Task <ul style="list-style-type: none"> • maximal, HOH assist • Writing <ul style="list-style-type: none"> • perseverative, non-communicative • MCST-A MCST-A Clip <ul style="list-style-type: none"> • average of 2.5 trials per message attempt • average of 2.8 cues per attempt • with max assist, able to convey single-hit messages in external storage system | <ul style="list-style-type: none"> • Partner Dependent Strategy Trials <ul style="list-style-type: none"> • successful with all • Device Trial with Stored Messages Transaction Clip <ul style="list-style-type: none"> • transaction "in order" <ul style="list-style-type: none"> • transaction "out of order" • Formulation Trials Not Attempted |
|--|--|

Overlay for TechTalk

Hi. 	Fine, how are you? 	I use this machine to help me talk. 	Can you help me find the ant killer? 
Can you help me find the Scott's Lawn Fertilizer? 	Thank you. 	How much will it be? 	Goodbye. 

AAC Treatment Goals Transitional Communicator



- Goals: The person with aphasia will. . . .
- Tell simple stories on an SGD by activating sequential messages.
- Answer predictable questions (e.g., autobiographical, topical) by searching for, selecting, and pointing to pre-stored messages on a simple SGD or notebook.
- Increase independent use of nonspeech strategies (e.g. gesture) to convey messages in conversation.

AAC Treatment Outcomes: Max

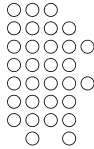
- Use PACE (Davis & Wilcox, 1981) activities and other "real" conversation opportunities to improve his independent use of unaided strategies (gesture, pantomime, drawing) other than speech.
- Use Written Choice and Augmented Input and teach partners.
- Develop and teach use of a communication notebook consisting of 1-3 pages to convey meaningful personal and news-related information to conversational partners.
- Improve "symbol/referent" connection between voice-output symbols and message content.

Types and Assessment Results			
Can the person with aphasia...	Independent Rod (Generative)	Independent Kelly (Stored Message)	Partner-Dependent Max (Contextual Choice)
use unaided strategies (e.g., gesture, facial)	yes	yes	not yet
use partner-supported strategies	yes	yes	yes
use external stored message systems	yes	best with "one-symbol" messages	with max assist; on a single page
access whole-phrase messages on voice-output device	yes	best with "whole-phrase" messages	only "in order" for transaction; only with cues
generate messages piece by piece	yes	not yet	not yet, if ever?

Speech Generating Device Considerations

?


When recommending a voice-output device (SGD) for a client with aphasia, what device features should I consider?



Technology Features: What Matters?

- appearance
 - size
 - pictures
 - hardware
- accessibility
 - portability
- voice quality
 - volume
- ease of use
- effectiveness
 - is it worth it?

Ordering food at the deli counter with a DynaMyte.



“Not the Device but How It’s Used”

- dynamic screens can be useful for some, but not others
 - if the communicator has more than 8 pages worth of messages to communicate, may be useful
 - synthesized systems are often ways of retrieving more messages [words, pictures, environments, letters] than available on a static-display, digitized device with symbols
- picture-based systems are the ones we see most often for people with aphasia
 - usually not systems that require sequencing of iconic symbols to access pieces of messages (words) or whole messages

**Language Factors:
How Are Messages Stored and Retrieved?**

<p>Storage</p> <ul style="list-style-type: none"> letter by letter <ul style="list-style-type: none"> primarily spelling with word prediction by single words alone text <u>plus</u> symbols or pictures <ul style="list-style-type: none"> most common phrases/sentences icons without words visual scenes 	<p>Retrieval</p> <ul style="list-style-type: none"> various combinations of retrieval. . . <ul style="list-style-type: none"> letters and phrases words and phrases words and pictures words, phrases, sentences scenes and sentences
---	---

**Letter by Letter:
Use word prediction strategies to supplement spelling.**

- Communicator types 't' then 'a.'
- Computer generates "table", "take", "taking", "talk."
- Communicator hits key/clicks to choose desired word.

GUS Pocket PC




**More Devices with
Spelling/Prediction/Phrases**

Say-It! SAM
Communicator
Words+

Enkidu Portable
Impact Handheld
DynaVox

**Sample Goals for a Letter-Based or
Picture-Based Prediction System**



- **Beginning Goal:**
 - Done after family members' names have been added to prediction pool.
 - The client will select the first letters of family member's names and select the words in the prediction list 4 out of 5 times with minimal cueing.
- **More Advanced Goal:**
 - In a conversation with a familiar partner, Rod will respond to specific questions about his job as an airport manager by typing the first 2-3 letters of his answer and selecting the best predicted option 3 out of 5 opportunities with minimal cueing.

**Retrieval by Letters, Words, Pictures,
Phrases**

Word Power Software
(Available on a variety of systems.)

word and letter-based
retrieval with links

picture/word and letter-
based retrieval with links

Retrieve by Picture/Word from a "Pool"

Treatment Goal: Client will formulate a 2-3 word sentence asking for a specific item of food or drink.

C-Speak Aphasia
Mayer Johnson
(Used with Speaking Dynamically Pro)


Picture Symbol-Based Retrieval

DynaVox Fast Food Page

Enkidu Portable Impact Symbol Base Main Page
DynaVox Systems

Visual Scenes Display

- photographic representations of connected actions plus conversationally relevant phrases and questions
- topic choices stay constant



(Dietz, McKelvey, & Beukelman, 2006)
DynaVox Systems

<http://aac.unl.edu>

Goal for Visual Scenes System



- In a conversation about favorite movies, client will respond to partner's questions and ask questions of the partner using preprogrammed phrases, residual speech, gestures on 10 occasions in conversation with an unfamiliar partner with only 1 communication breakdown.

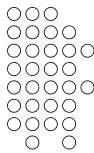


(Dietz, McKelvey, & Beukelman, 2006)
DynaVox Systems

AAC Funding



What procedures do I use to get funding for SGDs for people with aphasia who can benefit from voice-output systems?



Billing Codes



- Inpatient
 - billable CPT codes
- Outpatient
 - Insurance covers individual therapy
 - AAC evaluation, modifications, and treatment
 - available CPT codes
 - Group therapy (Elman, 2006) is also billable and fundable
 - Importance of goal/objective writing
 - e.g., "Patient will answer functional conversational questions by pointing to 1 of 4 partner-generated written phrase choices with 90% accuracy."
 - Can include patient in construction of low tech systems and programming of high tech systems to bill for a session.

Funding for SGDs

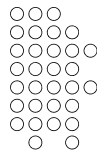


- SGDs are attainable for people with aphasia.
- Medicare, Medicaid, Vocational Rehabilitation, and many insurers will fund devices if application is submitted through a DME provider or if request is sent directly to vendor.
- SLPs have the primary responsibility for this process.
- Include reports, copies of insurance cards, vendor forms, doctor's prescription.
- See www.aac-rrc.com for sample reports, FAQs, report protocol, billing codes for device classes.
- Also, see <http://www.aacfundinghelp.com/> for information and funding report template.

Summary and Conclusions

?

So what does all of this mean for me in daily practice with people who have aphasia?



Communicator Types and Device Decisions

	Independent Rod <i>(Generative)</i>	Independent Kelly <i>(Stored Message)</i>	Partner-Dependent Max <i>(Contextual Choice)</i>
Device Selected	DynaMyte (word, phrase, & letter-based pages)	"Interim" Digitized Device	Communication Book Practice
Treatment Activities	DynaMyte (word, phrase, & letter-based pages)	DynaVox V Visual Scenes	Digitized Devices in Treatment
Other Approaches	All Strategies	Communication Book and Unaided Strategies	Augmented Input and Written Choice

Limitations

- not enough people yet to conduct group validation studies
 - a clinical tool, at best
- based, in large part, on clinician judgment of communicative adequacy and "usability" of techniques
 - need social validation and this is ongoing
- perhaps a place to start for people with aphasia who have needs unmet through speech alone

Summary

- illustrated components of the assessment protocol (Lasker, Garrett, & Fox, 2007)
- detailed the evaluation process and the clinical questions posed
- provided exemplars of 3 "broad" types of communicators with aphasia
 - Independent - *Generative*
 - Independent - *Stored Message*
 - Partner-Dependent - *Contextual Choice/Transitional*

Selected References



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- Lasker, J. P. & Garrett, K. L. (2006) Using the *Multimodal Communication Screening Test for Persons with Aphasia (MCST-A)* to guide the selection of alternative communication strategies for people with aphasia. *Aphasiology*, 20(2/3/4), 217-232.
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Other Resources



- aac.unl.edu
 - MCST-A
 - copy of this talk

- new FSU website soon to come
 - presentations
 - protocols

- jlasker@fsu.edu
