Customizing AAC Interventions for Adult Users: Cognitive Vs. Linguistic Challenges

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Communicative Competence...
“...suggests an adequate level of communication skills to function within the environment” (Light, 1989, p. 138)
–Linguistic
–Social
–Strategic
–Operational

Cognitive Challenges

Attention: Implications for Use of High-Tech AAC

• Sustain focus (vigilance) to scan for target information
• Selectively attend to page content (without distraction)
• Alternate between different strategies for message formulation
• Divide attention between two tasks at once (e.g., formulating a message while listening to partner)

Memory loss is common

• Anterograde Amnesia—remembering new information (after onset)
• Retrograde Amnesia—recalling events just prior to onset

Implications

• Message formulation strategies
  –Recall location of prestored message
  –Recall that a prestored message exists
• Application to daily living
  –Recent memory (recall past event)
  –Prospective memory (recall future intention)
Executive Function

- Initiation & drive (e.g., use of device & strategies)
- Organization (e.g., content groupings)
- Generative thinking (e.g., problem-solving location of prestored message)
- Awareness (e.g., ability to self-evaluate effectiveness of use and modify behavior)

Use of AAC by Adults with TBI?

- Letter-by-letter spelling—less use of other message formulation strategies

“...although they may have retained spelling ability and may appear to have relatively sophisticated communication skills, their substantial deficits in memory, attention, and cognitive flexibility greatly impact their use of encoding techniques” (p. 44)

(Fager, Hux, Beukelman, & Karantounis, 2006)

Implication...

- Cognitive impairments impact strategic competence—ability to adapt and compensate with SGD (e.g., use of message formulation techniques including prestored text)

Case Report: GB

- 28 year old
- Severe anoxia (11 years TPO)
- Significant physical involvement (spasticity)
- Functionally intact language with significant impairment of cognitive function

- Nonfunctional speech/High-tech user of AAC
  - DynaVox 3100 (about 7 years)
  - DynaVox Vmax (about 1½ years)

Cognitive Strengths & Weakness

- Strengths:
  - Memory of distant past (remote memory)
  - Selective & sustained attention for locating message content

- Weaknesses:
  - Higher level thinking (limited insight & problem-solving)
  - Memory since onset of injury

Significant Memory Loss

- Anterograde Amnesia—remembering events since onset
  - Duration of storage—about 5 minutes
  - Post Traumatic Amnesia (PTA)—day to day recollection

- Retrograde Amnesia—about 1 year

PAST  ONSET TODAY
Challenge: Consolidate to Long Term Memory

- Declarative (Explicit)
  - Semantic (Facts)
- Nondeclarative (Implicit)
  - Episodic (Events)
  - Procedural (Skills/Habits)
  - Priming (Conditioning)

(Sohlberg & Mateer, 2001)

The contrast...

- Declarative—conscious recollection and learning
- Nondeclarative—learning new information without conscious awareness of practice

(Sohlberg & Mateer, 2001; Turkstra & Bourgeois, 2005)

AAC: Nondeclarative Learning

- Page content—systematically organized to promote “habit and routine” locations
- Cueing hierarchy—errorless learning to maximize success
- Procedures—to execute activities of daily living

Page content—systematically organized to promote “habit and routine” locations

Alphabet to Main Topic’s Page
Procedural Learning

- Takes more time & practice opportunities
- Requires more repetition
- Benefits from systematic approach
- Errorless learning
  - Minimize errors during acquisition
  - Break task into discrete steps

(Sohlberg et al., 2005; Turkstra & Bourgeois, 2005)

Cueing Hierarchy

- Given a scenario situation…
  1. “Show me the fastest way to say… (target) using your… (specific topic page)”
  2. “Show me the fastest way to say… (target)”
  3. “Show me how you would say… (target)”
  4. “What would you say?”

Procedures for self-cares & navigating environment…

...including preprogrammed “reminder” alarms that link to page of procedures

Strategic Competence…

- Enhanced by adapting and compensating for cognitive impairments through instructional approach that emphasized:
  - Procedural memory
  - Errorless learning
**Linguistic Challenges**

- Receptive/expressive language strengths and weaknesses of user (acquired or congenital causes)
- Language skills specific to user’s AAC system
  
  (Beukelman & Mirenda, 2005; Light, 1989)

**Implications for Use of High-Tech AAC**

- Receptive language ability
  - Auditory comprehension of interaction
  - Reading comprehension of prestored messages
- Expressive language ability
  - Message formulation skills for word or sentence responses
  - Rate enhancement features

**Social Competence**

- Sociolinguistic—conventions or rules that operate in linguistic interactions
- Sociorelational—motivation to communicate, responsiveness, interest in communication

(Light, 1989)

**Case Report: FP**

- 53 years of age
- Cerebral Palsy
- “Deaf since birth”
FP’s Profile

- Natural Abilities
  - Basic signs
  - Nonverbal skills (emblematic gestures, facial affect, vocal intonation)
  - Vocal approximations & labored graphics (nonfunctional)
  - Some lip reading skills
  - Severely to profoundly hearing impaired (some use of residual hearing)

User of High-Tech AAC System: DynaVox MT4

- Strengths (Assets)
  - Cognitive abilities (attention, memory, organizational skills)
  - Reading comprehension (words, simple sentences)
  - Direct selection
  - Ambulatory (and able to carry device)

Communication Profile: MT4

- Weaknesses (Barriers)
  - Hearing loss—importance of augmented input
  - Linguistic & Social Competence

Compromised Language System

- Receptive Language
  - Semantics (understanding word content such as “device”)
  - Syntax and morphology for selecting accurate message content
- Expressive Language
  - Spelling accuracy (“hamgbe” for hamburger)
  - Sentence organization (“I drink my cup” to describe its function)

Priority Themes…

- Maximize strengths (cognitive capabilities) to minimize effects of language impairments
- Customize visual displays (e.g., color encoding & category labels)
  - Store grammatically complete utterances
  - Organize prestored messages topically to ensure relevance of message
  - Color code prestored messages to facilitate discrimination of linguistic features

(Poag et al., 2008, 2009; Light & Drager, 2007; Todman et al., 2008)

Prestored Messages… Grouped “About” someone vs. messages “To” the person
Customized visual displays... Message content grouped by concept of “time”

Sociolinguistic Skills
• Conversation moves primarily limited to 1-word responses initially

Sociolinguistic Skills
• Visual displays also were designed to enhance social communication skills for discourse by organizing the display to help him sequence messages with relevant and contextually appropriate content.

(North, 1992, 1994; McCoy et al., 2009)

Navigating a conversation...

Main Idea + Extensions
Share opinions...

...and conclude an interaction

Visual Display of Pictures

- Importance of personal photos (provided physical context)
- Color encoding consistency
  - “Big” & “little” ideas
  - Added extending & initiating moves (“personal” vs. “to others”)

(Scaife, 2001)

Expanding communicative functions to include social closeness

“It shows you care”

“Rules” to enhance decision-making about message relevance

Shared Knowledge

(Scaife, 1992, 1994)

Sociorelational

- Desire, interest, and motivation to communicate with others using his AAC system
Comments from family…

- "With his new technology at his fingertips, he was able to express his feelings at home and his symptoms with more accuracy to his doctors…"
- "His ability to use such an electronic speaking tool contributed to his own feelings of independence at home."
- "I wish to underscore the dramatic transformation of [FP] into a social individual."

In Summary

- Both AAC users presented with long-standing communication needs
- Content and organization of messages were adapted to maximize communicative effectiveness (minimizing weaknesses)
- Visual displays were customized to facilitate learning
- Instruction techniques emphasized consistency and continuity for learning

Selected Readings…


...Readings (cont.)


