Augmentative Communication News

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# Upfront

We struggle, as a professional community, to provide young children who are unable to talk with access to the kinds of linguistic expression their peers enjoy using natural speech. Early AAC intervention with infants, toddlers and preschoolers is complex and challenging. Developmentally, the early years are a time of rapid change and growth. For families, it is often a time of uncertainty and adjustment. Family members are coping with the day-to-day realities of parenting a small child with a significant disability. At the same time, they are becoming familiar with the "world of disability" and dealing with the emotional and financial stresses that so often accompany it.

Enter the AAC professional, smiling reassuringly, laden with a bulging bag of tools, techniques and strategies. This bag contains manual signs, graphic symbols, talking picture frames, switches, aided language stimulation, augmented input strategies, software for learning and literacy, scanning arrays, synthesized and digitized speech devices, light pointers, picture boards, and a whole new way of thinking about communication. Overwhelming? To be sure.

Family members are likely to have a slew of questions: What can we do to facilitate speech development? Do some AAC techniques discourage speech development? How much emphasis and time should we devote to developing alternative and augmentative approaches? What technology is worth investing in? When? What are the most effective kinds of AAC treatment approaches for a child like mine? Who can help us?

In 1990, an ACN survey showed that master clinicians from several countries felt that we in the AAC community poorly served very young children. Today, the news is much, much better. Many young children do receive AAC services, and there is a growing body of research, products and clinical options that focus on the very young.

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# Clinical News

## AAC approaches for infants and toddlers

I asked seven master clinicians and teachers: *"What type of AAC products/approaches do you find most effective with infants, toddlers and preschool children?"* All emphasized an early focus on basic interaction skills and receptive language development. All supported a family-centered model of service delivery. All acknowledged the importance of paying attention to the cognitive skills that underlie basic communication and language development (*e.g.,* cause/effect and means/ends relationships; intentional behaviors; ability to establish joint attention, ability to map concepts to symbols/words). All said a child's developmental level was a primary consideration when making AAC decisions.

These professionals start slowly, and gradually introduce AAC strategies to young children and their caregivers. All supported the use of low-tech strategies, and whenever physically possible, speech, manual signs and gestures. [See next issue of *ACN* on *Gestures and AAC*.] Most introduced digitized speech devices early on, but waited until a child was between four and six years old (developmentally) to begin using synthesized speech devices. Most considered computers with appropriate software powerful

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learning tools for children. Tables 1 and 2 give examples of their comments on low-tech and high-tech devices.

## Views from the community

As a group, the master clinicians and educators whose thoughts and opinions are summarized in this section (though each quite young) probably lay claim to more than 100 years of experience working with young children who have severe speech impairments.

1. **Gayle Porter**, a speech-language pathologist, works with very young children who have physical disabilities. As described below, she uses low-tech "paper-aided language displays," made with BoardMaker software with a combination of PCS[1] and Compic[2] symbols, and simple AAC devices:

• *Situation specific displays*. Activity-based displays for use in the home, early intervention groups and daycare environments, based on Goossens', Crain and Elder.[3]

• *General interactive displays.* Displays with "general" vocabulary that supports communication during specific activities and on outings (*e.g.*, hurry up; I don't like this; something's wrong).

• *Simple multi-level communication books.* Multi-page books with interactive vocabulary such as "*more, finish, uh oh, hurry up, stop, help,* and go" on the first page. Later on, she adds additional phrases to the first page such as, "*I like this…, Something's wrong…, I have a question about…, I want…* " and links them to other pages in the book.

• *"Simple" voice output aids***.** Digitized AAC devices with limited messages to introduce technology and work on switch access. Porter uses devices during specific games and reading activities to "call out," initiate turns and so on.

As children develop, Porter increases the complexity of both low-tech displays and voice output communication aids. She adds the alphabet and expands vocabulary, which requires the use of multi-level books, displays and devices.

Because many children with severe physical impairment struggle to learn the physical (and cognitive) components of communication device and switch access, she moves slowly with technology. "The goal is to keep the operational competencies required of the child and the family to a minimum, so caregivers can focus on interaction, and gradually learn how to communicate using AAC."

2. **Cynthia Cress**, a professor at the University of Nebraska, is completing a research project that examines the communication and symbolic development of nonspeaking children with physical and developmental disabilities. Over the past five years, Cress has followed 42 children longitudinally for 18 months, while they were between one and three years of age. Cress was looking for factors associated with improvements in effective communication. She has data on parent/child interaction, joint attention, play skills, persistence and mastery, vocabulary development, gestures and imitation skills. As part of her research, Cress provided trial AAC intervention and consultation to families and practitioners, emphasizing gestures and signs embedded in activities.

Cress suggests that for children to learn to use an AAC device or graphic symbol, they must first learn the purpose of using an external "thing" for self-expression. She said that learning to use AAC techniques is built upon a child's earlier experiences using their own behaviors as signals, having partners respond to their signals and gradually incorporating "things" that help them convey messages, albeit less directly. In addition, developing the symbolic behaviors necessary to use some AAC techniques requires that a child learn to (1) manage joint attention (between a person, event/object and the AAC strategy), (2) plan and execute multiple steps, (3) appreciate the reasons to communicate and (4) understand that various modes may be effective. She believes that, "any child under two has a limited tolerance for delays between communicating a message and receiving a response. Thus, seeking out an external means to communicate may not be immediate enough for very young children." Portable modes are needed so children

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In this issue **Clinical News** summarizes the results of an *ACN* survey that asked master clinicians to share what they are doing and thinking when they use AAC techniques with very young children with delayed speech. **University/Research** gives information about a longitudinal study that will compare the effects of three intervention strategies with severely disabled, nonspeaking toddlers—two: use AAC (speech output devices), one uses a traditional therapy approach. The **Equipment** section reviews some useful products. **AAC-RERC** reports the results of a research project with typically developing preschoolers conducted by Penn State University partners. They studied learning issues as related to AAC devices with three different organization schemas. Many thanks to those listed in **Resources and References** for sharing their opinions and experiences.

One more thing—*Beneath the Surface: Creative Expressions of Augmented Communicators*, edited by ACI's Michael B. Williams and Carole Krezman, is now available. It's fantastic. See page 8 for details.

*Sarah W. Blackstone, Ph.D., CCC-SP, Author*

## Table 1. Low-tech displays

| | |
|---|---|
| 1 | Know the child. |
| 2 | Make it FUN to use. |
| 3 | Make it EASY to use. |
| 4 | Make it MEANINGFUL to the child. |
| 5 | Don't get hung up on nouns. |
| 6 | Represent and organize vocabulary carefully. It should make sense for the child. |
| 7 | Make sure vocabulary gives the child a way to control activities and people. |
| 8 | Provide social vocabulary. |
| 9 | Make displays activity based. |
| 10 | Provide access to a larger vocabulary than you expect the child to use. |

can communicate messages like MORE, GO AWAY, COME HERE. Cress also models and incorporates manual signs, graphic symbols, multi-item displays, print and simple speech output devices into familiar routines to expand children's awareness and use of a range of communication strategies.

**3. Teresa Iacono**, a senior research fellow, emphasizes the importance of embedding AAC into intervention approaches that have a strong research base in the classroom and clinic (*e.g.,* milieu teaching and responsive interactive approaches).[4,5,6,7] In a university-based, early-intervention program that serves ambulatory children with cognitive disabilities and autism, she reports preschool teachers like to use digitized speech devices (*e.g.*, MessageMate[8] and the Macaw[9]) because of their size, portability and ease of programming. However, the AAC devices are not typically dedicated to one child. Rather, they are embedded in specific activities and routines and available to all children. She said, "It isn't unusual to see a Macaw in one of the "corners" with a vocabulary that relates to the activity, a low-tech calendar system on the wall and another device available at snack time." Speaking children can provide good models of device use for speech-impaired children. She also noted that children who are just learning English benefit from having access to AAC approaches. She summed it up by saying, "AAC devices don't dominate interactions; they are just a part of them."

In her clinical work, Iacono uses manual signs as a way to provide additional input to spoken language. "What a child attempts to imitate gives me information about what language structures/vocabulary to teach." She also uses manual signs to prompt children to expand their language (*e.g.,* use a longer utterance or a new word or linguistic structure). She believes that clinicians help when they model language forms a child is capable of producing, *i.e.,* sign, graphic symbol on a low or high-tech aid or speech.

4. **Howard Shane**, Director of the Communication Enhancement Clinic, reports the preschoolers he sees have primarily pervasive developmental disabilities (50%) and cerebral palsy (20%). He believes early interventionists should encourage lots of human interaction, and work to increase a child's opportunities to experience cause/effect relationships during routines and preferred activities. "Increasing the quantity and quality of natural communication exchanges," he says, "is an important goal." He pays close attention to how children currently communicate, and helps families build an awareness of these natural modes. Shane teaches young children manual signs and gestures while encouraging speech. He also uses signs/gestures to teach more abstract language forms like MORE."

"Low-tech displays are very important," Shane reports. He introduces graphic symbols using BIG iconic photographs of a child's favorite toys, familiar objects, people and pets. Commercial food product labels also provide useful representations of meaningful language. By mounting photos/labels on a cutout foam background, he makes early graphic symbols three-dimensional. As children get older, he builds topic-based displays with vocabularies that enable children to build sentences.

Between the ages of two and four (developmentally), Shane introduces simple digitized speech output devices so children can access simple messages (*e.g.,* Cheap Talker,[10] Big Mack[11]). He says, "high tech devices are important when they are motivating and do not interfere with the communication process." He considers more complex

## Table 2. High-tech devices

| | |
|---|---|
| 1 | Must be easy for caregivers to use. |
| 2 | Must be easy to program.. |
| 3 | Must be easy for the child to use. |
| 4 | It's gotta work "right now." |
| 5 | Must be dependable and durable. |
| 6 | Vocabulary must be represented and organized in ways the child can access easily. |
| 7 | Must have sufficient vocabulary capacity. |
| 8 | Must be portable. |
| 9 | Sufficient instructional time must be available. |
| 10 | Child must have lots of free time to practice. |

AAC devices (*e.g.*, the DynaVox[12], Freestyle[13] and products using a Minspeak approach[14]) when children are between 4 and 6 years old, developmentally.

**5. Pati King-DeBaun**, a speech-language pathologist, uses a combination of simple communication devices and communication displays with young children. She focuses on building receptive language skills and, like others, cited the work of Carole Goossens' as she "engineers" the environment for communication.[3] King-DeBaun described first "posting communication "scripts" for everyday use during routine activities (feeding, bath time, diapering, *etc.*). Later on, she introduces symbols (three to five per activity) when everyone is ready. She also encourages families to use computers as interactive learning tools and has developed software to support many activities. (See **Equipment**.)

In preschools, King-DeBaun starts with scripts, adding symbols as the child's and teacher's skill levels increase. She uses simple, digitized communication aids (*e.g.,* Cheap Talker,[10] Hawk,[15] Tech/Talk, etc.,[1] and Big Mack[11]) and computers to demonstrate the power of communicating out loud. With regard to AAC devices, she says, "The simpler and more user friendly the device, the better."

6. **Linda Burkhart**, a special educator, focuses on teaching receptive language skills to young children while providing multiple opportunities for interaction and cognitive engagement. She feels that immersing the child in symbols is

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crucial, but "the real key to early training is encouraging joint attention, shared enjoyment and responding to subtle communicative attempts from the child." She adds, "Engaging the children's affect is a big factor in their retention and understanding."

Early on, she uses eye gaze displays, (two inch squares with highlighted background) and offers choices using two fists—this one or that one, teaching children to look away when they don't want either choice. She also uses manual signs and pictures as an integral part of a young child's daily experiences—car seat, diaper-changing table, bath and highchair. She favors simple voice output communication devices for specific activities, using a number of single talking messages in an array (*e.g.,* talking picture frames[16] on a carpet square) instead of a single device, so that individual messages can be easily changed.

She strives to provide children between two and four years of age with access to the largest vocabulary possible, using activity-based displays on a highlighted background. She puts many more symbols on a board than she expects a child to use, and then models their use.

Burkhart says computers are powerful learning tools because they give children access to literacy, art, world knowledge and independence. Also, they can help children play with sounds and language in an error-free learning environment. She recommends using IntelliPics and Overlay Maker[17] so that teachers can customize software for their students.

7. **Arlene Kraat**, a speech-language pathologist and clinical instructor, uses different treatment approaches with different children. "We can not expect any single approach to work with all children." Her comments are well taken.

"We do specific things with children on the autism spectrum, and other things with children who have comprehension/production gaps because of cerebral palsy. We take still other approaches with children who seem to be at a prelinguistic level cognitively and communicatively. Then, within each of these groups, there are differences. For example, one child with autism may have relatedness issues that need to be addressed before superimposing linguistic goals; another may have auditory processing problems and require sign/symbols as "input" to develop their comprehension of spoken language. Some children need to expand the use of language beyond routines, while others need to extend schemas to incorporate into their play activities. Then there is the issue of whether a child is primarily being treated in a preschool classroom environment or privately, at home.

There are times we use a generic language array, times we use context/topic boards (when children are very young) and times we use both. There are times we use manual signs, times we use light-tech, times we use high-tech devices and times we integrate all three of these approaches. There are children we work with where AAC acts as a "bridge" to spoken language. Other children will continue to use AAC productively, or both receptively and productively. Products and approaches must be matched to the abilities and challenges of the child.

## Comment

Continuing this dialogue on treatment of young children is essential. "We need to be talking to each other about what particular intervention models and procedures we use with children who have different profiles."[18] Hopefully, this issue of *ACN* can facilitate that important dialogue. These master clinicians have shared important ideas and strategies that can help guide our work with very young children. We must also strive to build a stronger clinical research base to support specific teaching methodologies and intervention models.

# University & Research

## Role of speech input and output in effective AAC treatment

Romski, Sevcik, Adamson and Bakeman have recently embarked on a five-year, NIH funded project to compare intervention outcomes for severely developmentally delayed toddlers (ages 24 - 33 months) who are not yet talking. Some have mild motor impairments. The goal of the project is to develop a fine-grained longitudinal description of the communication development of these children, and to compare the relative effects of three different intervention approaches over time (*i.e.*, three, six and twelve months following the treatment.) The current project is based on their previous research, and uses a modified version of SAL (System for Augmenting Language) which has five integrated components:[19]

1) Speech output; 2) individualized symbol vocabulary; 3) naturalistic communication experiences where use of language is encouraged but not required; 4) partner training in using a device and 5) mechanisms that support a child's participation in communication.

Their hypothesis is that "augmented input" will prove to be more effective than approaches that do not incorporate speech output devices into the treatment protocol. Two pilot studies support the benefits of using a modified SAL approach with very young children.

**Case study.** A 34-month-old boy with partial Trisomy 13, cerebral palsy and significant developmental delay (1 year, 3 months on the Vineland Adaptive Behavior Scales) participated with his mother in a 12-week intervention program of augmented communication input. Initially, his speech comprehension skills were at a 15-month level. Expressively, he used undifferentiated vocalizations. During baseline he did not comprehend the meanings of any of the symbols being taught (*e.g.*, more, all done, book, snack, drink, bubbles, jack-in-the-box). After 12 weeks of a

modified SAL approach, his understanding of speech and symbols representing the target vocabulary had increased to ten words. Expressively, he began playing with symbols (almost like babbling) after the first six weeks. By 11 weeks, he used symbols spontaneously and appropriately to communicate messages and was having positive interactions with his 18-month-old brother, using the AAC device. No changes were noted in spoken language skills.[20]

**Ten toddlers**. After 12 months of SAL training, ten significantly disabled toddlers developed expressive symbol vocabularies. The mean number of symbols they used was 29, with a range from 12 to 72 symbols. Again, no increases in spoken language production skills were noted.[21]

Romski and her colleagues plan to follow 60 children for 15 months each. Children will be randomly assigned to one of three intervention groups (20 per group):

Group 1: No AAC. Speech/communication intervention approach focusing on spoken words.

Group 2: Augmented communication input approach focusing on input and comprehension using a speech output AAC device.

Group 3: Augmented communication output approach focusing on output/production using a speech output AAC device.

Intervention will be provided to each child for 12 weeks. Sessions will be divided into ten-minute segments and simulate daily routines: (1) book reading, (2) snack and (3) interactive play. Initially, parents will observe sessions, and then they will participate (with coaching). Eventually they will conduct the sessions. The last few weeks of instruction will take place in the child's home. A variety of outcomes will be measured longitudinally, including speech and symbol comprehension and production, adaptive behavior, educational placement, parental stress and perception of outcomes.

## Comment

These researchers hypothesize that the use of speech output devices has advantages over traditional therapy approaches for children with severe developmental delays who are nonspeaking. When data are collected and analyzed, we will know more about the advantages and disadvantages of the three teaching methodologies being investigated; and thus, we can become more grounded in the teaching methodologies we use with young children.

To follow the progress of this research project, contact Dr. Mary Ann Romski, Ph.D., Dept. of Communication, Georgia State University, Atlanta, GA 30303. 404-651-3469; fax 404-651-1409; joumar@panther.gsu.edu

# Equipment

## For young children

New products are available to assist in addressing the needs of very young children with severely delayed communication skills. *Play & Learn* is a preschool curriculum designed for early childhood professionals. *Tech for Tots* is an introductory orientation to assistive technology with very young children. *Emergent Literacy Success, Storytime Songbook* and *Making Language Visible* have creative ideas and activities for very young children.

### Play & Learn

*Mary J. Sullivan Coleman and Laura Krueger*. This 300 page preschool curriculum incorporates technology, motor skills development, communication, socialization and cognitive skills in a 12-month program. Included are a list of toys, equipment resources and a functional motor checklist. The authors believe "all children learn through movement and meaningful play." The school day begins with *Warming up for the Day,* and ends with *Perfect Ending* activities. Monthly themes include: October (Fall colors); January (Winter wonderland); August (Exploring our environment). Within each theme, the teacher emphasizes: (1) routines and music; (2) repetition; (3) play and (4) social interaction. The classroom is designed to promote independence and active involvement. Assistive technology allows the inclusion of all children and motivates children to explore activities.

$59 US. AbleNet, Inc. 1081 Tenth Avenue, S.E., Minneapolis, MN 55414-1312. www.ablenetinc.com

### Tech for tots: Assistive technology for infants and young children

*Toni Solano and Sonia K. Aller.* This educational package is designed to acquaint parents, professionals and students across disciplines with issues regarding assistive technology for infants and young children. It includes a course book, instructor notes, guided discussions and activities, reproducible handouts, a 16-minute video, an assistive technology resource guide, an exam, a course evaluation and a choice of either slides, overheads or a PowerPoint file on a CD.

From $59.99 to $99.99. Children's Hospital Los Angeles Research Institute, Box 54700, MS #84, Los Angeles, CA 90054-0700. Fax 323-668-7923. www.uscuap.org

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### Emergent literary success: Merging whole language and technology

*Caroline Musselwhite and Pati King-DeBaun.* This book compiles current theory and practical applications to support and empower students in their quest for literacy. Sections include a review of the literature, illustrations and mini-case examples.

Pati King-DeBaun, Communicating, PO Box 3358, Park City, UT 84060. 435-645-7737. www.creative-comm.com

### Storytime Songbook 2: Parts I and II

*Pati King-DeBaun.* The stories on this CD are in a song format. Features include: highlighted text, enlarged text, simple graphics, animation, digitized singing and music. Compatible with both MAC and Windows platforms. Children can access it using a mouse, Touch Window, IntelliKeys, single switch and scanning (auditory prompts).

Pati King-DeBaun, Communicating, PO Box 3358, Park City, UT 84060. 435-645-7737. www.creative-comm.com

### Making Language Visible

*Pati King-DeBaun.* This CD has a collection of scripts and symbols for home and school. Easy to print out and use. Compatible with MAC and Windows.

Pati King-DeBaun, Communicating, PO Box 3358, Park City, UT 84060. 435-645-7737. www.creative-comm.com

### IntelliTools Website

This site has an area where you can download overlays and activities for young children. It is easy to find things and just as easy to "grab" them for your own use. Check it out! www.intellitools.com

## The AAC-RERC

## Improving AAC technologies for young children

Dr. Janice Light, Kathryn Drager and AAC-RERC partners from Pennsylvania State University are completing a project designed to investigate the learning demands of some of the current generation of AAC devices that organize language according to different strategies.

1. Taxonomic organization with concepts presented in a grid. Dynamic display device with four symbols, representing *taxonomic* categories (*e.g.*, people, things, doings and sayings) on a main page that enables the child to branch to four additional pages with more symbols.

2. Schematic organization with concepts presented in a grid. Dynamic display device with four symbols representing *schematic* categories on a main page that enables the child to branch to four additional pages with more symbols.

3. Schematic organization with concepts presented in contextual scenes. Dynamic display device with the main page representing a house with four rooms that enables a child to select schematic representations for a room and branch to four additional pages with more symbols.

### Methodology

One hundred and twenty typically developing children between 2 1/2 and 5 years old participated in the study. These children were assigned, by age, to one of the three organization conditions, as described. Each child received three to four hours of instruction over five sessions aimed at teaching the child to use a device to communicate about a birthday party theme. The vocabulary was the same for all organizations. On the main page, each of four items was linked to another page. Investigators instructed the children to accurately select between 12 (2 1/2-year-olds) and 30 (5 to 6-year-olds) vocabulary items. The last session was scheduled two weeks after the previous session, to determine if learning was maintained. Following the fourth session, children were asked to locate novel vocabulary (which had always been present on the device) to ascertain whether they had generalized their learning to items that were present but not specifically taught. In addition, children were asked to use the device during a free play activity. Error analyses are underway.

Research questions included:

- How accurate are young children who are not disabled at locating target vocabulary using AAC devices when the vocabulary is introduced initially?
- Does the children's performance improve across learning sessions?
- Do children perform more accurately using taxonomic organization with items presented in a grid, or using schematic organization with items presented in a grid or in a scene?
- Are children able to generalize learning of the organization system to new vocabulary items?
- Are children able to use AAC devices in functional play activities?

### Results

Table I shows the number of vocabulary items each group was taught and the number of items learned in session #1 and after three to four hours of training ("maintenance"). In addition, it shows how effectively the children were at generalizing to new items.

**Two-and-one-half to three- year-**

**Table 3. Teaching young children to locate vocabulary items in AAC devices**

| Groups | # of symbols taught | # of symbols in device | Taxonomic in grid | | | Schematic in grid | | | Schematic in scenes | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Session #1 | Maintenance | Generalization | Session #1 | Maintenance | Generalization | Session #1 | Maintenance | Generalization |
| **2 1/2+ yr. olds** | 12 items | 60 items | 0.7<br>6% | 1.6<br>13% | 1.1<br>9% | 0.7<br>6%. | 1.7<br>14% | 0.9<br>8% | 1.3<br>11% | 4.1<br>34% | 0.5<br>4% |
| **3 yr. olds** | 18 items | 60 items | 2.0<br>11% | 8.0<br>44% | 2.5<br>14% | 2.3<br>13% | 5.7<br>32% | 32.<br>18% | 1.9<br>11% | 8.9<br>49% | 2.8<br>16% |
| **4 yr. olds** | 24 items | 60 items | 6.3<br>26% | 16.0<br>67% | 8.8<br>37% | 6.3<br>26% | 14.8<br>62% | 8.2<br>34% | 6.3<br>26% | 15.7<br>65% | 7.5<br>31% |
| **5 yr. olds** | 30 items | 60 items | 11.2<br>37% | 24.1<br>80% | 15.4<br>51% | 12.3<br>41% | 23.8<br>79% | 15.0<br>50% | 10.0<br>33% | 21.4<br>71% | 13.1<br>44% |

**olds**: These children had very low levels of accuracy with all systems. There was not a statistically significant difference in their scores between the first and last sessions. Each child was taught 12 symbols, but no child learned more than four (34% accuracy). The group using the schematic scene condition was more accurate than other groups. Two-year-old children were not able to generalize.

**Three-year-olds**: Three-year-old children were more accurate than two-year-olds. However, their levels of accuracy after training were still quite low (less than 50%). They were taught 18 vocabulary items and learned a mean of seven (range 1 to 16) after approximately 3 to 4 hours of instruction. Unlike the two-year-olds, most (97%) benefited from instruction. The organization strategy was not a statistically significant factor. These children began to show evidence of generalization to new vocabulary items.

**Four-year-olds**: Four-year-old children performed more accurately than three-year-olds. This group was taught 24 items. All showed improvement. However, they only learned two-thirds of the 24 items after three to four hours of instruction. This group had only a limited ability to generalize. The organization schema was not a factor in their performance.

**Five-year-olds**: Children between the ages of five and six years learned about three-fourths of the 30 items they were taught. All five-year-olds identified more items initially than the younger children, and all benefited from the four training sessions. They were also able to generalize more effectively. Once again, the organizational strategy was not a factor.

## Comments

If typically developing 2 ˚ and 3-year-olds without disabilities, who speak, learn words rapidly and have vocabularies of hundreds of words can learn to locate only four items on an AAC device after three to four hours of direct instruction, then how can we expect children at similar developmental levels with hearing, vision, motor, learning, behavioral and linguistic difficulties to use AAC devices effectively to communicate? Likewise, if typically developing 5-year-olds, whose vocabularies number in the thousands, learn to use no more than 24 (80%) of the items taught after four hours of instruction, we need to look more closely at issues related to (1) the learning costs of using current AAC devices to provide access to language and (2) device design. These data have implications for older augmented communicators whose receptive language and cognitive levels fall below six years.

While the researchers carefully point out limitations to this study, their data support their recommendations to reduce the learning demands of AAC systems by:

1. Re-designing AAC systems to better reflect what we know about the development of children between the ages of two and six. Considerations include the representation of language, organization of displays and ways to select language in a device.

2. Exploring the use of other AAC means of communication with young children.

3. Providing external scaffolding to support children in their attempts to manage different organizational structures (*e.g.*, adult manages "page" location).

4. Using familiar contexts/event schema to teach organizational structure.

Studying the learning requirements of the current generation of AAC devices and considering more carefully the cognitive demands we place on people who use AAC devices, these resesarchers are leading us toward a generation of AAC devices that may better meet young children's needs.

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www.aac-rerc.com

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## Resources

Linda Burkhart, 6201 Candle Ct., Eldersburg, MD 21784. 410-795-4561; fax 410 795-8834; linda@Lburkhart.com; www.Lburkhart.com

Cynthia Cress, Ph.D., University of Nebraska-Lincoln, 202 Barkley Memorial Center, Lincoln, NE 68583. 402-472-4431; fax 402-472-7697. ccress@unlinfo.unl.edu http://www.unl.edu/barkley/present/cress.html

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