



Effects of Early AAC Intervention for Children with Down Syndrome

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The Penn State AAC Team

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Children with Down syndrome

- Down syndrome is the most commonly occurring chromosomal condition
 - Approximately 1 in 750 births
- Children with Down syndrome experience
 - Low muscle tone
 - Cognitive delays
 - Language delay
 - Delays in speech production
 - Reduced speech intelligibility

Delay in speech development

- Children with Down syndrome typically demonstrate significant delays in speech development
- Delays in speech
 - May negatively impact many aspects of development
 - May result in underestimating children's skills
 - May result in low expectations

AAC

- Augmentative and alternative communication (AAC) offers young children with Down syndrome a potential means to enhance
 - Functional communication
 - Social development
 - Language development
 - Learning / cognitive development
 - Literacy development
 - Quality of life

AAC systems

- AAC systems include
 - Unaided systems that do not require external equipment
 - E.g., signs, gestures
 - Aided systems that require external aids or equipment
 - Low tech communication boards or books
 - High tech speech generating systems (SGDs)
- It is NOT a question of choosing between AAC or natural speech
 - Rather AAC is used in conjunction with intervention to maximize speech development

Research questions

- What are the effects of early AAC intervention on the speech, language, & communication development of young children with Down syndrome?
 - Rates of turn taking /participation
 - Modes of communication
 - Vocabulary acquisition /use
 - Mean length of utterance /message

Research design

- Initially conceptualized as short term study
 - Single subject research design
 - Multiple baseline across participants
- Opportunity to extend intervention longitudinally
 - Describe effects over time
 - Data collection extended over a period of 14-28 months

Participants

- Part of a larger research study
 - children with a range of developmental disabilities who had complex communication needs
- Focus on children with Down syndrome
 - 6 children with Down syndrome
 - 2 boys and 4 girls
 - 6 - 16 months old at start of study
 - 21-37 months at end of data collection
 - Followed for 14-28 months
 - None had functional speech at baseline
 - 5 were presymbolic
 - 1 (16 month old) was minimally symbolic
 - Introduced to Baby Signs by mother at 12 months
 - <10 signs expressively

Intervention

- Scheduled for 1 hour per week
- In natural environment
 - Typically at home
- Within naturally occurring interactions
 - play & other activities of daily living
- Involved
 - parents
 - siblings

Components of the intervention

see <http://aackids.psu.edu>

- Intervention involved 5 components:
 - Identified meaningful contexts for communication
 - Provided effective means to communicate
 - Selected appropriate vocabulary
 - Set up environment to support communication
 - Used appropriate interaction strategies to support communication

Identified meaningful contexts for communication / interaction

- Selected contexts to promote communication based on the following criteria
 - Interactive / reciprocal
 - Sustainable over multiple turns
 - Meaningful / familiar to child
 - Motivating for the child
 - Valued by the family
 - Fun!

Examples of contexts to promote communication /interaction

- Social games
 - E.g., peek a boo, “So big”
- Singing songs (line by line)
 - E.g., Itsy bitsy spider, Wheels on the Bus, Old McDonald
- Book reading
 - E.g., Brown Bear, Who’s hiding?
- Play activities
 - E.g., Playing telephone, cars, farm, dolls, musical instruments

Provided effective means of communication

- Children were always encouraged to use vocalizations /speech
- In addition, children were provided with AAC to augment their communication
 - Signs and gestures
 - Speech generating devices /assistive technologies
- SGD’s were designed to be
 - Fun
 - Easy to learn and use

SGD’s were designed to be fun

(from Light, Drager, & Nemser, 2004; Light, Page, Curran & Pitkin, 2008)

- Customized to meet child’s interests & preferences
- Incorporated motivating content
 - Opportunities for social interaction, book reading, singing songs, fun interactive play activities, etc.
- Incorporated multiple bright colors
- Incorporated engaging output
 - Library of sound effects
- Incorporated humor and “fun” in the designs

Examples of AAC technologies designed to be fun

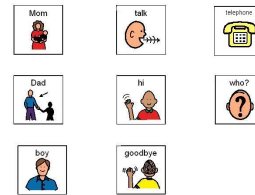


SGDs were designed to be easy to learn & use

- Reduced learning demands by designing more developmentally appropriate systems
- Used visual scene displays to support children's understanding & use
 - A visual scene display is a picture or photo of a child's experiences / daily activities
 - Vocabulary /language concepts are embedded under "hot spots" in visual scenes

AAC displays for playing telephone

Traditional grid display



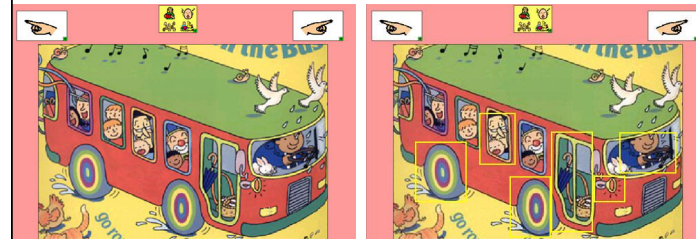
Visual scene display



Potential advantages of VSDs

- VSDs represent familiar events and activities
 - replicate the contexts in which children learn language
- Language concepts are presented in context
 - provide support for understanding & learning
 - support access to language via episodic memory
- VSDs preserve conceptual & visual relationships between symbols that occur in life
 - preserve the location, proportionality of concepts
- VSDs provide motivating & interesting contexts
 - stimulate interaction
- VSDs also seem to offer visual processing advantages
 - regularly process scenes visually within daily life
 - rapidly process scenes (<200 milliseconds)

VSD for singing The Wheels on the Bus



Selected appropriate vocabulary

- Introduced new vocabulary regularly during meaningful play activities
 - Modeled functional use of vocabulary in context
 - speech & sign
 - speech & aided AAC
- Ensured that vocabulary was
 - Motivating and fun
 - Functional
 - Developmentally appropriate
- Encouraged language learning via AAC
 - Did not require language learning prior to AAC

Used strategies to promote communication

- Provided opportunities for child to communicate during all activities
 - Opportunities to make choices, request objects/activities, comment, express emotions, ask questions
- Waited & allowed child time to communicate
- Modeled AAC + speech
 - Speech + signs
 - Speech + aided AAC
- Responded to the child's attempts to communicate

Ensured appropriate positioning to facilitate joint attention



Results

Rates of turn taking

- All children participated minimally in interactions at baseline prior to intervention
- All demonstrated significant increases in their rates of turn taking after introduction of AAC
 - Rates of turn taking varied across children
- All children sustained interactions with others for significantly longer after AAC intervention
 - Many more opportunities to learn language and other skills

Results

Modes of communication

- The children had limited means to communicate at baseline
- During intervention, the children learned to use multiple means of communication
 - Aided AAC
 - SGDs with VSDs
 - Signs /gestures
 - Speech

Results

Modes of communication

- At the start of intervention, the children relied heavily on SGDs
 - Imposed minimal motor /linguistic demands
 - Provided visual supports for communication
 - Were engaging and fun
- As the children developed motor & language skills, they used signs & gestures as well as aided AAC
 - Emerged around 9-15 months
- All children began to use speech as they developed oral motor skills
 - Emerged around 13-19 months

Results

Modes of communication

- The children relied on multiple modes to communicate
 - Access to aided & unaided AAC provided the children with the means to actively participate in social interactions and learn language before they were able to use speech
 - They were ready to communicate before they were able to talk
 - Use of AAC did NOT inhibit speech development
 - The children relied increasingly on speech over time

Results

Vocabulary acquisition and use

- The children expressed very few concepts at baseline
 - They had minimal means to express themselves
- New vocabulary was regularly introduced and modeled for the children
 - Speech + aided AAC
 - Speech + sign
- During intervention, the children rapidly acquired “first words” via AAC
 - Acquired first words via AAC well before they had first spoken words

Results

Vocabulary acquisition and use

- All of the children demonstrated significant growth in their expression of concepts with AAC intervention
 - All children acquired a range of semantic concepts
 - AAC provided a powerful visual support to facilitate language learning

Results

Acquisition of new concepts

- The children used AAC to learn preschool concepts
 - E.g., colors
 - numbers
 - letter sounds
- As preschoolers, the children developed
 - phonological awareness skills
 - early literacy skills

Results

Complexity of messages

- Over time all of the children learned to combine concepts to express more complex meanings
 - Children began using 2 word messages between 18-27 months
 - Continued to rely heavily on single word messages
 - Gains in length of message were not as strong as their gains in pragmatic & semantic development
 - Gains in syntax & morphology came later with literacy development

Results

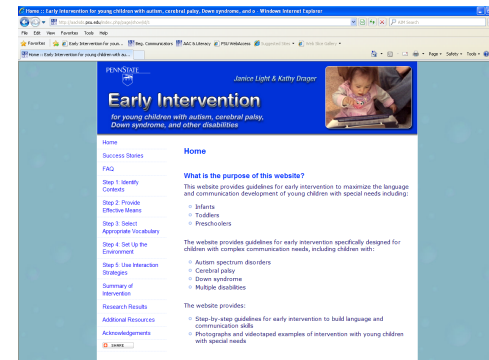
Range of interactions

- The children used AAC
 - With parents and teachers
 - To make requests, share information, learn new concepts, ask questions, play
 - By themselves for play and learning
 - With other children as contexts/shared activities to support social interaction
 - Shared books, singing, play activities

Conclusions

- Early AAC intervention does NOT inhibit speech development in young children with Down syndrome
- Early AAC intervention offers the means to jumpstart language and communication development with young children with Down syndrome
 - Increase rates of participation /turn taking
 - Enhance semantic development
 - Acquisition of first words / range of vocabulary concepts
 - Provide access to new learning
 - Early preschool concepts – colors, numbers, literacy
 - Facilitate social interaction with adults and peers
 - Have fun!

Early intervention for young children with autism, cerebral palsy, Down syndrome & other disabilities
Website at <http://aackids.psu.edu>



For handouts, visit <http://aac.psu.edu>

AAC at Penn State

Augmentative and Alternative Communication at the Pennsylvania State University

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UPCOMING AAC-RELATED EVENTS

Events on January 10, 2012
Designing Effective AAC Technologies for Beginning Communicators - ATIA Webinar by Janice Light
Starts: 12:00 pm
Ends: January 10, 2012 - 1:30 pm
Location: Online Webinar
Description: This session will include discussion of a wide range of research studies that address the subject of the design of AAC technologies for beginning communicators. Each study will be presented briefly with a

Home

Welcome to AAC at Penn State!

The Penn State AAC community of faculty, graduate students and undergraduate students are dedicated to enhancing communication and improving the overall quality of life for individuals who have complex communication needs and their families. We are seeking to immerse customers for

SEARCH

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RECENT POSTS

- Mobile Devices and Communication Apps: Current Trends and Future Directions - Webinar (12/13/11)
- Masters Students Prepare for Externship Experiences (12/9/11)
- Congratulations to Penn State Masters Student (12/9/11)
- AAC for School-age Children with Intellectual Disabilities: Strategies for Leap-Term Intervention - Webinar (12/7/11)
- AAC for School-age Children with Intellectual Disabilities: Reason for Existence for

Resources

- Website on early AAC intervention
 - Visit <http://aackids.psu.edu>
- References
 - Visit <http://aackids.psu.edu>
 - Select “Additional resources” from menu for a downloadable list of references
- Webcast
 - www.aac-rerc.com
 - Select webcasts from menu
 - Select “AAC interventions to maximize language development for young children”

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 - The opinions contained in this presentation are those of the grantee and do not necessarily reflect those of the granting agency.