Children with significant communication disabilities are at risk in all aspects of development:
- Functional communication
- Language development
- Cognitive development and learning
- Literacy development
- Social participation
- Quality of life
- Early intervention is critical

The challenge:
- To provide children with complex communication needs access to the magic and power of language and communication at an early age
- AAC interventions offer the potential for enhanced communication and language development for children
- To date, the potential has not been fully realized for young children

Goals of the presentation:
- To share results of research to enhance language and communication for young children who require AAC
- To discuss implications for practice to improve outcomes for young children

Effects of AAC Interventions with Young Children
(Light, Drager, Curran, Hayes, Kristiansen, Lewis, May, Page, Panek, Pendergast, & Witte, in progress)

- Longitudinal study
- Investigate impact of AAC intervention on language development and communication of young children with complex communication needs
- 7 participants to date
  - 16-36 months old
  - Significant communication disabilities
  - All minimally symbolic at baseline
  - <25 symbols expressively
  - Longitudinal data
AAC interventions

- Develop and implement appropriate AAC systems
  - Ensure children have the tools to communicate
- Provide appropriate intervention to build language and communication skills
  - Ensure children learn the skills to support effective communication
- Work with parents and other facilitators
  - Ensure children have meaningful opportunities to communicate
- Intervention scheduled 1x week for 1 hour

Goals of AAC Interventions

- Maximize language and communication
  - Increase participation and build social interaction/turn taking
- Express range of communication functions
  - Social interaction, needs and wants, sharing information/joint attention
- Develop breadth of semantic concepts to support more diverse communication
- Build greater complexity of language structure to support more complex communication
  - Semantic-syntactic development
  - Morphological development
- Build phonological awareness / foundations for literacy development

Steps in AAC Interventions

1. Identify meaningful contexts for communication
2. Develop appropriate AAC systems
3. Work with parents / facilitators to ensure appropriate scaffolding support
4. Infuse communication into all activities
5. Monitor progress / Evaluate outcomes

Identify meaningful contexts for communication

- Select contexts as priorities
  - Interactive
  - Motivating to the child
  - Meaningful / familiar
  - High frequency
  - Valued by child & family
  - High impact / greatest need

Develop appropriate AAC systems

- Systems must be:
  - Versatile
  - Appealing
  - Dynamic
  - Easy to use
AAC systems must be versatile

- AAC systems must be versatile
- Must meet needs in various contexts
- Must be flexible
- Must provide growth potential
- Use multiple modes to maximize language and communication
  - Speech
  - Unaided – e.g., signs, gestures
  - Aided - e.g., light tech and high tech

AAC systems must be appealing

- Many AAC systems
  - Reflect adult perspectives
  - Do not have strong appeal for young children
- If AAC systems are appealing
  - Young children will be more apt to use them
  - Peers will be more apt to interact

Systems must be appealing

(Light, Drager, & Nemser, 2004; Light, Curran, Page, & Pitkin, 2005)

- Suggestions to increase the appeal
  - Infuse motivating activities
  - Incorporate popular characters
  - Incorporate sound effects, songs, musical instruments, laughter, voices
  - Use multiple bright colors; add decorations
  - Allow child to choose
  - Have fun!

AAC systems must be dynamic

- Typically developing preschoolers learn more than 5 new words a day
- Children who require AAC can only learn new words if we provide them with access to the vocabulary
  - Signs
  - Aided symbols
- Add vocabulary regularly!!
- Make sure that AAC systems are available at all times

Select appropriate vocabulary

- Be sure to include a range of concepts
  - people, actions, objects, places, social words, relational concepts, questions, etc.
- Check to make sure that the vocabulary is
  - Individualized
  - Motivating / fun
  - Functional
  - Developmentally appropriate
  - Culturally appropriate
  - Supports language learning
- Choose appropriate wording for each concept
  - Kids should sound like kids!
- Model concepts the child knows as well as new concepts

AAC systems must be easy to learn

- Current AAC technologies reflect the conceptual models of nondisabled adults
  - These models are not congruent with young children’s conceptual models
- As a result, AAC systems are difficult for children to learn to use
AAC systems must be easy to learn

- Reduce the learning demands of AAC systems for young children by using appropriate designs
- Representations of language concepts
- Layout, organization, and navigation
- Selection of these concepts
- Output

Representation of language

- Young children’s learning of concepts
  - Embedded in context
  - Differs from adult concepts
- Current AAC symbol sets
  - Represent adult conceptual models
  - Often incorporate parts of objects and people
  - May require metalinguistic skills
  - May not be meaningful to young children
  - May take time for young children to learn

Use appropriate representations

- Use representations that reflect child’s understanding of concept
- Use symbols that represent meaningful contexts /experiences in the child’s life
  - Digital photos of the child family in meaningful activities
  - Line drawings that represent children’s understanding
  - Avoid isolated parts of objects or events
- Teach symbols in context
  - Introduce symbols in context
  - Link the symbol to the concept explicitly

Organization, layout & navigation

- Once there is more than one language concept, they must be organized in some way
- They must be displayed in some way
- The user must navigate the system
- The organization, layout and navigation affects:
  - ease of learning
  - ease /accuracy of use

Use appropriate organizations

- Use personalized schematic organizations
  - Organize vocabulary according to familiar events /activities (Fallon, Light & Achenbach, 2003)
- Organize vocabulary in small groups
  - build “page” organizations from small groups (Fallon, Light & Achenbach, 2003)

Use appropriate layout

- Types of layouts
  - Traditional grid layout
  - Visual scene display
  - Hybrid displays
Traditional grid layout
- Vocabulary represented by separate AAC symbols in “boxes”
- Language is taken out of context
- “Decontextualized”
- Concepts are separate
- Imposes greater processing demands

Use appropriate layout
- Visual scene layout
  - “Graphic metaphor” (Shane, 1998)
  - Vocabulary embedded under “hot spot” in visual scene
  - Vocabulary presented in meaningful context
  - Concepts linked visually and conceptually

Use appropriate layouts
- Very young children are more accurate using visual scene layouts than traditional grid layouts (Drager, Light, Fallon, Jeffries, & Speltz, 2003)
- Transition to use various layouts over time
  - Visual scene displays
  - Hybrid displays
    - Visual scene displays with some items presented in a grid-type layout
  - Traditional grid displays

Reduce navigational demands
- It is difficult for young children to learn navigation to locate language concepts
- Traditionally we have reduced navigational demands by reducing number of language concepts available
- Do NOT hold back language development
- Reduce navigational demands
  - Appropriate design
  - Partner scaffolding

Implement AAC systems
- It is challenging for young children to use AAC systems
  - They must coordinate attention to
    - Themselves
    - The partner
    - The ongoing activity
    - The AAC symbols
  - Provide scaffolding support to reduce the demands by
    - Positioning the partner appropriately
    - Infusing the AAC symbols into the activity
    - Infusing the activity into the AAC system
Position the partner

- Ensure that the partner is closely aligned with
  - The AAC system
  - The activity
- Maximize attention to
  - Partner
  - AAC system
  - Activity

Integrate AAC systems and play

- Children’s language learning & communication is infused in play and daily activities
- Too often aided AAC systems
  - Sit “outside” of children’s lives/activities
  - Decontextualize language & communication
- Re-design AAC systems
  - Infuse AAC symbols into play activities
    - Construct AAC symbols with velcro on back
    - Bring the symbols into the activity; link symbols to the referents explicitly; use them in play
  - Infuse play activities into AAC systems

Working with parents to maximize communication & language

- Implement AAC in meaningful contexts in natural environment
- Identify opportunities for communication within these contexts
- Model AAC + speech
- Wait
- Respond to the child
- Monitor progress/Evaluate outcomes

Identify opportunities for communication

- Within each context, identify opportunities for communication
  - Meaningful
  - Motivating
  - Numerous
  - Varied
  - Fun

- If the child attempts to communicate, respond immediately
  - Fulfill the intent
  - Expand on the child’s message
    - Model AAC + speech
  - Continue the activity
  - Continue to set up meaningful opportunities for child to communicate

Clearly mark the opportunity

- Wait and allow the child time to communicate
  - Use expectant delay
  - Focus attention on child; maintain eye contact
  - Use expectant body posture
  - Wait
If the child does not attempt to communicate, 
- Model an appropriate turn 
  - use AAC + speech 
- Use a third party model if available 
  - Parent, sibling, aide 
- Present the opportunity again

Always 
- Model AAC + speech 
- Expose the child to more vocabulary/ more complex messages than he/she currently uses 
  - Model AAC as a means to communicate 
  - Provide opportunities for child to learn new concepts & new structures

Results – Case #1

Boy with severe CP, trach
Baseline (age: 25 months)
- No vocalizations, gestures, or signs 
- Uses <25 digital photos of toys
- Participates minimally 
  - Expresses 1 concept or less per 20 minute interaction 
  - Expresses requests for objects only 
  - Communicates in single telegraphic messages

After 12 weeks of intervention (age: 28 months)
- Expresses >480 words via light tech and high tech AAC 
- Increased vocab by >5 words per day  
- Active participant in interaction 
  - Expresses >48 concepts per 20 minute interaction 
  - Increase of approximately 50 x rate of baseline 
  - Communicates in 1-2 word messages 
  - Expresses range of semantic relations 
    - agent, action, object, locative, demonstrative, possessor, quantifier, instrument, questions, etc.

After 9 months of intervention (age: 34 months)
- Expresses >1,000 words via light tech and high tech AAC 
- Continues to increase vocab by >5 words per day 
- Active participant in interactions 
  - Expresses approx 50 concepts per 20 minute interaction 
  - Increase of approximately 50 x rate of baseline 
  - Communicates in 1-4 word messages 
  - Expresses wide range of semantic relations 
    - agent, action, object, locative, demonstrative, possessor, quantifier, instrument, questions, etc. 
  - Beginning to include grammatical markers e.g., present progressive, plurals, possessive, past tense 
  - Learning phonological awareness skills, letter-sound associations, early literacy skills

After 12-14 months of intervention (age: 37-39 months)
- Has acquired several thousand words via light tech & high tech AAC 
- Continues to increase vocab by >5 words per day 
- Participates actively in interactions with adults and peers 
  - Sustained rate of communication 40-50 turns per 20 min. interaction 
  - Increase of approximately 50 x rate of baseline 
  - Communicates in multword messages 
  - Expresses wide range of semantic relations 
  - Uses grammatical markers as required 
    - e.g., present progressive, plural, possessive, past tense 
  - Demonstrates early literacy skills 
    - E.g. phonological awareness skills (initial phoneme segmentation, sound blending) 
    - letter-sound associations 
    - Decoding single words (CV) in isolation and shared reading
Results – Case #2

- Boy with Down Syndrome, otitis media
- Baseline (age: 29 months)
  - Says <10 spoken word approximations
  - Has < 10 signs
  - Participates minimally
    - Expresses <1 concept per minute in interaction
    - Expresses < 20 words/concepts in 25 minutes
  - Only expresses object concepts
  - Requests preferred items

After 7 months of intervention (age: 36 months)

- Expresses >1,210 words via speech, signs, light tech and high tech AAC
- Increased vocabulary by >5 words per day
- Active participant in interaction
  - Expresses >10 words per minute
  - Expresses >250 words in 25 minutes
  - Increase is 10 x rate of baseline
- Expresses wide range of semantic relations
  - Agent, action, object, locative, demonstrative, possessor, quantifier, instrument, questions, etc
- Requests items, comments, interacts socially, asks questions, etc.

Results to date

- All children have demonstrated significant increases in their rate of turn taking
- All children sustain interactions with others for significantly longer
- All children participate in interactions that involve
  - Social routines
  - Play activities
  - Not just expression of needs and wants

- Children use their AAC systems independently for play & learning as well
- Some of the children use their systems as contexts for interaction with peers
  - Shared books
  - Shared singing
  - Play

- All children have acquired a range of semantic concepts
- All but one child has learned to combine concepts to communicate more complex meanings

- All children have been able to use scene displays on initial introduction once use is modeled
  - seem to be more interested & motivated when scene displays are used to integrate AAC & play, book reading, music
- All children have learned to use other displays
  - Hybrid displays
  - Grid displays
- Children move through different stages
- Increase participation and build social interaction
- Develop breadth of semantic concepts/vocabulary to support more diverse communication & conceptual development
- Build greater complexity of language structure to support more complex communication
- Build phonological awareness skills and foundations for literacy development

The future

To realize the magic and power of language and communication for young children with complex communication needs so that they can achieve their full potential.