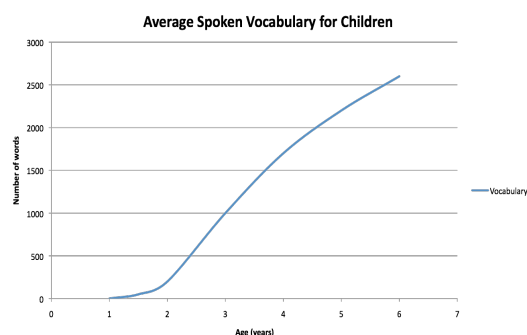Building Language & Literacy Skills
with Children Who Require AAC

Janice Light, Kathryn Drager & David McNaughton
Penn State University

ISAAC 2014

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Development of language and literacy skills



Average Spoken Vocabulary for Children

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## Language & literacy development

- semantic development
  - acquisition of symbolic concepts
- pragmatic development
  - development of turn taking skills/ expression of communicative intents
- syntax and morphological development
  - development of more complex communication

- development of phonological awareness skills
  - ability to notice /think about sound structure of words
- development of literacy skills
  - acquisition of conventional reading and writing skills

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## Challenges for children with CCN

- Limited opportunities for communication, language & literacy learning
- Lack of evidence-based interventions
  - 80% of children were older than 2 years of age (Hustad, et al., 2005)
- Low expectations
- Inappropriate AAC systems
  - May not be appealing
  - May be difficult to learn and use
  - May not provide access to sufficient language

## Goals of the Session

- Describe the components of successful evidence-based interventions to support the language & literacy development of children with CCN
- Illustrate effective evidence-based practices through a series of longitudinal case studies describing intervention over a number of years
- Report on language & literacy outcomes for the children
- Discuss implications for practice

## Goals/Stages of Intervention

1. Increase active participation in social interactions
   - Increase turn taking
   - Ensure breadth of communicative functions

2. Develop a wide range of semantic concepts

3. Build greater complexity of language structure

4. Build phonological awareness skills & conventional literacy skills

- Intervention is guided, but not bound by, a developmental model

## Gareth

- 25 month old boy
- Cerebral palsy – severe motor impairment
- Tracheotomy
- Baseline
  - No vocalizations, gestures, or signs
  - Uses <25 digital photos of toys
  - Expresses requests for objects only
    - Reaches toward toy or photo if offered
  - Participates minimally
    - Expresses 1 concept or less per 20 minute interaction

## Goals/Stages of Intervention

**1. Increase active participation in social interactions**

2. Develop a wide range of semantic concepts
3. Build greater complexity of language structure
4. Build phonological awareness skills & conventional literacy skills

## Introduce appropriate AAC systems

- Light tech symbols
  - Meaningful & appealing representations of concepts
    - Digital photos, scanned images, color line drawings
  - Covered in contact paper & backed with velcro
  - Taught in meaningful contexts
    - Symbol paired with the actual referents

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- Speech generating device (SGD)
  - Mercury with Speaking Dynamically software
  - Accessed through direct selection with both hands
  - Access to 1-2 symbols per page initially
    - Gradually increase number of symbols as access improved
  - Visual scene layouts
    - Meaningful & appealing representations
  - With digitized speech output, sound effects, music, etc

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## Work with parents to enhance participation

- Identify opportunities for communication
  - Infuse into familiar, meaningful, motivating, social activities
  - Opportunities to sustain social interaction
- Model use of aided AAC plus speech
  - Speech + light tech symbols; Speech +SGD
- Provide scaffolding support in AAC use
  - Locate appropriate light tech symbols to offer choices
  - Help locate appropriate pages in SGD
- Recognize and respond to child's communicative attempts
  - Fulfill communicative intent
  - Expand and model more complex messages using aided AAC
- Have fun!

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### Turns
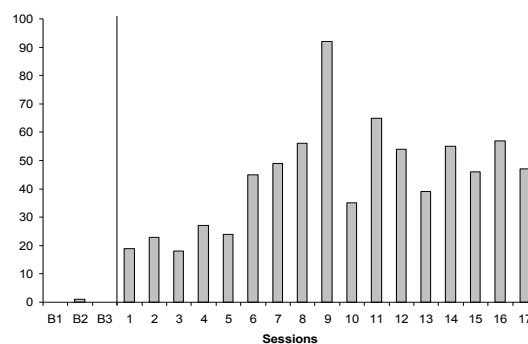
## Results after 4 weeks

- After 4 weeks of intervention (age: 26 months)
  - Much more active participant in interaction
    - Takes approximately 20 turns per 20 minute interaction
    - Increase of approximately 20 x rate of baseline
  - Expresses >180 words via light tech & high tech AAC
    - Increased vocabulary by >5 words per day
  - Communicates in single word telegraphic messages
  - Expresses 4-5 different semantic relations
    - agent, action, object, locative, attribute/adverbial

## Goals/Stages of Intervention

1. Increase active participation in social interactions
2. **Develop a wide range of semantic concepts**
   - To expand expressive vocabulary to communicate more diverse meaning
   - To teach question "What's that?" to provide some control over vocabulary acquisition
3. Build greater complexity of language structure
4. Build phonological awareness skills & conventional literacy skills

## Results after 12 weeks

- After 12 weeks of intervention (age: 28 months)
  - Participates actively in interactions with familiar adults
    - Expresses >48 concepts per 20 minute interaction
    - Increase of approximately 50 x rate of baseline
  - Expresses >480 words via light tech & high tech AAC
    - Increased vocabulary by >5 words per day
  - Expresses wide range of semantic relations
    - agent, action, object, attribute/adverbial, locative, demonstrative, possessor, quantifier, instrument, questions, etc.
  - Communicates in 1-2 word messages
    - Beginning to combine concepts

## Goals/Stages of Intervention

1. Increase active participation in social interactions
2. Develop a wide range of semantic concepts
3. **Build greater complexity of language structure**
   - To encourage communication of more complex, novel meanings by combining symbols
   - To introduce early morphological structures to specify meaning
4. Build phonological awareness skills & conventional literacy skills

## Results

- After 12 months of intervention (age: 37 months)
  - Expresses >1,000 words via light tech and high tech AAC
    - Continues to increase vocabulary 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
  - Expresses wide range of semantic relations
    - agent, action, object, locative, demonstrative, possessor, quantifier, instrument, questions, etc.
  - Communicates in 1-4 word messages
    - Understands use of many grammatical markers
    - Beginning to use some grammatical markers

## Goals/Stages of Intervention

1. Increase active participation in social interactions
2. Develop a wide range of semantic concepts
3. Build greater complexity of language structure

4. **Build phonological awareness skills & conventional literacy skills**
   - Expand AAC systems to support literacy development
   - Provide access to alphabet and words
     - Introduce alphabet board
     - Access to letters and sounds on SGD
       - Speech output letter sounds not names

## Stage 4
## Literacy instruction

- Instruction targeted
  - Phonological awareness skills
    - Sound blending skills
    - Phoneme segmentation skills
  - Letter-sound correspondences
  - Decoding skills
  - Sight word recognition skills
  - Reading comprehension strategies
  - Early writing skills

## Literacy instruction

- Instructional procedures
  - Direct instruction in basic skills
    - Model the skill
    - Provide guided practice
    - Provide independent practice with feedback
  - Frequent opportunities to apply skills during meaningful, motivating literacy activities

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Sight Words                    Light & McNaughton, 2014                    21

## Instruction in sound blending

- Goal
  - The student will blend 3 target phonemes presented orally in sequence (with each phoneme extended 1-2 seconds), determine the target word, and then point to the correct AAC symbol for the target word



## Results

- After 17 months of intervention (age: 42 months)
  - Acquiring conventional literacy skills
    - phonological awareness skills
      - initial phoneme segmentation >90% accuracy
      - sound blending >90% accuracy
    - letter-sound correspondences >90% accuracy
    - decoding single words (cvc) in isolation >80% accuracy
    - decoding during shared reading >80% accuracy

## Building reading comprehension

- Reading comprehension is a complex process that requires the child to
  - track through sentence from left to right
  - decode or recognize by sight each word in sequence
  - access the meaning of the words
  - process all words in sequence to derive meaning of sentence (or longer text)
  - relate meaning to prior knowledge /experience to comprehend text

## Gareth – 5 years old

- Outcomes
  - Enters Kindergarten as a reader and writer
  - Fully included in regular education class
  - Full time assistance of aide
  - Uses alphabet board and SGD as primary means of communication
  - Literacy skills exceed those of most typical peers

## Anna

- 3 years 10 months old
- Autism
- Ambulatory
- Good function with hands
- Functional vision and hearing
- Attending preschool with reverse integration
  - One on one aide (TSS)

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## Baseline prior to instruction

- Receptive language skills
  - Difficult to assess comprehension
- At the start of instruction, communicated telegraphically via
  - Signs / gestures
  - Graphic symbols – PECS
  - Vocalizations /A few speech approximations
  - Express needs /wants
- Frustrated
  - Limited means to express herself
  - Demonstrated significant behavior challenges

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## Goals of intervention with young children with CCN

1. Increase active participation in social interactions
2. Develop a wide range of semantic concepts
3. Build greater complexity of language structure
4. Build phonological awareness skills & conventional literacy skills

## Stage 4
## Literacy instruction

- Instruction targeted
  - Phonological awareness skills
    - Sound blending skills
    - Phoneme segmentation skills
  - Letter-sound correspondences
  - Decoding skills
  - Sight word recognition skills
  - Reading comprehension strategies
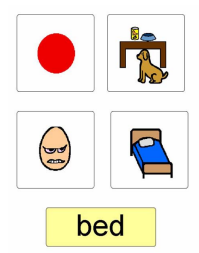  - Early writing skills

## Instruction in
## letter-sound correspondences

- Goal
  - The student will match a target phoneme presented orally to the letter that represents the target phoneme

| b | m |
|---|---|
| t | o |

## Instruction in single word decoding

- Goal
  - The student will decode a single word presented in writing and match the word to the correct AAC symbol



bed

## Applying decoding skills during shared book reading

- Provide opportunities to apply decoding skills during shared reading
  - Highlight target words
  - Read sentence out loud / track words with finger
  - Pause at highlighted target word
  - Child decodes target word and then selects AAC symbol from communication display or VOCA

## Ongoing literacy instruction

- Read read read!!
  - Talk about stories
- Expand decoding /sight word recognition skills
  - Decoding regular cvc, cvcc, ccvc words
  - Recognizing sight words
    - irregular frequently occurring words
  - Decoding words with long vowel /silent e
- Teaching writing skills
  - Writing stories

## Building reading comprehension

- Reading comprehension is a complex process that requires the child to
  - track through sentence from left to right
  - decode or recognize by sight each word in sequence
  - access the meaning of the words
  - process all words in sequence to derive meaning of sentence (or longer text)
  - relate meaning to prior knowledge /experience to comprehend text

## Basic comprehension skills
### "Max naps"

Student reads the text
Illustration is covered

Student selects the picture that represents the meaning from group

Max naps.

## Basic comprehension skills
### "Max naps"

Student uncovers illustration

Student checks if picture chosen matches illustration.

Max naps.

### Anna
### Results after 60 hours of instruction

- 5 years 2 months old
  - Results after approximately 60 hours of instruction over 50 weeks
- Mastered basic literacy skills
  - Letter sound correspondences
  - Single word decoding / sight word recognition skills
    - Reads more than 170 words independently
    - Decodes novel regular words
    - Recognizes frequently occurring sight words

### Anna
### Results after 60 hours of instruction

- Reads simple books independently
  - Reads stories with 30-40 words
  - Responds to factual wh-questions with >80% accuracy
  - Learning to respond to inference questions
- Writing skills
  - spells more than 50 words
    - Attempts any word with sound spelling
  - writes simple stories
- Enters Kindergarten as a reader and writer
  - Literacy skills exceed those of most typically developing peers
  - Included in regular education class

### Jackson

- 15 month old boy
- Down Syndrome, otitis media
- Lives with parents & sister
- <5 speech approximations
- A few baby signs

- Interest in books
- Method to indicate responses (e.g., point, look)
- Use of pictures, speech, sign

#1) Increase participation in social interactions

- Prepare a motivating activity
  – Games, pattern books

- Provide access to communication (AAC)
  – Speech approximations, Signs /gestures
  – Speech generating device with Visual Scene Displays (VSDs)

- Offer opportunities
  – Model use of AAC plus speech
  – Help locate appropriate pages in  VSD
  – Position VSD to support communication

- Wait
  – Allow opportunity to take turns independently

- Respond to communicative attempts
  – Expand & model more complex messages



Frequency of turns expressed by Jackson at baseline & during intervention (15-37 months)
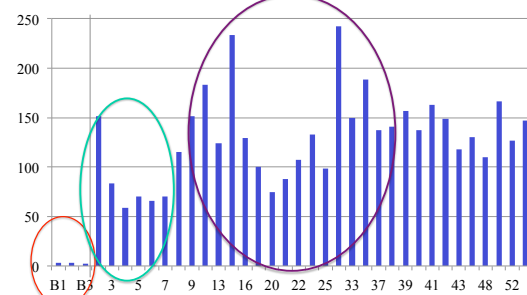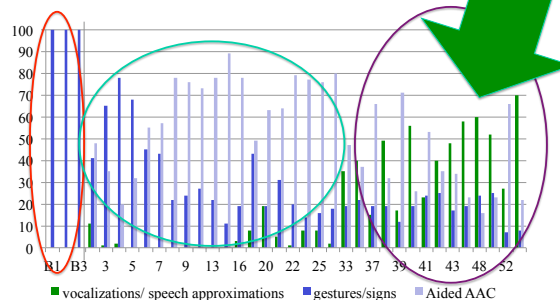
## Goals/Stages of Intervention

1. Increase active participation in social interactions

2. **Develop a wide range of semantic concepts**

3. **Build greater complexity of language structure**

4. Build phonological awareness skills & conventional literacy skills

- Prepare a motivating activity
  – Books, games
- Provide access to communication
  – AAC (Speech Generating Device)
  – Sign
  – Speech
    • Introduce a wide range of concepts
    • Introduce early preschool concepts
      – Letters & numbers
- Offer opportunities
  – Teach new concepts in context
  – Model use of AAC
- Wait
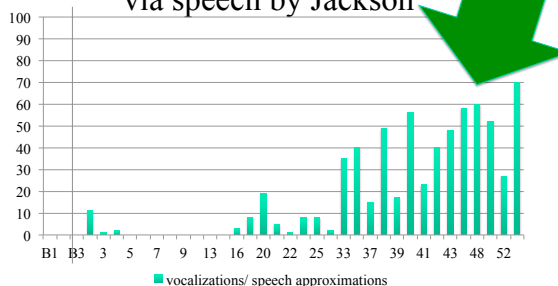- Respond to communicative attempts

## Jackson – 2 years 9 months

- After 18 months of intervention
  - Participates actively in interactions
    - Approx 200 turns per 20 minute interaction
    - Rate of 10 turns per minute
  - Relies on multimodal communication
    - Speech (26%)
    - Signs/ gestures (25%)
    - Aided AAC (48%)
    - Increased use of speech
    - AAC does not inhibit speech



% of turns expressed via different modes by Jackson (15-37 months)

vocalizations/ speech approximations   gestures/signs   Aided AAC



% of turns communicated via speech by Jackson

vocalizations/ speech approximations

## Jackson – 2 years 9 months

- Acquired >1,000 words (multi-modal)
- Expresses 45-80 different concepts in 20 minutes of interaction
- Expresses wide range of semantic relations
  - agent, action, object, entity, attribute, adverbial, recurrence, locative, greetings, demonstrative, quantifier, question, affirmation, negation
- Typically uses single words
  - Increased use of 2-3 word combinations
- Navigates aided AAC system independently

## Goals/Stages of Intervention

1. Increase active participation in social interactions
2. Develop a wide range of semantic concepts
3. Build greater complexity of language structure

**4. Build phonological awareness skills & conventional literacy skills**
   - use literacy to
   - build language skills
     - vocabulary, morphology, syntax
   - support speech development

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## Stage 4
## Literacy instruction

- Instruction targeted
  - Phonological awareness skills
    - Sound blending skills
    - Phoneme segmentation skills
  - Letter-sound correspondences
  - Decoding skills
  - Sight word recognition skills
  - Reading comprehension strategies
  - Early writing skills

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## Jackson – 5 years old

- Literacy skills
  - Demonstrates phonological awareness skills
    - Sound blending
    - Phoneme segmentation
  - Knows all letter-sound correspondences
  - Decodes regular cvc words
  - Applies decoding skills during shared book reading
  - Reads simple books independently
  - Types simple regular words / short sentences
  - Enters Kindergarten as a reader

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Hi Miss Janice .
It's Anna. I miss you. Im a good reader. Thank you for making me happy with with reading. Where are your Janice books? I loved reading them. Im in third grade at grays'woods. I watch my old Janice movies. Do you watch Janice movies? Where are you working?

Love,
Anna \*\*\*\*\*\*

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Sight Words          Light & McNaughton, 2014          53

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## Meeting the Challenges
## for Children with CCN

- Provide opportunities for communication, language & literacy learning
- Use evidence-based interventions from an early age
- Raise expectations
- Appropriate AAC systems
  - Appealing
  - Easy to learn and use
  - Provide access to sufficient language

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## Implications for
## children with CCN

- Start the language and literacy learning process with their typically developing peers
- Keep pace with their typical peers during the first 5 years of development
- Enter school ready to learn with their peers

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Introduction          (c) Light & McNaughton, 2014          56