

## Addressing Literacy Outcomes in Children with Autism Spectrum Disorders

Sylvia F. Diehl, Ph.D., CCC-SLP  
4202 E. Fowler PCD 1017  
Tampa, FL 33620  
diehl@cas.usf.edu



## Purpose of Today's Session

- Identify neurological issues related that may influence literacy abilities in children with ASD
- Identify differences in literacy development between typically developing children and children with ASD
- Discuss the evidence base on joint attention and shared reading in children with ASD
- Discuss the current evidence related to literacy outcomes in children with ASD



## National Standards Project

- Review of treatment literature that targets one of the core characteristics of ASD published between 1957 and the fall of 2007.
  - Includes both group and single case studies
  - <http://www.nationalautismcenter.org/affiliates/reports.php>
  - Established, emerging, unestablished, ineffective/harmful
  - Important to know the study and the literature to interpret categories correctly



## Established

- Behavioral packages (includes PBS, FCT, ABA, priming)
- AAC
- Joint attention
- Modeling (In Vivo and Video)
- Naturalistic teaching strategies
- Peer training packages
- Pivotal response treatment
- Visual schedules
- Self management
- Story based packages



## Emerging

- Cognitive Behavioral Intervention Package
- Developmental Relationship-based
- Exercise
- Imitation-based Interaction (imitating child)
- Language Training (Production)
- Language Training (Production & Understanding)
- Massage/Touch Therapy
- Music Therapy
- Picture Exchange Communication System
- Scripting
- Sign Instruction
- Social Communication Intervention
- Social Skills Package
- Structured Teaching
- Technology-based Treatment
- Theory of Mind Training



## Not Established

- May or may not be based on research
- Beneficial treatment effects reported based on very poorly controlled studies (scores of 0 or 1 on the SMRS)
- Interventions
  - Academic Interventions
  - Auditory Integration Training
  - Facilitated Communication
  - Gluten- and Casein-Free Diet
  - Sensory Integrative Package



Brain behavior that influences literacy learning

## NEUROLOGY, ASD, ETIOLOGY, AND LITERACY



### Connections

- Neurons are organized differently
- White matter increased in certain brain areas
- Some pathways may have increased connections, while other pathways are under-connected (Cheng et al., 2009; Belmont, 2005; Herbert, 2005)



Diehl, 2011

### Connections/Sound/Language

(Shafati, Jeste, & Nelson, 2009)

- Some children with autism did not prefer speech sounds to non-speech sound
- Some children did not pay attention to speech or language differences
- Discriminating (Longer latency for in-category words)
- Prioritizing (Sometimes no difference for in and out of category words)



Diehl, 2011

### Other Connection Issues

(Shafati, Jeste & Nelson, 2009)

- Face processing
  - Some preference of non-social stimuli to faces
  - Lack of experience may play a part along with disinterest
- Executive function
  - Less sensitive to situations where errors happen
  - Less able to modify their behavior
  - Response monitoring took longer and less resources were allocated for it



Diehl, 2011

### Connections: Response to Intervention

- Overall developmental outcomes
  - Increase in positive outcomes with early intervention (Kelly, Naigles, & Fein, 2010; Anderson, Lord, & Risi, 2007)
- Intense instruction changed connections
  - Coordinate information processing
  - Changes in white matter of poor readers with 100 hours of intense instruction (Keller & Just, 2009)



Diehl, 2011

### Summary: Neurology, ASD, Literacy

- Functional connectivity influences at many levels
  - Attentional differences to speech and language
  - Semantic processing differences in making connections
  - Differences attending to socially related processes
  - Differences in ability to flexibly respond
  - Intervention makes a difference!



Diehl, 2011

## Neurology, ASD, Literacy

- These findings suggest these behavioral characteristics that influence literacy learning
  - Theory of Mind
  - Executive Functioning
  - Central Coherence



## Theory of Mind

- The ability to take other people's perspectives
- Inferring the full range of mental states from behavior
- In other words, the ability to predict relationships between external states of affairs and internal states of mind (Frith, 1989)



## Some Effects of Theory of Mind Dysfunction

- People seem to act randomly
- Can't keep secrets
- Lack remorse
- Sharing and taking turns difficult
- Don't embarrass
- May appear self-centered, egocentric, and uncaring



## Theory of Mind and School

- Difficulty with certain text genre because of inferencing requirements
  - Often good decoding but poor comprehension (Central coherence and executive function play a part here)
  - Narratives harder than expositions
  - Trouble with persuasive arguments, debating, genre requiring multiple perspectives



## Theory of Mind and School

- Influences all social situations
- Roles must be specifically defined
  - Cooperative learning groups
  - School discourse
  - Peer interactions



## Executive Function

(Perner & Lang, 2000)

- Processes in control of behavior (Self-control)
  - Forward planning
  - Coordinating actions
  - Controlling sequences of action
  - Cognitive flexibility
- "Executive functions are needed to maintain a mentally specified goal and to bring it to fruition against distracting alternatives."



### Executive Function and School

- Prevent oneself from making a response
- Difficulty changing responses
- Directing attention to a goal
- Setting goal priorities
- Difficulty with transient cues
- Difficulty with novel situations




### Central Coherence

- Draw together diverse information to construct higher-level meaning in context
  - Understand semantic use of ambiguous words according to context
  - “Tasks using local information would be easier than tasks requiring the recognition of global meaning or integration of stimuli in context” (Happe, 2000)




### Central Coherence and School




- Understanding ambiguous words
- Getting the gist of information
- Focus on pieces rather than whole
- Integrate information from very sources to form a whole
  - Good rote memory but poor integration
- Generalization

### Anxiety

- Most children with ASD have very high levels of anxiety
  - Physical comfort is threatened in unusual ways
  - Hard to handle unknown plans and expectations
  - Do not know how to use social support




### Summary of Behavioral Characteristics That May Influence Literacy

- Theory of Mind
- Executive Functioning
- Central Coherence
- Anxiety




Brain behavior that may influence progress in the education setting

### NEUROBIOLOGY, ASD, AND LITERACY



Diehl, 2011

## Connections



- Neurons are organized differently
- White matter increased in certain brain areas
- Some pathways may have increased connections, while other pathways are under-connected (Cheng et al., 2009; Belmont, 2005; Herbert, 2005)

Diehl, 2011

## Connections/Sound/Language

(Shafati, Jeste, & Nelson, 2009)

- Some children with autism did not prefer speech sounds to non-speech sound
- Some children did not pay attention to speech or language differences
- Discriminating (Longer latency for in-category words)
- Prioritizing (Sometimes no difference for in and out of category words)

Diehl, 2011

## Other Connection Issues

(Shafati, Jeste & Nelson, 2009)

- Face processing
  - Some preference of non-social stimuli to faces
  - Lack of experience may play a part along with disinterest
- Executive function
  - Less sensitive to situations where errors happen
  - Less able to modify their behavior
  - Response monitoring took longer and less resources were allocated for it

Diehl, 2011

## Connections: Response to Intervention

- Overall developmental outcomes
  - Increase in positive outcomes with early intervention (Kelly, Naigles, & Fein, 2010; Anderson, Lord, & Risi, 2007)
- Intense instruction changed connections
  - Coordinate information processing
  - Changes in white matter of poor readers with 100 hours of intense instruction (Keller & Just, 2009)

Diehl, 2011

## Summary: Neurology, ASD, Literacy

- Functional connectivity influences at many levels
  - Attentional differences to speech and language
  - Semantic processing differences in making connections
  - Differences attending to socially related processes
  - Differences in ability to flexibly respond
  - Intervention makes a difference!

Diehl, 2011

Influence of Neurobiology on Learning

## BEHAVIORAL CONNECTIONS

Diehl, 2011

## Neurology, ASD, Literacy

- These findings suggest these behavioral characteristics that influence literacy learning
  - Social Perspective Taking
  - Executive Functioning
  - Central Coherence

Diehl, 2011



### Social Perspective Taking (Theory of Mind; Mentalizing)

- The ability to take other people's perspectives



#### Effects

- People seem to act randomly
- Sharing and taking turns difficult
- Can't keep secrets
- Lack remorse or embarrassment
- May appear self-centered, egocentric, and uncaring
- Easier to comprehend factual reading than story or persuasive readings

Diehl, 2011

## Executive Function

(Perner &amp; Lang, 2000)

- Planning, coordinating actions, controlling sequences of action and cognitive flexibility
- Effects
  - Impulsivity
  - Difficulty changing responses
  - Directing attention to a goal
  - Setting goal priorities
  - Difficulty with transient cues
  - Difficulty with novel situations
  - May focus so much on decoding connect with meaning
  - Self management and repair

Diehl, 2011



## Central Coherence Challenges and Reading



- Understanding ambiguous words
- Getting the gist of information
- Focus on pieces rather than whole
- Generalization

Diehl, 2011



## Anxiety

- Most children with ASD have very high levels of anxiety
  - Physical comfort is threatened in unusual ways
  - Hard to handle unknown plans and expectations
  - Do not know how to use social support

Diehl, 2011



### Summary of Behavioral Characteristics That Influence Literacy Learning

- Theory of Mind
- Executive Functioning
- Central Coherence
- Anxiety

Diehl, 2011



**ASD AND LITERACY**



 **Patterns of Reading Ability**  
(Nation, et al., 2006)

- Investigated skills of 41 children with ASD
  - Word recognition
  - Nonword decoding
  - Text reading accuracy
  - Text comprehension



**Patterns of Reading Ability**  
(Nation, et al., 2006)

- **Different patterns**
  - Some good decoding with poor comprehension (Hyperlexia reading profile; inadequate use of language skills to bring meaning to message)
  - Strong association between autism and hyperlexia
  - Comprehension often reflects language abilities
  - Coherence issues
  - Preoccupation with text and reading



**Patterns of Reading Ability**  
(Nation, et al., 2006)

- Some good at reading words  
poor at reading nonwords  
(Inadequate phonological decoding skills)
  - 42% of readers in study showed significant differences between word and nonword decoding abilities
  - 15% had adequate word reading and were very poor in nonwords
  - May be related to functioning level?
  - Normal readers show little differences



**Patterns of Reading Ability**  
(Nation, et al., 2006)

- Some poor at reading words and nonwords
  - 12% had nonmeasurable reading abilities
  - Some had letter identification



**Patterns of Reading Ability**  
(Nation, et al., 2006)

- **Overall**
  - Aggregate normal ranges of reading accuracy
  - 65% of same showed reading comprehension impairments
  - 1/3 of sample very severe reading comprehension impairments
  - Reading comprehension abilities strongly tied to language abilities





## HYPERLEXIA

### Hyperlexia

- Found often in ASD populations (Grigorenko, Klin, & Volkmar, 2003)
- Healy (1982) Definition
  - Precocious onset of single word decoding (Newman, 2007 also)
  - Impaired reading comprehension (Newman, 2007 also)
  - Impaired listening
  - Exceptional single word ability compared with language or cognitive abilities




### Hyperlexia

- Possible reasons
  - Weak central coherence contribute to reading comprehension issues
    - Processing in lower cortical areas
    - Difficulty making connections and associations
  - Narrow and restricted interests may contribute to strong decoding through extensive reading and practice (Healy, Aram, Horwitz, & Kessler, 1982)
    - Because drawn to letters may practice decoding more

### Hyperlexia

- Cardosa-Martins & Da Silva (2008)
  - Hyperlexics performed as well as controls on nonword reading measures
  - Most errors were phonological rather than visual
  - Indifference to symbolic notion may provide focus on decoding
  - May only gradually attend to meaning




## PHONOLOGICAL AWARENESS

At age 5, Temple Grandin chose 'suitcase' as the picture that started with /b/, because she thought it was a 'box'. She ignored 'birdbath' b/c she thought it was a 'garden'.

### Phonological Awareness

- Children with ASD appear to have depressed phonological abilities
  - Sound Blending (Heimann, Nelson, Tjus, & Gillberg 1995)
  - Children with ASD with and without history of hyperlexia
    - Sound Awareness Test WJTA-III (Newman et al., 2007) which consists of rhyming, sound deletion, sound substitution, and sound reversal within words.
    - Children with hx of hyperlexia did better than children w/o hx but both groups did poorer than TD children
    - May not be true of children with lower vocabulary ability or intellectual levels (Cardosa-Martins & daSilva, 2008)



## Phonological Awareness

- Elision and Sound Blending (Smith-Gabig, 2009)
  - CTOPP-Elision (Say top without the /t/) more difficult than the sound blending
  - 43% below average on both; 26% on one; 29% within average range
  - Receptive vocabulary related to elision task
- Correlations with Word Recognition
  - Both groups similar in both words and nonword recognition
  - Some variability with ASD group on words and nonwords
  - No relationship between the PA subtests and word recognition for children with ASD



## SPELLING



## Spelling

- Appears to be largely IQ dependent
  - Across two large studies involving a total of 280 participants with ASD, Mayes and Calhoun (2003a, 2003b) found that all of their participants with average IQ scores and approximately half of the children who had IQ scores below 80 achieved average scores on decoding and spelling measures.



## Spelling

(Diehl, Silliman, & Bahr, In preparation)

- Appears to be subgroups
  - Good spellers
  - Difficulty with morphological issues
  - Semantic issues
    - Homonyms
    - Neglect of root word
    - Insertion of whole words in attempts to spell




## READING COMPREHENSION



## Vocabulary

- Preschool children with ASD are severely delayed in their vocabulary relative to their nonverbal mental ages (Charman, Drew, Baird, & Baird, 2003).
- Although the discrepancies between nonverbal and verbal abilities often diminish with age in higher functioning
- Individuals with ASD (Joseph, Tager-Flusberg, & Lord, 2002), the majority nevertheless continue to show limited vocabulary knowledge as adults (Howlin, Goode, Hutton, & Rutter, 2004).



## Narratives

- Loveland, McEvoy, Tunali, and Kelley (1990)
  - More likely to include bizarre or inappropriate utterances during story retellings than were individuals with Down syndrome who were matched on verbal age.
- Difficulty using evaluation in their personal narratives (Losh & Capps, 2003).
  - Personal narratives (putting personal experience in narratives) appear to be more challenging than storybook narratives for students with ASD
  - Trouble building causal relationships and inferences in narrative



## Narratives

- The additional challenge of personal narratives may reflect the greater requirement for generativity in formulating both the content and the structure of the narrative compared to one that is being told based on a storybook.



## FLUENCY



## Fluency

- Even though decoding might be rapid
  - Poorly modulated prosody
  - Pauses and grouping don't reflect semantic content
  - May not go back and correct (Repair )



## Expectations of Literacy for Children with Autism

(Mirenda, 2003)

- Children with autism often do not learn to read, write, and spell because they are not taught.
  - Expectations for literacy learning are low ESPECIALLY FOR CHILDREN WITH LIMITED VERBAL ABILITY.
  - Splinter skills such as hyperlexia, print awareness, and sight word recognition are not viewed as relevant for reading.
  - Students with autism are regarded as too cognitively impaired or not yet ready for literacy instruction



## Expectations of Literacy and Children with ASD

(Lanter & Watson, 2008)

- There is evidence that demonstrates that the promotion of reading skills helps some students with ASD advance their oral language skills (Broun, 2004; Colasent & Griffith, 1998; Craig & Sexton Telfer, 2005; Koppenhaver & Erickson, 2003; Wolfberg, 1999).
- No set time to begin to teach play, cognitive, social, or language skills, there is no set time to begin to teach reading.

Spoken language abilities should not be viewed as a prerequisite for literacy learning.



**State of Science involved in Literacy Learning in Children with ASD**

- 11 Peer reviewed studies related to intervention including children with ASD (Whalon, Otaiba & Delano, 2009)
  - 4 of those on computer based instruction on code instruction
  - 5 focused on cooperative learning or peer supports
  - 1 reading comprehensions strategies
  - 1 to 1 reading directions in trials
- Others that did not meet criteria
- Others that have general recommendations but are not studies



**So... What can we do?**




**SHARED STORYBOOK READING**



**Shared Storybook Reading**

- Research supports the effectiveness of storybook sharing for:
  - Increasing vocabulary development (Coyne et al., 2004; Sharif, Rieber, Ozuh, 2002)
  - General linguistic performance (Crain-Thoreson & Dale, 1999; Mendelsohn, Mogilner, & Dreyer, 2001)
  - Emergent literacy knowledge (Justice, Pullen, Pence, 2008; Justice, 2002)
- Popular language intervention context
- Increased popularity within RTI process



**Dialogic Reading**

- Whitehurst and colleagues designed a program called “dialogic reading” that focused on intensifying the interaction of preschoolers.
  - Trained adults
    - Ask open-ended questions about the storybook
    - Expand children’s verbal contributions
    - Praise or encourage these contributions to the discussion made by the child.
  - Commenting has also been shown to positively increase the number of conversational acts and to positively impact early literacy skills (Fieldie-Barnsley & Purdie, 2003).



**Shared Storybook Reading**

- Research with ASD scant but encouraging
  - Crowe (1977) in a poster session ASHA
  - Dexter (1997) unpublished doctoral dissertation using it with aided language stimulation (AAC strategy)
  - Kirchner (1991) chapter in a book describing case example
  - Bellon, Ogletree, & Harn (2000) Single case study with 3-10 year old very echolalic and limited spontaneous; large increase in spontaneous language



### Style Differences

- Engagement not the same for everyone
- Descriptive analyses of parental behaviors when reading books in children with language impairment have shown that important differences in child engagement occur as a function of reading style (Rabidoux & MacDonald, 2000; Schneider & Hecht, 1995)
- Suggested that the selection of successful strategies used in shared storybook reading discourse with some children with language impairment may need to be specifically tailored to ensure engagement and linguistic progress (Kaderavek & Justice, 2002)



### Style Differences

- The possibility of individual fluctuation in engagement becomes magnified when the context of shared storybook reading is a group preschool setting where the opportunities for a mismatch are increased (Diehl & Vaughn, In Press)
  - Monitoring for active involvement
  - Balance between requests and responses
  - Focus and excitement on content
  - Scaffolding
  - Repetition
  - Inflection, volume, and pausing



### SHARED STORYBOOK READING



### BEFORE READING



### Choosing the right book

- If the child doesn't enjoy reading yet, try....
  - A book that is really a song
  - A short book with one line a page
  - Make a book with pictures of things that are pleasurable to the child
  - A book that has places to touch different textures
  - A book that makes sounds (Be careful not to choose a long one)
  - Use powerpoint books



### Choosing the right book

- In the beginning...
  - Large colorful pictures
  - Make sure the language is not too hard
  - Choose books that reflect children's special interests or experiences
  - Choose a book that's not too long
  - Choose books with repeating lines or rhythm



### Make it routine

- Make it a habit
  - Many parents find before bed time a good time.
  - Add more reading times once bedtime works.
- Have a "special" reading place
- Use routine words in a sing song manner such as "Turn the page."



### Once you have the book habit

- **Focus on prediction**
  - Predicting is taking clues from looking and making an guess using the cues
- Look at the cover, model "I bet this is a book about \_\_\_\_." Then ask the child what the book is about when looking at the cover picture.
  - Tease "Is this book about a bus? No..." (while pointing the picture). "It's about a mouse."
- Help child make predictions from the pictures about what the story concerns or what may happen next. Use words like "I wonder what is next."



### DURING READING



### Have a good time!

- Use special interests
  - "This is just like the Nemo movie."
- Be careful not to talk so much or badger with questions.
- A comment or question every couple of pages is usually good.



### Teach new words

- Select one to three new word meanings and tell the child what they mean in a child-friendly way as the words come up.
- Focus on basic understanding along with connecting the word with children's previous experiences.
- Try and use words in your everyday life. Select experiences such as field trips, toys, or movies that highlight new words.



### Prompt during reading

- **Use a variety of prompting during reading**
  - Ask who, what, when, and where questions when reading if your child is at the point that he/she enjoys the book.
  - Use the flashlight to make it more fun. This also encourages joint attention
  - Ask questions that connect with child's previous experiences





**AFTER READING**



### Talking

- **Change the balance**

- Adults should do more talking when concepts or words are new.
- Children should do more talking when they have already mastered the concepts or are familiar with the book
- Make sure it is joint; no monologues without listening on either side (Unless you asked them to "tell" you the story
  - Make sure you model looking and listening
  - Encourage the eye connection



**Encourage retellings and using new words**

- Help children use the book to tell you or others the story using the new vocabulary words.
- Follow-up with the new vocabulary words so that children will apply them to other situations outside of book sharing



### Talk about future plans

- Talk about what books you would like to read next time
- Take children to library to choose new books
- Talk about future experiences that relate to the book's theme



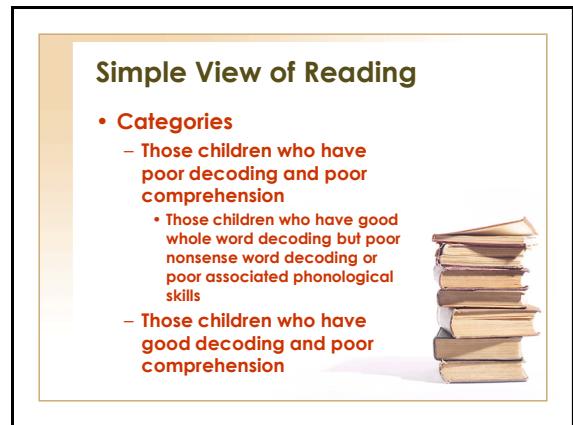
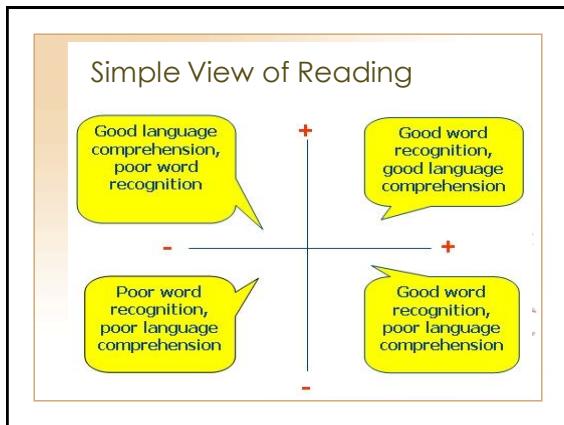
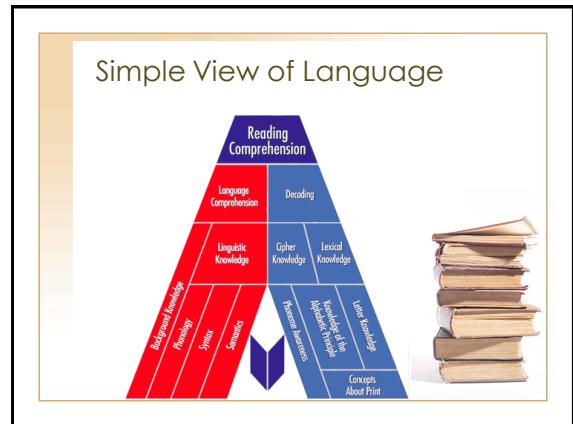
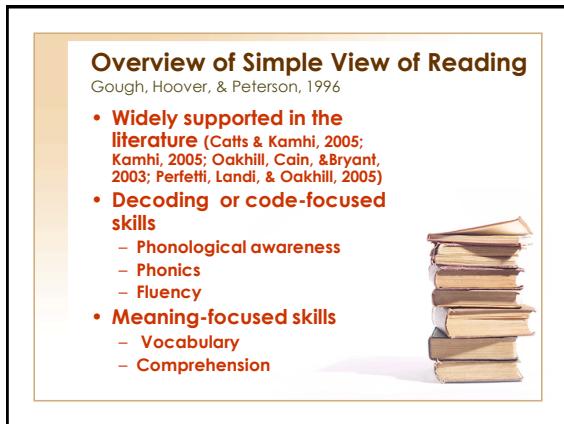
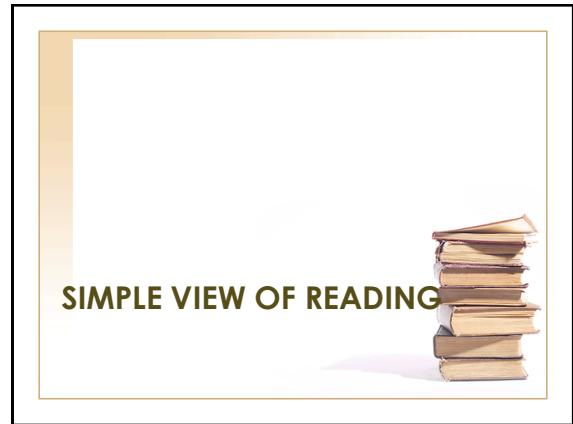
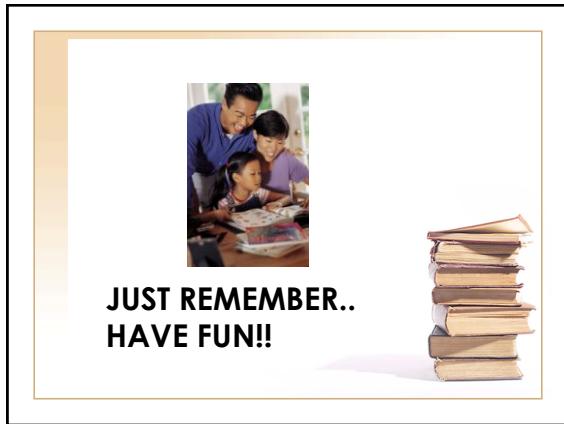

**LITERACY IS NOT JUST ABOUT BOOK READING TIME**



### Literacy is everywhere!

- Grocery store
- Computers
- Visual schedules
- Restaurants
- Shopping
- Riding in the car
- Personal date book
- Telephones
- Birthday cards





## PHONOLOGICAL AWARENESS AND PHONICS CONNECTIONS



### Phonological Awareness/ Phonics Connections

- Important to use visuals to show connections
- Important to show semantic connections along with it
- Typical manipulative supports probably effective to show onset and rhyme (i.e., Blocks, Flip charts)
- Personally had success with music related programs
  - Rocknlearn <http://www.rocknlearn.com/>
  - Sing your way through phonics <http://www.actionfactor.com/pages/program.html>
  - Various phonic songs [http://www.songsforteaching.com/phonic\\_s.htm](http://www.songsforteaching.com/phonic_s.htm)



### Using visuals to show connections

- Shows them sound on lips
  - <http://www.uiowa.edu/~aca/dtech/phonetics/english/fromeset.html>
- Cards
- Show them the grapheme
- Show them in words with semantic connections



### Lindamood Programs

- Recommended by publisher for ASD
- No research on children with autism yet
  - Talkies
  - Visualization and Verbalization
- Fairly complex program
- Takes one on one



### Phonological Awareness Intervention

- Available evidence involves using computer assisted instruction (Basil & Reyes, 2003; Coleman-Martin, Heller, Chihak, & Irvine, 2005; Heimann, Nelson, Tjus, & Gillberg, 1995; Tjus, Heimann, & Nelson, 1998)
- Use Software programs to develop skills
  - All My Words (Crick Software, Ltd.)
  - Teach Me Phonemics series (SoftTouch)
  - [www.adapledlearning.com](http://www.adapledlearning.com) (Boardmaker Plus Applications)
  - Earobics, <http://www.earobics.com/>
  - DaisyQuest & Daisy's Castle, Pro-ED



### Phonological/Phonemic Awareness

- Phonemic awareness can be helped by voice output software
  - Pix Writer, PixReader, Intellikeys software, or Writing with Symbols
- Go to <http://www.auburn.edu/~murraba/prog.html> for a list of programs from reading researchers



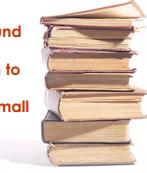
## Phonological Awareness Commercial Programs

- **Phonological Awareness Training for Reading** (Torgesen & Bryant) Pro-Ed \$129 kit. Good for small group. Two research studies show its effectiveness in stimulating phonological awareness in at-risk children (not with ASD)
- **Phonemic Awareness in Young Children: A Classroom Curriculum** (Adams, Forman, Lundberg, & Beeler) Brooks Publishing \$29 This is a carefully sequenced series of activities that will stimulate phonological awareness in 15-20 minutes of teacher-led activities each day. For kindergarten or at-risk first grade.



## Phonological Awareness Commercial Programs

- **Sounds Abound** (Catts & Variainen) Linguisystems \$34.95 manual \$37.00 game This spiral bound notebook contains numerous activities that a kindergarten teacher can use to stimulate phonological awareness in young children. It is not a systematic curriculum, but a set of instructional activities. The Sounds Abound Game with a game board and question cards provides opportunities for children to practice skills in sound comparison, blending, deletion, and segmenting in small groups.



## FLUENCY



## Fluency

- Teaching use of text hints (i.e., periods, commas)
- Putting added text hints in (i.e., all caps for loud, small writing for whispers, etc)
- Listening to audiobooks while looking at texts
- Role playing/drama
- Video Modeling
- Using stick figures along with speech and thought balloons to show different speakers
- Repeated practice



## Video Modeling

- Watch a video of adults or children modeling particular target behaviors (e.g., conversational scripts, self help skills, greeting, labeling, etc.)
- Even children who don't readily imitate models will often reproduce verbalizations from TV and video
- Video modeling has yielded better results than live modeling in some individual with autism (Charlop-Christy, Le, & Freeman, 2000; Haring, Kennedy, Adams, and Pitts-Conway, 1987)



## READING COMPREHENSION



## General Hints

- Motivate and engage right from the beginning
- Be enthusiastic about what you are teaching
- Heavy use of visuals
- Use narrow and restricted interests
- Active Boards
- Song lyrics on flip charts
- Photographs for taking role
- Sabotage with humor
- Use prosody
- Wait time
- Expect engagement
- Focus on deep rather than surface knowledge



## Reading Comprehension

- Summarizing
- Activating Schema
- Priming
- Reading Checklist
- Knowledge of text structure
- Graphic Organizers/Visual Maps
- Anaphoric Cuing
- Cloze Procedure
- Wh Question Sorting
- QAR
- Visuals for Figurative Language
- Jokes
- Text to Self
- Key Words
- Think Alouds
- Use of Comic Strip Conversation Symbols
- Likes/Dislikes Books
- Vocabulary/Information Books that connect to other knowledge
- Social Information Stories
- Picture walks
- Peer Mentoring/Tutoring



## Summarizing

- Remember central coherence?
- Start with just picking from disparate content areas
  - This was a story about
    - Panthers
    - A boy who lost his Mom
    - Sponge Bob
- Teach them how to gather clues and be a detective
- Write clues down on sticky notes
- Put them all together to summarize



## Text Comprehension

- Activating schema (Saldana & Frith, 2007)
  - Facilitates reading by helping integrating text with prior knowledge
  - Sometimes reading questions before reading activated irrelevant or inaccurate knowledge perseverated on it affecting reading comprehension
  - Recommends guided activation of prior knowledge



## Reading Checklists

	Reading Checklist
	*Read pages 5-8
	* Things to look for?
	Where panthers live?
	What do they eat?
	What kills them?
	* Words to find in dictionary
	puma
	jaguar
	habitat



## KWLH

- Helps students activate prior knowledge.
  - What I know
    - Brainstorming
  - What I want to know
    - Student directed discovery
    - Use multiple references
  - What I learned
    - Summarizing what learned
  - How can we learn more



## Strategy: KWLH

What We Know	What We Want to Find Out	What We Learned	How Can We Learn More
<ul style="list-style-type: none"> <li>Dinosaurs are large.</li> <li>Dinosaurs are dead.</li> <li>They lived a long time ago.</li> <li>There is a movie about dinosaurs.</li> </ul>	<ul style="list-style-type: none"> <li>How long ago did they live?</li> <li>Why did they die?</li> <li>How do we know what they looked like?</li> <li>Who are the people who study dinosaurs?</li> </ul>	<ul style="list-style-type: none"> <li>An archeologist has an exciting life.</li> <li>Dinosaurs eat plants and some eat meat.</li> <li>Some dinosaurs were gigantic, but had small brains.</li> <li>Fossils uncover dinosaur traits.</li> </ul>	<ul style="list-style-type: none"> <li>Research</li> <li>Museums</li> <li>Field Trips</li> <li>Archaeological digs</li> <li>Videos</li> <li>Internet computer search</li> </ul>

## Priming

- Priming is the previewing of information. It links individual instruction to classroom activities.
- Used to increase competence before problems develop
- Carried out in the afternoon or evening prior to material being presented in the classroom
- Primed event should approximate what will actually occur the following day
- Short, meaningful sessions are most effective



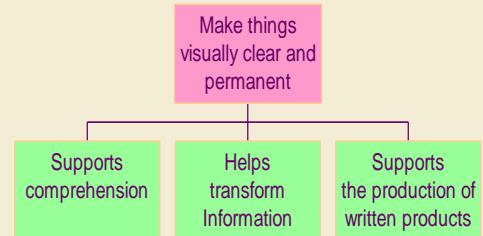
## Encourage knowledge of text structure

- Story Retellings
- Plays
- Use of graphic organizers
  - Narrative
  - First/Then
  - Compare/Contrast
  - Persuasive

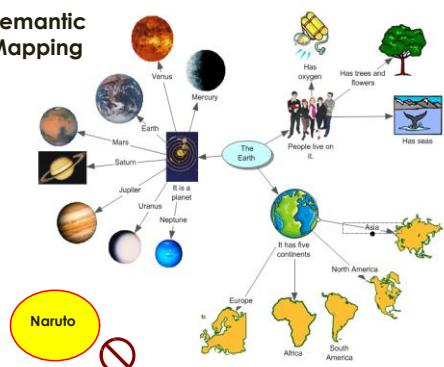


## Graphic Organizers

### Graphic Organizers



## Semantic Mapping



## Who-Did-What Sequence (Gately, 2008)

### Who

1. Anna's mother

2. Anna

3. Father

4. Caleb

5. Sarah

### Did what

1. Died.

2. Takes care of family

3. Writes newspaper ad

4. Waits and hopes.

5. Answers the ad.



## Conversation Bags

- Add remnants while learning during theme
- Pass around bag for classroom conversation
- Bag is topic
- Passing is turn taking
- Supports content level discussions



## Anaphoric Cuing

(O'Connor & Klein, 2004)

- **Anaphora**
  - The reference of the text back to earlier elements
    - Pronoun most common form
- ASD problems interpreting pronoun referents increase with complexity of sentences
- Had choose between three possible referents
- Most effective in increasing comprehension



## Anaphoric Cueing

(O'Connor & Klein, 2004)

- Students with autism have difficulty:
  - Knowing what unspecified words refer to
    - He, She, It, Her, His, Us, We, You, Them, Their, This, That, Those, There, Something
- What to do about it?
  - Give simple checks throughout reading
    - The duck was having a hard time climbing the trees in the usual way. It hurt his feet.
    - His feet
    - Joel's feet   The duck's feet   Mrs. Nelson's feet

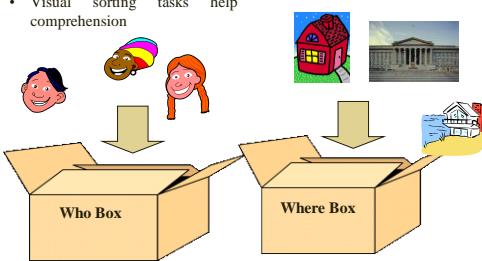
## Cloze Procedure

- Requires students to make use of information in the text to make predictions
  - Increased self monitoring of correctness of responsiveness and initiated rereading
  - Small gains in reading comprehension (O'Connor & Klein, 2004)



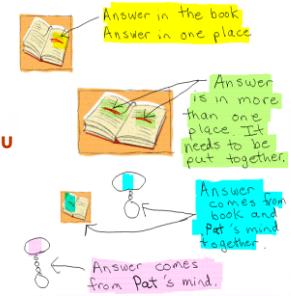
## Wh Question Sorting

- Visual sorting tasks help comprehension



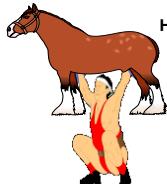
## Question Answer Relationships

- Right there
- Think and search
- Author and you
- On your own



## Comprehension: Supporting Figurative Language

- Visual boards can be used to teach idioms.



Silly Meaning



Real Meaning

## Comprehension: Jokes-Multiple Meanings

The word **ball** can mean more than one thing.  
It depends on the other words in the sentence.



Cinderella



A ball can be a dance.  
A ball can be something you play with.

## Jokes-Multiple Meanings

### Joke of the Day



Cinderella

Why was Cinderella so bad at football?

### Joke of the Day



Why was Cinderella so bad at football?  
She kept running away from the ball!



Why is it funny?



Football players are supposed to hold on to the ball and run to make a touchdown. They don't run away from it. It is using both meanings of the word ball to make a joke.

## Think Alouds

- Use Think Alouds to show inference and prediction**
  - Motivations for behaviors
  - Emotions
  - Things that are contrary to expectation
  - Alternative outcomes
  - Subjective evaluative remarks.
  - Story Retellings



## Think-Alouds

- Talk through the thinking process ("as we brainstorm, we will...")
- Allow students to hear what is going on in the teacher's or peer's mind
- Allow teachers to see the strategies a student is using to understand the text
- Increase meta-cognitive awareness
- Are tied to higher reading comprehension scores



## Three Connections

(Harvey & Goudy's, 2000)

- Text to self**
  - Connection between reading and personal experience
- Text to text**
  - Connection between reading and another story of a similar genre
- Text to world**
  - Connection between reading and information about the world

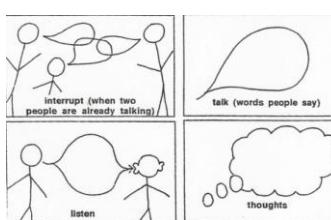


## Key Words

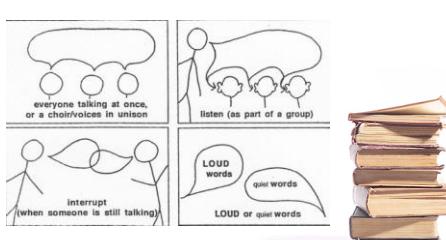
- Let each child have a ring (shower curtain rings, page holder rings, etc.) to keep words cards of interest and need. These key word rings would be hung on hooks or nails in one location in the classroom.
- Precut cards (with one hole punched on the end) should be ready for you and the child to write the word together in standard spelling.
- If a child needs you to spell or write a word, it is put on the card and becomes the child's special word
- The class quickly remembers which children have which word and prompts class support.



## Comic Strip Conversation Symbols




## Comic Strip Conversation Symbols




## Case Example

- Michaela
  - Fourth grader
  - Fully included
  - Did well except for occasional blow-ups that seemed to make no sense to his teachers
  - Particular trouble in P.E.
  - This conversation with her was enlightening



**Comic Strip Conversations**

(Grav. 1994)

Some Symbols

Where are you? (Draw yourself)

Who else is here? (Draw the other people.)

What are you doing? (Draw what you were doing.)

What happened? What did others do? (Draw what happened.)

Plan:

**Comic Strip Conversations**

(Grav. 1994)

Some Symbols

talk

interrupt

LOUD quiet

think

listen as part of a group

**Social Story with Comic Strip Conversation Symbols**

At school, my teachers talk to me to give me new information and give me directions. My teachers talk to my friends to give them new information and to give them directions.

It is important for me to hear my teacher's words. It is important for my friends to hear my teacher's words. Here is an example:

Friend

Friend

Patrick

Spell tornado

**Social Stories with Comic Strip Conversation Symbols**

If I interrupt, the words bump into each other and get confused. Here is an example:

friend

friend

Pat

The weather is so tornado

**Social Stories with Comic Strip Conversation Symbols**

If I raise my hand in class, my teachers will know I want to say something. They will finish talking and then call my name so I can tell them what I was thinking.

1

2

Spell tornado

Wait who would you like to say?

I will try to raise my hand and wait for my teacher to call on me when I want to say something in class.

**Likes/Dislikes Book**

- Start with family or people close to the child using things he /she understands or really likes
  - TV Shows
  - Colors
  - Favorite athletic team
- Move to using it for character definition in books
- Can also do Character Catalog

## Vocabulary/Information Books

- Make simple powerpoint books unpacking the information of the story or highlighting vocabulary words
- Make use of visual dictionaries to help
- Make sure to make connections to previous knowledge in the book



## Social Information Stories

- I am reading Sarah, Plain and Tall. It is a story about a family who lives on a prairie. Caleb is a little boy in the story. His mother died when he was born. Caleb misses his mother. I can tell this because he keeps asking his sister Anna to tell him about his mother. When I think about Caleb missing his mother, I can think about missing my brother who is at college. I am sad when my brother leaves for college. This helps me to know how Caleb feels in the story (Gateley, 2008)



## Picture Walks

- Looking at the pictures from the story or text and predicting what it might be about.
- Can use reading the captions too.
- A mistake that worked
  - Put pictures on wall with numbers have them walk around and collect them in order
  - Guess what story is about



## Peer Mentoring

- Most research support
- Least used
- Students taught to:
  - Model
  - Scaffold
  - Question
  - Praise



## Planning for Grouping

- Can be determined by:
  - Readiness
  - Interest
  - Reading level
  - Skill level
  - Background knowledge
  - Social skills



## Collaborative Groups



- Keys to successful collaboration
  - Establish importance
  - Define roles
    - Task director
    - Recorder
    - Praiser/Encourager
  - Give suggested language



### Cooperative Learning Group Example

**Task Director**

Job: Keep team on task. Make sure your team understands and agrees with the answers.

Things to say:

- Let's review the rules.
- Should we ask the teacher?
- We have one more part to do.
- Let's read the directions again.
- Does everyone understand?



### Cooperative Learning Group Example

- Recorder
  - Write down what team says
  - Repeat the words for the team
- Recorder Language
  - Is this what I should write?
  - Please slow down.
  - Say that again please.
  - Here's what I have so far.
  - What should I write next?



### Cooperative Learning Group Example

**Task Director**

Job: Keep team on task. Make sure your team understands and agrees with the answers.

Things to say:

- Let's review the rules.
- Should we ask the teacher?
- We have one more part to do.
- Let's read the directions again.
- Does everyone understand?



WRITING



### Writing

- Actual motor planning difficult
  - Forming and spacing letters
  - Tactile properties of holding writing instrument
- Writing is thinking on paper.
  - Manipulating and organizing language in the mind can be daunting for a visual thinker.
- Must consider audience in writing.
  - Theory of mind




### Physical Writing

- Work with occupational therapist
- Suggest Handwriting without Tears (Carlson, McLaughlin, Derby, & Blecher, 2009)
- Tripod
- Marker
- Slanted Surface
- Keyboard /Laptop



## Typing Websites

- Handwriting without Tears: <http://www.hwtears.com/>
- Typing Websites
  - <http://www.superkids.com/aweb/pages/reviews/typing/>
  - <http://www.wacona.com/keyboardin ggames/keyboardin ggames.html> (a cool website set up by an elementary school)
  - [http://www.learninggamesforkids.com /keyboarding\\_games.html](http://www.learninggamesforkids.com /keyboarding_games.html) (Online typing games)
  - [http://funschool.kaboose.com/fun-blaster/games/game\\_type\\_me.html](http://funschool.kaboose.com/fun-blaster/games/game_type_me.html)
  - <http://www.computerlabkids.com/key boarding.htm>
  - <http://www.gameaquarium.com/keybo arding3.htm> (Online typing games from BBC)



## Self-Regulated Strategy Development

- SRSD strong research background for children with language impairment (Graham & Harris, 2005)
- Use of SRSD with Asperger's Syndrome (Delano, 2007)
  - Instructions in strategy, rationale, model with self talk
  - Child memorized strategy
  - Practice with self instruction
  - Feedback
  - Independent Use



## Self Regulated Strategy Development

- Process
  - Planning
  - Writing
  - Revising
  - Editing
  - Monitoring
- Use Technology to support processes



## 3-2-1 Summarizer

- After reading over my work
  - 3 revisions I can make to improve it
  - 2 resources I can use to help improve my work
  - 1 thing I really like about my first draft



## Self-check cards

I have used capital letters correctly.  
If yes, go to next card.  
If no, see back of card for more information.

Reminders for using capital letters.

- Names of persons and pets
- Pronoun I
- First letter of sentence
- Names of language, countries, months days

## Thanks for all you do for kids!