
Research in Communication Challenges in Learners with ASD
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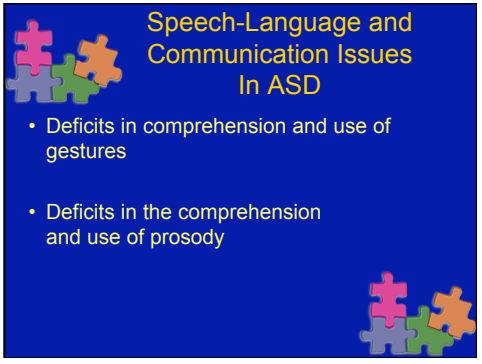
Speech-Language and Communication Issues In ASD
• Non-communicative (lack of intentionality)
• 20-30 % may fail to develop functional speech
• Deficits in language comprehension


Speech-Language and Communication Issues In ASD
• Deficits in comprehension and use of gestures
• Deficits in the comprehension and use of prosody


Speech-Language and Communication Issues in ASD
• Impoverished lexical representation
• Atypical lexical organization
• Deficits in abstract language

Speech-Language and Communication Issues in ASD

- Deficits in pragmatic competence
- Difficulty with initiating and sustaining conversations
- Deficits in social language

Unique Challenges

- Echolalia
- Difficulty with gestures
- Expressive language may be better than receptive language
- Comprehension of language in context or in everyday situations may be significantly reduced when compared to comprehension of single words

This Presentation

- Review research in early language development in children with ASD and discuss implications for assessment and treatment
- Review research in vocabulary development and language processing

This Presentation

- Review research in more advanced language development including abstract language and social language

Early Language Development

Early Social Cognitive Development

- Research indicates that certain early social cognitive development components are critical precursors to the onset of vocabulary and other key language milestones

Early Social Cognitive Development

- The most important skills include:
  - Joint attention
  - Use of gestures
  - Imitation
  - Gaze following

Predictors of Outcomes

- Joint attention is a significant predictor of language outcomes
  - Specifically, response to joint attention
- Gesture use and non-verbal cognitive skills appear to be best predictors of both receptive and expressive skills

(Luyster, et al., 2008)

Predictors of Outcomes

- Imitation appears highly correlated with expressive language
- Gesture use (specifically pointing) seems to be one of the most robust predictors of receptive language
  - Some describe gestures as the bridge between receptive and expressive language (Charman et al., 2003)

Assessment Tools for Early Language

- Mullen Scales for Early Learning (Mullen, 1995)
  - Assessment of developmental functioning for child birth to 5yrs 8 mos.
  - Overall score as well as sub scores for:
    - Gross and fine motor
    - Visual reception
    - Receptive and expressive language

Assessment Tools for Early Language

- MacArthur-Bates Communicative Development Inventory (Fenson et al., 2003)
  - Parental assessment of child's early language
    - Begins as young as 8 months

Assessment Tools for Early Language

- Early Social Communication Scales (Mundy & Hogan 1996)
  - Measures non verbal social communication including:
    - Social interaction
    - Joint attention
    - Behavioral regulation

Assessment Tools for Early Language

- Imitation Battery
  (Rogers et al., 2003)

Joint Attention

Joint Attention

- The ability to coordinate attention between people and objects
  Loveland & Landry (1986)
- An attentional state during which a child and a partner share an interest
  Adamson & Chance (1998)

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Joint Attention

- RJA: Responding to joint attention
  - Ability to follow direction of gaze or point
- IJA: Initiating joint attention
  - Ability to use direction of gaze or point to direct the attention of others

Seibert et al. (1982)

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Joint Attention

- Proto-imperative
  - Requesting with gestures or eye gaze
- Proto-declarative
  - Commenting or sharing interest

Bates (1976)

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Joint Attention

- By 3 months of age infants can:
  - Discriminate triadic from non-triadic contexts
    - They are already sensitive to cues from the social partner that are required for later engagement in joint attention

Striano & Stahl (2005)

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Joint Attention

- By 3 months of age infants can:
  - Gaze following is pretty clearly established

Hood, Willen, & Driver (1998)

  - Perceive adult eye movement and act upon changes in eye movement alone

D'Entrement (2000)

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Joint Attention

- By 4 months of age, cueing of an object through adult gaze significantly enhances object processing

Reid, Striano, Kaufman, & Johnson (2004)

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Joint Attention

- Pointing is clearly established by 9 months of age
  - May simply mark own attention opposed to focus the attention of others
    Carpenter et al. (1998)
- By 12 months of age, point is accompanied by gaze alteration
  Bates et al. (1979)

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Joint Attention

- 9 months of age: infants can follow line of reference gestures and pointing
  Baldwin, 1993

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Joint Attention

- 16 months-19 months: infants are sensitive to speaker non-verbal cues as a source of information about the reference of novel objects
  Baldwin, 1991

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JA and Language

- Clear evidence that vocabulary and language skills are learned during joint attention activities
  Baldwin, 1993
- Significant evidence that acquisition of JA behaviors is correlated with better outcomes in language and communication
  Carpenter, Nagel, & Tomasello, 1998

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Language

- In early word learning, children must overcome the problem of infinite possibilities
  Quinne (1990)
- Behaviors developed within JA support the young child in overcoming this challenge
  - Referred to as "knowledge based constraints"

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Knowledge Based Constraints

- Behavioral cues to referential intent
- Non-verbal cues as a source of information about the reference of novel objects
  Baldwin, 1991
- Beyond just looking where others look or point…must include integration of information

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Knowledge Based Constraints

- Evidence that 5 month olds look where others look or point but do not show a subsequent preference for the object (that was looked at)
- By 7 months of age, clear preference for the object
  Cleveland, Schug, & Striano (2007)

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Early Word Learning

- Fastmapping accounts for rapid word learning in early very young children
- Children are significantly more likely to map a word on to a novel referent following an adult gaze or point
  - Failure to attend to these behavioral cues will interfere with the process of fastmapping

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Joint Attention and Social Competence

- Development of overt joint attention behaviors appear to precursors to later more covert social behavior (e.g., following a conversation topic)
  Vaughan Van Hecke et al. (2007)
- Deficits in joint attention have been shown to be predictive of social problems in childhood
  Lord, Floody, & Pickles (2003)
  Scheinkopf et al. (2004)

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Joint Attention and Social Competence

- Early intentional use of eye contact is thought to mark early development of social cognition
  Brooks & Meltzoff (2002)
  Woodward (2003)
- 9-12 months of age has been described as the "social cognitive revolution"
  Tomasello (1995)

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Joint Attention and Social Competence

- Children who use a point to direct adult attention were more likely to demonstrate adequate social cognition (IJA)
  Brune & Woodward (2007)
- Social cognition involves both social responsiveness along with comprehension and integration of information
  Mundy et al. (2007)

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Joint Attention and Social Competence

- Social motivation may be fundamental to the evolution and development of human social cognition
- Tendency to engage in joint attention (particularly IJA) may reflect the degree to which sharing experiences with others is rewarding
  Mundy et al. (2007)

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Early Development and ASD

- 2 Key avenues of research have significantly advanced the field in terms of better understanding the behaviors present and absent during the first two years of development in children with ASD
  - Retrospective studies
  - Sibling research

Retrospective Studies

- Reviewing videotapes of young children who were later diagnosed with ASD
  - Baranek (1999)
  - Osterling & Dawson (1994)
  - Klin & Jones (2008)
- Sibling research
  - Zwaigenbaum et al. (2005)
  - Landa Garret-Mayer (2006)

Implications for SLPs

- SLPs must become familiar with early indicators that can put a child at risk for autism.
- Typically the SLP will be the first person to actually see a child with autism

Implications for SLPs

- ASHA recently issues a policy statement that recognizes the critical role of the SLP in the diagnostic process:

"Speech-language pathologists who acquire and maintain the necessary knowledge and skills can diagnose ASD, typically as part of a diagnostic team…"

www.asha.org/docs/html/PS2006-00105.html


Autism
• Children with autism appear to demonstrate deficits in joint attention early in development and remain persistent throughout development
Mundy, Sigman, & Kasari (1994)
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Autism
• If joint attention behaviors do appear in children with autism, they emerge very late and typically do not have the same quality of shared affective interaction.
Kasari, Sigman, Mundy, & Yirmiya (1990)
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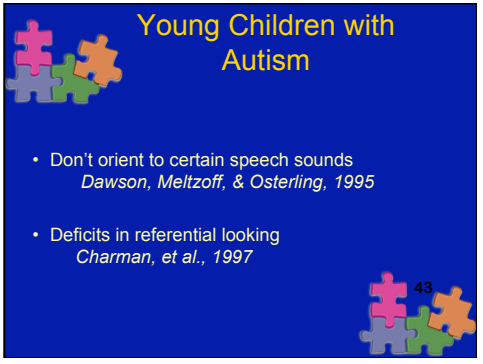
Young Children with Autism
• Don't orient to certain speech sounds
Dawson, Meltzoff, & Osterling, 1995
• Deficits in referential looking
Charman, et al., 1997
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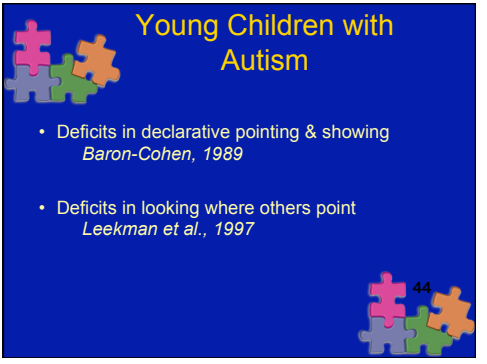
Young Children with Autism
• Deficits in declarative pointing & showing
Baron-Cohen, 1989
• Deficits in looking where others point
Leekman et al., 1997
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Theories

- There are three primary theories put forth to explain the early social communicative disturbances seen in children with autism
  - Cognitive (Baron-Cohen et al., 1994)
  - Affective (Dawson, Meltzoff, & Osterling, 1994; Mundy & Stella, 2000)
  - Attention (Pennington & Ozonoff, 1996; Leekman& Moore, 2001)

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Affective/Social Orienting Model

- Prior to the emergence of cognition as the primary regulator of behavior, frontal mediated neuroaffective motivation systems prioritize social information processing in human development

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Affective/Social Orienting Model

- A deficit in these systems contributes to the social and cognitive disturbances in autism

  Dawson & Lewy, 1989; Mundy, 1995

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Affective/Social Orienting Model

- Disturbances in joint attention involve in part impairment that involves frontal cortical processes

  Mundy et al., 1999

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Affective/Social Orienting Model

- Evidence supporting basic social-orienting disturbance in children with autism:
  - No preference for speech and speech like sounds
    Klin, 1991

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Affective/Social Orienting Model

- Evidence supporting basic social-orienting disturbance in children with autism:
  - Disturbances in social orienting observed in a review of "first birthday" tapes
    Osterling & Dawson, 1994

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Affective/Social Orienting Model

- Assumptions of Model
  - Experience drives a substantial portion of postnatal brain development
    Huttenlocher, 1994
  - To some degree, a neurobehavioral system is self-organizing (e.g., prioritization of social information processing)
    Mundy & Stella, 2001

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Implications

- Children with autism lack this self-organizing feature. This leads to deviant development of neurobehavioral systems over time.
  Mundy & Crowson, 1997

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Implications

- Neurological disturbances secondary to lack of early social orienting are due to a negative feedback system
  Mundy & Stella, 2001

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Implications

- The loss of critical social input may distort typical symbolic and social cognitive development.
- The assumption that the development of social information processing is separate for the development of object oriented processing may help explain why children with autism demonstrate some cognitive strengths but not in the areas of social cognition
  Mundy, 1995

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Joint Attention

- Children with autism do appear to demonstrate deficits in attending to different information in the environment early in development (Attention)
- They also demonstrate deficits in attending to the bids for attention from others (Jointness)

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Summary

- There is something about the way children with autism process (or fail to process) early social information that affects their development of joint attention.
- Questions remain as to the underlying reason for this difficulty.

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Summary

- Joint attention plays a significant role in the development of:

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JA and ASD

- Research has shown that JA behaviors can be taught to learners with ASD

Whalen & Schreibman (2003)
Kasari, Freeman, & Paparella (2006)
Vismara & Lyons (2007)
Kasari, Paparella, Freeman, & Jahromi (2008)

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JA Intervention

- Research seems to support the integration of developmental and behavioral approaches
- Generalization and maintenance of skills within many programs was weak

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JA and Intervention

- IJA behaviors were frequently more difficult to teach and maintain
- Measures of language outcomes were employed but few looked at measures of social competence
  - Some did include measures of social initiations, social affect, symbolic play

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Intervention Research

- Even with direct instruction, you may only establish joint attention behaviors but limited generalization
- Must build social motivation for joint attention

Jones & Carr, 2004

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Issues

- Despite similar requesting abilities, children with ASD demonstrate fewer JA behaviors

Mundy et al. (1994)

- Consistent use of gestural communication to request objects but little use of gestures to direct adult behavior

Wetherby & Prizant (1984)

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Issues

- IJA and RJA behaviors appear to demonstrate dissociable paths of development and impairment in children with ASD

Mundy, Kasari, Sigman, & Ruskin (1995)

- RJA may be more associated with linguistic competence whereas IJA may be associated with social and pragmatic competence

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Issues

- RJA and IJA may reflect unique and differentiated aspects of executive functions

Vaughan Van Hecke et al. (2007)

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Intervention Research

- Results indicate that simple environmental manipulations only resulted in modest gains and that direct instruction is often necessary

  Jones & Carr, 2004

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Building Social Motivation

- Establish adult as generalized reinforcer (Repeatedly pair with powerful reinforcer)
- Use highly interesting stimuli (strong child preference)

  Jones & Carr, 2004

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Building Social Motivation

- Provide natural consequences when possible
- Intersperse activities to maintain attention and interest

  Jones & Carr, 2004

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Implications for Assessment

- Early assessment protocols should include evaluation of use of eye contact and gestures to regulate the behaviors of others.
  - Does the child point or gesture communicatively
  - Does the child alternate gaze between what is wanted and a person
  - Does the child look at a person to receive feedback

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Implications for Intervention
• The development of “eye contact” must go beyond the simple response of looking at someone when requested to “look at me”.
• The learner should make spontaneous eye contact
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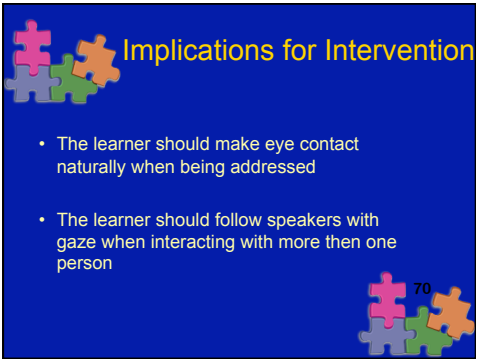
Implications for Intervention
• The learner should make eye contact naturally when being addressed
• The learner should follow speakers with gaze when interacting with more then one person
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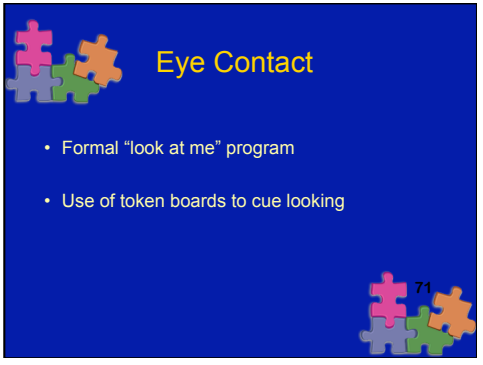
Eye Contact
• Formal “look at me” program
• Use of token boards to cue looking
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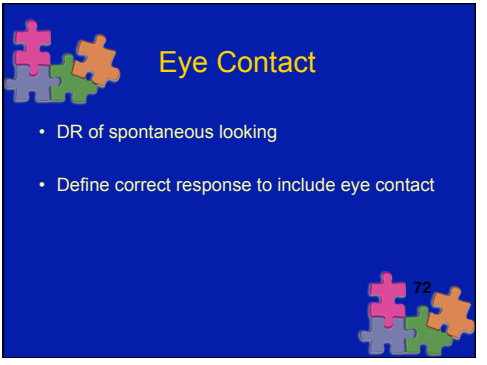
Eye Contact
• DR of spontaneous looking
• Define correct response to include eye contact
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Implications for Intervention

- Explicit programming to use and respond to gestures, head turns and eye gaze must be incorporated into early programming.
  - Work on using non-linguistic cues to prompt object retrieval
  - Move to use of non-linguistic cues to prompt preference

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Eye Gaze Alternation

- Explicit instruction on eye gaze alternation
- Prompt behaviors as needed
- Use highly preferred items and introduce suddenly
  (e.g., have toy turn on suddenly or appear from under something)

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Additional Programs

- Making eye contact when looking at pictures in a book
- Identifying where a person is looking
- Perspective taking

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Additional Programs

- Work on establishing appropriate responses to facial expressions
  - Look in bag with anticipation and smile
  - Have highly preferred stimulus in bag for child if he/she comes over

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Conclusions

- Children with ASD demonstrate early and pervasive problems with joint attention, language and social competence
- Joint attention behaviors can be taught and in turn, enhance language outcomes in learners with ASD

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Conclusions

- Must go beyond simple behavioral teaching and systematically incorporate joint attention instruction in early teaching to promote development of JA behaviors
  Kasari, Paparella, Freeman, & Jahromi (2008)
- Limited research on effects of JA instruction on social competence in individuals with ASD

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Conclusions

- Many children with ASD develop or can be taught to engage in responsive joint attention behaviors but continue to demonstrate significant challenges with initiating joint attention behaviors

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Conclusions

- We may be teaching rudimentary social responsiveness but not social cognition or social motivation
- We may be supporting linguistic development but not necessarily social or communicative competence

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Important Considerations

- Social competence probably plays a more significant role in quality of life and good long term outcomes than linguistic competence or IQ
  - Consider employment and related outcomes in mild MR when compared to HFA or AD

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Promoting and Enhancing Speech

Speech Production

- DSM IV: Delay in, or total lack of, the development of spoken language (APA, 1994)
- 1/3 (Bryson, 1996) to 1/2 (Lord & Paul, 1997) of children with autism may fail to develop functional speech

Challenges to Speech Acquisition

- Attention
  - –joint attention
  - –input selection

Challenges to Speech Acquisition

- Perception
  - little or no break between sounds
  - speech sounds may vary
  - co-articulation effects

Vihman (1996)

Infant Speech Perception

- Biologically determined during first half of year one of life and applies generically to any linguistic input
- By second half of year one, preferences shift towards the native language

Infant Speech Perception

- Speech perception abilities get better and more refined with experience

Speech Perception

- 2 months of age: discrimination of phonemes
  Eimas, 1971
- 6-8 weeks of age: can discriminate changes in pitch contour
  Morse, 1972

Speech Perception

- 4 months of age: infants are sensitive to prosodic marking of phrasal units
  Jusczyk et al., 1992

Language Specific Filter

- A clear preference for native language
- Critical for the development of speech and language

Language Specific Filter

- Consider the example of a second language learner
  - Native Japanese speaker can not make the r/l distinction
  - This difficulty persists even with direct instruction

Language Specific Filter

- Consider the example of a second language learner
  - Research has shown that exposure to intensive and exaggerated speech samples across multiple speakers, the distinction can be taught.
  - All that was necessary was creating the right "listening experience"

Speech Perception in ASD

- Study found 2-3 year old children demonstrated a marked reduction in the attention to child directed speech (Paul et al., 2007)
- Reduced attention to speech affects the development of speech perception skills

Speech Perception in ASD

- Some individuals with ASD show diminished left hemisphere brain activity for speech and speech-like complex sounds (Badaert, et al., 2003)

Speech Perception in ASD

- In order to adequately process speech, a listener must be able to extract relevant invariant features of sounds while ignoring details or irrelevant information

Speech Perception in ASD

- Some evidence that children with autism may have enhanced aspects of auditory processing in areas such as pitch memory, pitch discrimination, and loudness.

Speech Perception in ASD

- The problem is that children with ASD may over focus on these irrelevant aspects of speech and actually mask the critical invariant features. (Lepisto, et al., 2008)

Phonology

- Direct link between speech perception and the development of phonology
- Spoken word production requires internal representation of phonological structure

Phonology vs. Articulation

- Articulation involves the actual physical production of sounds
- Phonology is best described as the sound system of the language and how these sounds fit together to form words

Phonology vs. Articulation

- The phonological level is in charge of the brainwork that goes into organizing the speech sounds into patterns of sound contrasts so that we can make sense when we talk.
- Phonology is necessary to both develop the categories of speech sounds but also the rules of relationships of these sounds

Receptive Language Development

- Clear evidence of a very large receptive vocabulary prior to any expressive speech
  Benedict, 1979

Receptive Language Development

The development of phonology may be dependent upon the analysis of speech from receptive vocabulary

- "lexical restructuring hypothesis"
  - As child's vocabulary develops, changes take place in the phonological information

Receptive Language

- Problems with the development of receptive language has been described as a "red flag" for autism
- Children with speech delays often demonstrate expressive speech deficits with intact receptive language. This is often the opposite in children with ASD.

Implications

- Underlying speech deficit may be a result of:

Severe Cognitive Delay

Failure to Parse the Input

Failure to Attend to the Input

Cognitive Delay

- Should see global delays across ALL programs
- Would not see spikes in visual programs such as matching, sorting, etc.

Receptive Language

- Critical for the development of verbal speech
- Some learners are able to master one concept commands in isolation but fail when put in discrimination
- Many of these learners rely on highly developed visual skills

Intonation Prompts

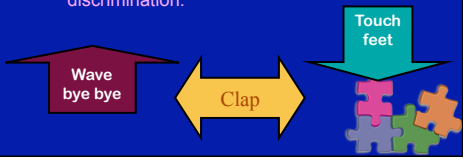
- Utilize suprasegmental (intonation) features as a cue to promote attending to segmental features (speech)
- Select 3 commands and create three distinct corresponding intonational patterns
- Programming must be consistent and fading must be systematic

Case Study

- Prior data revealed success with one concept command in isolation. Child could not follow two one step commands when presented in discrimination
- Evaluation of other programs revealed strong matching and sorting skills as well as good non-verbal motor imitation

Case Study

- Program
  - Step One:
  - Three one step commands introduced in discrimination:



Case Study

- Program
  Step Two:
  - Fade intonation when all three are mastered
  - Fade intonation one command at a time

Receptive Object Identification

- Some children can master one step commands but continue to struggle with receptive object identification
- May be something about the instruction that they can not comprehend

Receptive Object Identification

- Consider dropping the Sd
- Consider object related commands

Object Related Commands

- This is a viable option for learners who can follow 10-12 one step commands yet can not discriminate objects receptively
- Insert objects into the one step command program

Object Related Commands

- E.g.:
  - Stand up
  - Clap
  - Jump
  - Push car
  - Drink juice
  - Read book
  - Put on hat

Object Related Commands

- Intersperse new object related commands with simple one concept commands
- After 5-6 object related commands, begin to fade the action phrase, leaving only the object
- Gradually introduce “touch” or “give me”

Promoting Speech in Non-Verbal Children with ASD

- While match to sample is the most preferred strategy to promote speech in learners, there are some children who require additional prompts to produce sounds
- Prompting sounds effectively requires a knowledge of how sounds are produced to begin with

Some Common Mistakes

- Voiced vs. voiceless
- Vowel production
- Blends and dipthongs

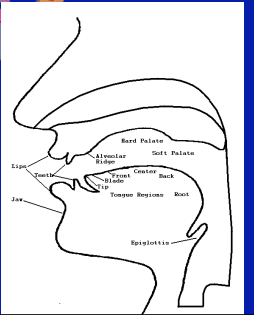
Voicing

- Voiced final consonants are not released, therefore not fully produced.
- Perception by the listener is made due to the oral cavity as well as the duration of the vowel preceding the final consonant as opposed to the actual production of the phoneme.

Voicing

- Verbal imitation programs, however, frequently prompt the release, thereby having the child produce the words with an additional schwa at the end of the word.

Big vs. Bic



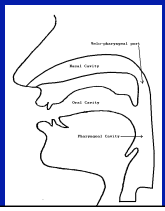
Back of the tongue is up against the soft palate at end of production for both but the duration of the production of the /I/ phoneme is longer when followed by the /G/

Intervention

- Consider prompting an exaggerated vowel length for CVC words with voiced final consonant.
- Prompt the voiceless cognate as opposed to the voiced

Vowel Production

- Changes in the oral cavity can be made by using lips, tongue, velum, etc.



Many people mistakenly believe the lips are the primary articulators for the production of vowels such as o or e

House's Vowel Quad

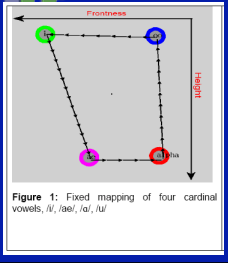


Figure 1: Fixed mapping of four cardinal vowels, /i/, /ae/, /a/, /u/

Research, however, indicates that the tongue placement is the critical factor in ALL vowel production

Failure to address tongue placement in vowel production drills will result in neutralized vowel production

Diphthongs

- A diphthong is actually two sounds chained together
- Examples:
  - Hi ahhh and eeee
  - Boy awe and eee
  - Say a and eee
  - How ahh and uuu

Teaching diphthongs requires the acquisition of the component sounds and then the implementation of a chaining program

Speech Production

- Knowledge of anatomy and physiology of sound production is essential to develop effective prompts
- Specifically, knowledge of manner, place and voicing

Vocabulary

Vocabulary Development

- Large receptive vocabulary precedes expressive vocabulary
  Benedict, 1979
- Babies can understand 50-100 words by 12 months of age
  Fensen, et al., 1994
- Typical children learn approximately nine new words a day from 18 months of age to six years of age

Challenges to Word Learning

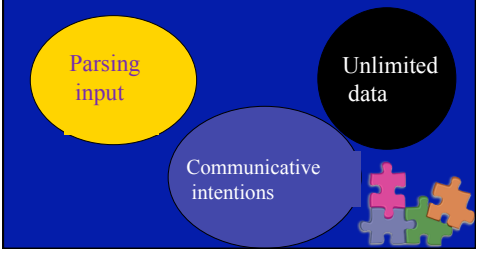
"Word learning is a serious problem of induction, requiring the young word learner to select from infinite possibilities"

Quinne, 1990

Early Word Learning

- The relationship between words and referents is arbitrary
- A very young child makes a quick judgment about a what a word might be when forced with novel words.
- By 16 months of age, not only will an infant know that a cat is a cat but will also know that calling it anything else is incorrect.

Challenges to Word Learning

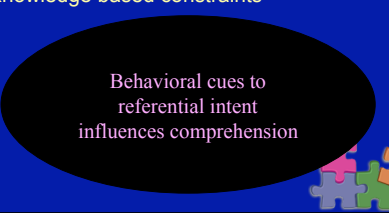


Word Learning Research

- Joint Attention: by 9 months of age, children can follow line of referencing, gestures, pointing and gaze
  Baldwin, 1993
- Learning words and interpreting meaning may facilitate acquisition of insights into other's knowledge states
  Baldwin & Moses, 1996

Word Learning Research

- Knowledge based constraints



Knowledge Based Constraints

- Looking where someone looks
- Looking where someone points
- Speakers intentions

Word Learning Research

- Word learning constraints (default assumptions)

Operate as default assumptions and can be overridden given counter evidence *(Markman, 1989)*

Word Learning Constraints

- Whole object principle: a novel object is likely to refer to the whole object, not its parts, substance or other properties
  Markman, 1990

Word Learning Research

- By preschool, children rely on:
  - world knowledge
  - word knowledge
  - speaker intention
  - syntax
  - Morphology
- At this point, the child must be able to detect patterns in the environment

Treatment Implications

- Discrete trial instruction for early word learning is important to address:

Failed joint attention

Overselectivity

Treatment Implication

- Probe for natural word learning
  - Fastmapping
    (Carey, 1978, Dollaghan, 1987)
  - QUIL (Quick Incidental Learning)
    (Rice & Woodsmall, 1988)
  - More natural word learning may play a significant role in developing theory of mind

Fastmapping

Give me the "deek"

The Lexicon

- "Mental dictionary"
- Contains all information we know about a word, including:
  - How it sounds
  - It's meaning
  - How it appears when written
  - How is it used in a sentence

Theories about how the Lexicon is Organized

All models assume a two stage process in lexical access of specific lexemes:

(1) Semantic & syntactic information.

(2) Phonological information.

Two Stage Process

- When figuring out which word to use when attributing a mental representation,
- 1. meaning is retrieved
- 2. corresponding sounds are joined
- The word is spoken

- Where in the selection chain there is a break will determine whether errors are due to semantics or phonology

Example

Paperclip → early interruption → scissors

Paperclip → late interruption → "paper" or "kaperclip"

Role of Vocabulary in Language Processing

- Common words are recognized faster than uncommon ones - or the *frequency effect*
- *Words in context are recognized faster than out of context words - or the context effect*

The Lexicon

- The strength of connections depends on the magnitude of activation occurring on a particular connection and between particular representations.
- The more activation occurs on a connection the stronger it gets and the faster the processing on that connection.
- High frequency words result in greater magnitude of activation than low frequency words
  - They possess stronger connections and their processing requires less time

Autism and the Lexicon

- Reduced use of language results in reduced connections as well as strength of connections
- Failure to benefit from linguistic context contributes to slowed activation

Semantic Deficits in ASD

- Failure to employ semantic information to aid encoding of verbal information
  Bowler, Matthews, & Gardner, 1997
- Tendency to employ syntactic word order strategies rather than semantic comprehension strategies in interpreting connected speech
  Paul, Fisher, & Cohen, 1997

Semantic Deficits in ASD

- Failure to interpret words according to semantic context
  Minshew & Rattan, 1992
- Tendency to produce less prototypic exemplars of categories than typically developing children on word fluency tasks
  Dunn, Gomes, & Sebastian, 1996

Semantic Deficits in ASD

- Some evidence of atypical lexical organization
  (Gerenser & Schwartz, 2004: Dunn & Bates, 2005)
- Some evidence of impoverished lexical representation
  (Gerenser & Schwartz, 2004)

Treatment Implication

- Building fluency
- Flexible meanings and multiple meanings
- Expanding representation
  - Category programs
  - Semantic maps
  - Association drills

Flexibility

- Flexible use of vocabulary
  - Place ten to fifteen pictures on the table and have learner retrieve item given a variety of names (e.g., give me the shoe, give me what you wear, give me the clothing, etc.)
  - Also, put written word cards on the table and have the learner retrieve them from definitions

bank ball star

Fluency

- Fluent use of vocabulary
  - Accuracy of receptive and expressive naming is insufficient. Fluent receptive and expressive drills should be included to strengthen representation.

Defining Mastery

Mastery

- % Correct
- Or
- Speed/frequency measures

% Correct

- Two individuals participate in a receptive labeling program. Both label 9/10 pictures correctly. Do they demonstrate the same level of competence?
- What if it took learner A only 1 minute to respond to task and learner B took 10 minutes? Do they still demonstrate the same level of competence?

% Correct

- Two readers read a passage and make no errors on the passage (100 % accuracy of word recognition). Are they both at the same reading level?
- What if Reader A was able to read 40 words per minute and Reader B was able to read 100 words per minute?

Speed/Frequency Measures

- Measures ability to perform quickly and without hesitation
- Competent performance is a fluid combination of accuracy plus speed
  Binder (1996)

Fluency Instruction

- Comes from the Precision Teaching Literature
- Vital outcomes of fluency include:
  - Retention
  - Endurance
  - Application
  - Stability

Retention

- Demonstrating competence after long periods without instruction
- Evidence that good retention is correlated with fluent performance

Endurance

- The ability to perform a task for long periods of time
- The ability to perform the task with few errors over long periods of time

Stability

- The ability to perform the task in less structured environments
- The ability to perform the task in highly distracting environments

Application

- Generalization of skill to novel stimuli
- Putting component skills together to form a composite skill

Critical Aspects of Word Learning

- Accuracy
- Rate
- Field

Critical Aspects of Word Learning

- Accuracy — Must first acquire the skill accurately in untimed condition
- Field — After mastered in simple field of 3, increase field size to 6-8 (gradually…or not, depending on the learner)
- Rate — After mastery in expanded field, target fluency aims
- Field — Systematically increase field within fluency drills

Why is Fluency Critical

- Receptive and expressive object identification are key component skills for much of the remaining language and communication skills
- Speech is highly transient and fluent behavior is critical
- Communication happens FAST.

Some Simple Steps

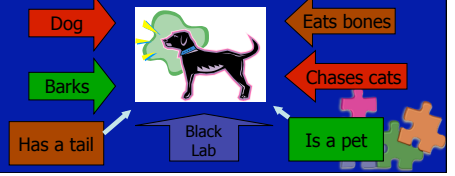
- Establish some simple fluency aims for your age group (e.g., # of objects identified in a 20 second time period by a typical 2 ½ year old)
- Pre-prepare materials (e.g., list of words; picture boards)

Issues to Consider

- Sometimes you have to teach the concept of "fast"
- Work your way up to your fluency aim by gradually setting targets
- Don't correct errors but record them

More on Vocabulary

- One theoretical assumption about a learner with autism is that he or she has impoverished representations



Last Words on Vocabulary

- Functional vocabulary
  - A learner must know "enough" about topics to allow for conversations to move beyond "rote" scripts.

home plate
double play
bat
first base
baseball
outfield
batting average
error
Johann Santana
home run
infield
world series
glove

Categorization

- Categories are vehicles for applying information in new circumstances
- Systems for simplifying the environment
- Helps us store and retrieve information efficiently
- Provides information that goes beyond the knowledge we have about an object

Theories of Categorization

- Classical view: for any given category, we can specify the necessary and sufficient criteria that defines the category
  Smith, Shoben, & Rips, 1974
- Family resemblance/prototype: children learn good exemplars faster then poor ones
  Rosch, 1975

Category Research

- Research on brain damage
  - category specific deficits
    Hardt, Berndt & Camarazza, 1985
- Lexical Organization
  - priming research
    Meyer & Schaneveldt, 1972; Forster, 1981

Autism

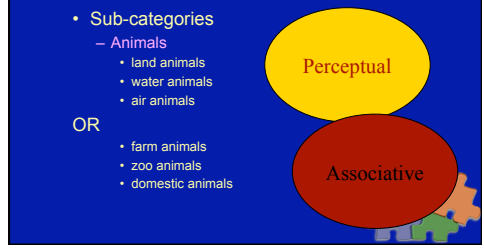
- Categorization strategies
  Klinger & Dawson, 1995
- Lexical organization
  Gerenser & Schwartz, 1999; Gerenser & Schwartz, 2003

Categorization

- Sub-categories
  - Animals
    - land animals
    - water animals
    - air animals

OR

- farm animals
- zoo animals
- domestic animals



Categorization

- Introduce Flexible Categories
- Generating Category Membership
- Inferring Category Membership

Generating Category Members

- Move to conditional membership
  e.g., “tell me some small animals” or “tell me some foods you eat for breakfast”
- Naming category
  e.g., “dogs, cats, bears …are all what?”

Moving beyond simple representations

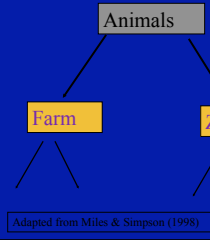
- Teaching multiple exemplars
- Using visual strategies
- Using obsessions to expand repertoire of language

Visual strategies

- Semantic maps
- Diagrams
- Charts

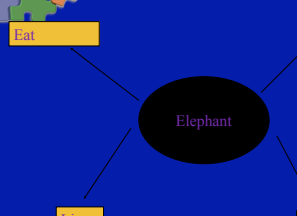
Adapted from Myles & Simpson (1998)

Semantic Map



Adapted from Miles & Simpson (1998)

Semantic Map



Adapted from Miles & Simpson (1998)

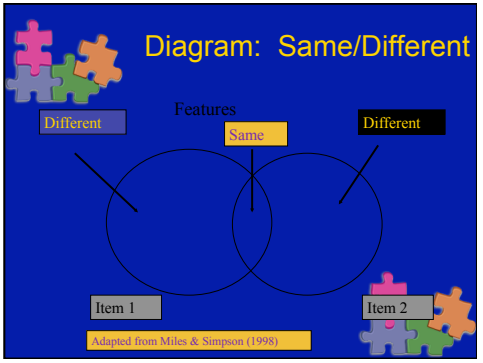
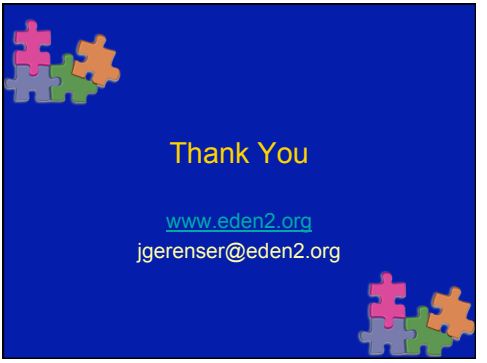


Diagram: Same/Different
Features
Different
Same
Different
Item 1
Item 2
Adapted from Miles & Simpson (1998)


Thank You
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