Joint Attention and ASD: Enhancing Language and Social Competence

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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)

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)

Joint Attention

- Proto-imperative
  - Requesting with gestures or eye gaze

- Proto-declarative
  - Commenting or sharing interest
  Bates (1976)
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)

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’Entremont (2000)

Joint Attention

• By 4 months of age, cueing of an object through adult gaze significantly enhances object processing
  Reid, Striano, Kaufman, & Johnson (2004)

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

• 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)
Joint Attention

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

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*

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*

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”
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

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

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
  Scheinkopf et al. (2004)
Joint Attention and Social Competence

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

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)

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)

Autism

- Children with autism appear to demonstrate deficits in joint attention early in development and remain persistent throughout development
  - Mundy, Sigman, & Kasari (1994)
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)

Early Development

- In the 1970s and 80s autism was typically not diagnosed until the child was 3 or even 4 years old

- By the 90s, children were being diagnosed by 2-2 ½ (although 3-4 continues to be the norm in parts of the country and world)

- Today, in some cases children can be diagnosed as young as 12 months of age

Changes in Research

- Research on the early years of children with ASD back in the 70s/80s was generally limited to parent recall

- Since children were typically not identified until 3-4 years of age, parents had to recall behavior from 2-3 years earlier
  
  – One of the major problems with this was that the symptoms of ASD are not ones of behaviors being present but rather ones of behaviors being absent

Changes in Research

- In the early 1990s, Dawson and colleagues conducted a study using video tapes of young children who had a diagnosis of ASD

- This was the first opportunity to actually see the behaviors of very young children with autism
Changes in Research

- More recently, the BABY SIBs projects that are happening across the country allow for even better observations of early behaviors.
- Infants born to families with ASD already present get tracked at various sites on a monthly basis.

One Year Well Baby Check-Up Approach

- Pierce et al. (2011)
- Distributed the Communication and Symbolic Behavior Scales Developmental Profile Infant Toddler Checklist was distributed for the 1 year check up to a group of pediatricians.

- Protocol had an estimated positive predictive value of .75.

One Year Well Baby Check-Up Approach

- 10,479 infants were screened.
- 184 infants who failed screening were evaluated and tracked.

Results
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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Eye Gaze Research

- Pierce et al. (2010)
  
  Found that infants as young as 14 months of age who would eventually receive a diagnosis of autism looked at shapes as opposed to children.
  
  The reverse was true for the 51 typically developing children
  
  If a toddler spend more than 70% of the time looking at the shapes, the probability of accurately classifying that toddler as having an autism spectrum disorder as 100%
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)

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

Affective/Social Orienting Model

- A deficit in these systems contributes to the social and cognitive disturbances in autism
  Dawson & Lewy, 1989; Mundy, 1995

Affective/Social Orienting Model

- Disturbances in joint attention involve in part impairment that involves frontal cortical processes
  Mundy et al., 1999
Affective/Social Orienting Model

- In this model, the types of functions proposed by the ToM model and the executive function model rely on cognitive maturation and information not likely to be fully available in the first 12 months of life when joint attention skills develop. Mundy & Stella, 2001

Affective/Social Orienting Model

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

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

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
Implications

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

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)

Mundy, 1995
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.

Summary

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

Intervention Research

- A number of interventions, including milieu teaching, developmental approaches and behavioral approaches have been used to teach joint attention behaviors

JA and ASD

- Research has shown that JA behaviors can be taught to learners with ASD
  - Kasari, Freeman, & Paparella (2006)
  - Vismara & Lyons (2007)
  - Kasari, Paparella, Freeman, & Jahromi (2008)
JA Intervention

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

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

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

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)
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

Issues

- RJA and IJA may reflect unique and differentiated aspects of executive functions
  Vaughan Van Hecke et al. (2007)

Intervention Research

- Results indicate that simple environmental manipulations only resulted in modest gains and that direct instruction is often necessary
  Jones & Carr, 2004

Building Social Motivation

- Establish adult as generalized reinforcer (Repeatedly pair with powerful reinforcer)

- Use highly interesting stimuli (strong child preference)
  Jones & Carr, 2004
Building Social Motivation

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

Jones & Carr, 2004

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

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

Implications for Intervention

- The learner should make eye contact naturally when being addressed
- The learner should follow speakers with gaze when interacting with more than one person
Eye Contact

- Formal “look at me” program
- Use of token boards to cue looking

Eye Contact

- DR of spontaneous looking
- Define correct response to include eye contact

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

Eye Gaze Alternation

- Explicit instruction on eye gaze alternation
- Prompt behaviors as needed
- Use highly preferred items and introduce suddenly
- Occasionally change up presentation
**Eye Gaze Alternation**

- Remote control toys work great.

**Additional Programs**

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

**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

**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
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

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

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

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
Considerations for the Older Participant

- Teach appropriate social responding
- Teach skills that will attract social contact from others
- Teach compensatory skills

Thank You

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