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Prediction of Communication Risk Before 12 months with the ISCBS: Group Outcomes at 3 Years

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Background

- Most current assessments measure early communication beginning around 9-12 months, and very little is known about early signs of atypical development prior to this age group
- The amount of communicative interaction an infant engages in (i.e., dyadic reengagement, rate of joint attention, rate of communication, and parental response contingency) correlates to receptive and expressive language at 30-36 months of age (Brady et al., 2004; McCathren et al., 1999; Schuymer et al., 2011).
- Poor use of social-communicative behaviors (i.e., pointing and waving/nodding, gesture use, joint attention, sharing interest, giving/showing, gaze/point following, requesting attention) and oral/manual motor skills at 12 months have been associated with later autism diagnosis (Gernsbacher et al., 2007; Veness et al., 2012).
- An infant assessment is needed that includes a broad range of temptations for testing multiple sub-domains of communication in very early communicators (Iacono, Waring, and Chan, 1996).
- The Infant Social and Communication Behavior Scales (ISCBS) is an assessment of early communication that is:
 - Based on research-based predictors of communication
 - Standardized for infants 2-12 months of age, in the process of norming
 - Applicable for pre-intentional communicators of any age
 - Scored using modality-independent behaviors
 - Assessed with practical dynamic/interactive temptations
 - Including formal AAC and literacy activities
 - Including multisensory and social temptations
 - Detailed in information on multiple communication skills
 - Appropriate for planning and tracking intervention progress
 - Discriminative between typical and at-risk development

Research Questions

- Does the ISCBS discriminate infants between 2-8 months who later demonstrate communication impairments (at 3 years) from those who do not?
- Which ISCBS communication behaviors and/or domains distinguish infants with communication risk from preintentional infants with typical development?

Participants

106 infants at 2-12 months (mean = 6.63 months, s.d. 3.5) = 98 with no known risk factors at birth, 5 premature, 2 with severe physical impairments, and 1 with deafness and cochlear implant at 18 months.

By age 3, 61 children were within typical limits with no clinically significant risk, including 3 of the premature infants.

Out of 106 children, 27 had the following diagnosed disabilities: 10 had language and/or speech disorders, 7 had ASD, 5 had behavioral disorders, 3 had physical/sensory processing disorders, and 2 had complex communication needs/AAC.

An additional 18 children had low MLUs at least 1 s.d. below age expectations with no specific diagnosis.

Procedure

- Infant – Administration at home: 18 different ISCBS social, toy, and communicative temptations, and the Battelle Developmental Inventory
 - Coders scored presence or absence of 31 possible infant behaviors for each temptation administered in the ISCBS. Each raw score was converted to a ratio score.
 - ISCBS behaviors scored by temptation were grouped into eight domains of social and communication skills: emergent communication, affect, attention, engagement, anticipation, reciprocity, mastery, motivation, and exploration.
- Follow-up at 3 years - Administration at home of:
 - Mullen Developmental Scales,
 - Clinical Evaluation of Language Fundamentals, Preschool (CELF-P),
 - Goldman-Fristoe Test of Articulation-2/Khan-Lewis Phonological Assessment-2,
 - Vineland Adaptive Behavior Scale,
 - Autism Diagnostic Observation Schedule, Second Edition (ADOS-2),
 - Language samples with parent and experimenter, including SALT analysis

Group Results & Discussion

An ANOVA analysis shows significant post-hoc comparisons with combined categories for the following disorders: a) physical/sensory disorders and behavioral disorders (PSBEH), and b) Speech/language disorders and low MLU (SLMLU). Additional ISCBS variables of interest were derived from significant t-tests between target groups.

1. Subgroup Differences: Children with Autism (n=7)

ANOVA: Less vocalizing than children with speech/language issues

- Less attending to voice than all other groups
- Poorer gesture imitation than TD and low MLU groups
- More negative affect directed to objects than TD and PSBEH groups
- Better response to “where’s mom/dad” than TD or SLMLU groups
-

Significant variables of interest:

- Less positive affect toward objects than BehDis or TD
- Less positive affect toward people than TD or SL disorder
- Less taking one turn than BehDis, or taking 3 turns than TD
- Less imitating a play action than TD or SL disorder or Low MLU
- Poorer vocal imitation than TD, SL disorder or low MLU
- Poorer vocal complexity than TD or low MLU
- Fewer gesture types than TD or low MLU
- Poorer targeted play actions than TD (e.g. stacking, in/out play)
- Poorer visual tracking and object permanence than TD

Impact for Children with ASD:

- Children with ASD shower poorer amount and quality of vocalizations as well as attention to others’ vocalizations, consistent with other research patterns before 12 months. Vocal patterns were notably worse than children with speech/language impairments, and may discriminate these groups at early ages.
- Significant reciprocity difficulties were seen in gesture, vocal, and play action imitation as well as taking any 3 turns in interaction, showing a consistent pattern with that shown in later childhood.
- Emotional concerns were shown in less positive affect toward people or objects and more negative affect toward objects, but gaze behaviors themselves were not impaired in most contexts. A combination of gaze and intent factors may distinguish infants at risk for ASD.
- Most early play schemes were within typical limits (e.g. banging), but poor targeted play may reflect early fine and/or gross motor limits often associated with infants with ASD.
- Limited visual tracking, object permanence, and gesture types may reflect a combination of language, cognitive, and social issues affecting early behavior of infants with ASD.

2. Subgroup Differences: Children with S/L disorder (n=10) and/or Low MLU (n=15)

ANOVA: **More** vocalizing in SL or SLMLU than TD or ASD groups

Significant variables of interest:

- Fewer gaze shifts and intentional communication in social contexts (SL) than TD
- **More** attend to and increase activity with quiet object, also look/act expectantly in social contexts (SLMLU) than TD
- Less imitation of play action than TD
- Less functional play, symbolic play, or object permanence than TD

Impact for Children with S/L Disorders or Risk:

- Infants with speech/language disorders or risk may make frequent use of vocalizations to engage listeners socially and compensate for less access to gestural communication.
- Infants with S/L disorders may take advantage of person-directed behaviors such as acting expectantly in social contexts to elicit partner behaviors to compensate for poorer skills at integrating object and person information within interactions using gaze shifts.
- Impaired skills in functional/symbolic play, object permanence, or play imitation may reflect general symbolic delays in children’s development associated with language impairment.

3. Subgroup differences: Children with Physical/Sensory (n=3) or Behavioral Disorders (n=5) or combined (PSBEH)

Significant variables of interest:

- Poorer intentional communication and gesture imitation in PSBEH than TD
- More vocalizing and taking one expected turn in PSBEH than TD
- Better spontaneously monitor adults in BD and PSD than ASD
- Better ability to modify behaviors at barriers in BD than ASD

Implications:

- Gesture skills are poorer in infants with PSBEH even without other indications of general language or cognitive delays, indicating possible difficulty integrating contextual factors
- Children with BD show more effective or active problem solving in play and/or use of vocalizations than children with ASD or TD.
- Infants with behavioral disorders show better awareness of people’s actions in their environments than children with ASD, indicating better social monitoring or “radar”.

Clinical Implications

- These pilot results with only 5-6 infants per disability group (ASD and LI) show promising indications of identification of communication risk in infancy, consistent with characteristics associated with older children who have those disorders; ongoing research includes 3 larger norming cohorts of 100 infants each, which should provide more definitive risk factors
- Children who who had no diagnosed disability but low productive MLU scores showed significant differences in some infant skills than TD peers, and looked more like children with LI.
- Pilot results suggest that identification of risk factors is best determined separately for infants with different outcomes; risks may be obscured when grouping all children with disabilities together
- It is possible to gain useful information about communication risk from children younger than 6-8 months using the ISCBS standardized play-based communication assessment.

ISCBS Collaborators

- Brookes Publishing Co.
 - Melissa Behm (Executive Vice President)
 - Astrid Zuckerman (Acquisitions Manager)
- University of Arizona
 - Darrell Sabers (research methodologist)
 - Amy Olson (research methodologist)
- Florida State University
 - Amy Wetherby (CSBS developer, ISCBS consultant)

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