

## **Characteristics of Intentional Communication in Young Children with Physical Impairments**

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Presentation at International Society for Augmentative and Alternative Communication Conference, Washington DC, Aug. 2000

### I. Background

- Past research has shown both linguistic and nonlinguistic environments differ for children with severe handicaps from those environments for typically developing children (Koenig and Mervis 1984).
- Characteristics of prelinguistic communicative behavior have been described for children with Down Syndrome, cognitive impairments as well as late talkers (Weitzner-Lin 1997, McLean, Brady, McLean & Behrens 1999, Brady, McLean, McLean, & Johnston, 1995, Thal & Tobias 1992, 1994).
- To date little research has explored the prelinguistic communication behaviors of children with a primary diagnosis of physical impairments (PI) (Pinder, Olswang & Coggins 1993, Pinder & Olswang 1995).

II. Research Design, A. Purpose. This longitudinal study was designed to assess early communicative behaviors among young children who had a primary diagnosis of physical impairments at risk for being nonspeaking.

B. Research Hypotheses: Children with physical impairments will:

- demonstrate fewer acts of joint attention and more sociability than typical developing children.
- use fewer gestures combined with vocalizations.
- use fewer and less varied vocalizations and words than typical developing children.
- demonstrate more respondent acts and fewer initiated acts.
- use more repetitions than modifications as repair strategies when faced with a communication breakdown.
- communicate at a rate slower than typical developing children.

C. Subjects • Thirty-three children demonstrated sufficient intentional communication to complete Communication and Symbolic Behavior Scales (CSBS) (Wetherby & Prizant, 1993) for at least 1 session.

- 12-25 months corrected for prematurity at the start of the study and 30-42 months at the end.
- Primary diagnosis of physical impairment and were at risk for being nonspeaking.

D. Methods:

- The children were followed for a period of 18 months and received a variety of assessment and trial AAC intervention activities in their home.
- The CSBS examines 22 categories relating to communication, symbolic and social skills.
- Standard temptations included: a wind up toy, bubbles, peek-a-boo, walk-mouse (tickle), blocks in a box, cheerios in a jar, toys hidden in a bag and books.
- Some modifications were necessary due to the children's physical impairments.

**ACKNOWLEDGEMENTS:** Supported in part by research grant #1 K08 DC00102-01A1 from the National Institute on Deafness and Other Communication Disorders (NIDCD), National Institutes of Health. The authors also appreciate the critical contributions of all of the families and children that participated in these research activities.

### E. Modifications of CSBS for children with PI

- Child positioning and support
- Toy manipulation & assistance (e.g. no grasp & release)
- Adapted play materials, routines, and books
- AAC strategies available & recognized (e.g. signs, symbols, behaviors)
- Unconventional types of gestures and sounds (e.g. lip smacks, head lean)
- Adult cueing/response associated w/ AAC (e.g. scanning, attention cues)
- Separate reliability for individual children (e.g. eyepointing)
- Scoring responsivity when the child began act or posturing w/in 3 seconds
- Allowing gestures, vocalizations, and looks to be slightly sequential.
- Additional or substitute temptations: Cheerios in jar: Feeding and swallowing problems, Balloons & some pretend play toys: Latex sensitivity, Bubbles, windup toy, toys in bag: Visual processing difficulty, Blocks & various small toys: Grasping & manipulation difficulty, Peekaboo, Walk Mouse: Older children too familiar with these routines
- Alternative behavior regulation, joint attention, or social routines
- Variable order & timing of temptations (e.g. fatigue, distractions)
- Trial AAC strategies as needed preceding CSBS trials (“mean old lady”)
- Possible “weighting” of scores if less than 5 temptations possible

### III. Results & Discussion: A. Planned comparisons to CSBS published norms

*1. Hypothesis confirmed:* Children w/PI show fewer joint attention acts and more sociability.

- Children w/PI produced as many behavior regulation acts as expected by last sample.
- Children w/PI produced fewer joint attention acts at the first sample, and consistently more sociability at both samples than expected. Both sociability and joint attention increased.
- Children w/PI produced consistently fewer gaze shifts at both samples.

*Within-Group Trends:* Behavior Regulation: Transitional (one-word) communicators increased their behavior regulation production to the highest category of scaled scores by last sample.

Joint Attention: Only skilled communicators (multiword) showed relative increase in JA

Sociability: All language stages showed increase in sociability over time, with the greatest increase for skilled (multiword) communicators.

Gaze Shifts: The more skilled communicators did not show a relative increase in gaze shifts over time; only poor communicators increased their use of gaze shifts.

*2. Hypothesis confirmed:* Children w/PI showed less gestures & vocalizations together.

- Children w/PI in the first sample produce less G+V Coordination than TD children, particularly evident among prelinguistic groups. Multiword children at the last sample produced comparable amounts of G + V coordination as TD children.

Children at both samples produced fewer conventional gestures than TD.

Children at last sample relied more on distal gestures than TD children, primarily evident in a relative emphasis on distal gestures for multiword children over norms.

*3. Hypothesis not confirmed:* Some children with PI showed more frequent vocalizations, although more restricted productive repertoires.

- Children w/PI who were prelinguistic or early one-word produced more vocalizations that expected from CSBS norms at either first or last sample.

- While children w/PI in the last sample produced amounts of consonants, syllables & multisyllables approaching TD norms, these numbers were highly variable across individual children and not compared statistically as group data.

4. *Hypothesis confirmed*: Children with PI were more likely to be respondent.

- Children w/PI at last sample produced more respondent acts than TD norms.
- Children who were less skilled communicators (prelinguistic and one-word) tended to be the children that increased their responsivity.

5. *Hypothesis not confirmed*: Children with PI tended to show more modifications than repeats when repairing communication breakdowns.

- Children w/PI produced fewer total repairs than expected for TD children, but produced more modify than repeat actions when repairing breakdowns.
- Anecdotal observation: Skilled communicators often showed very long lags between communicative acts and repairs – since they clearly anticipated the desired action, there may be less cost/benefit of producing a repair even when feasible.

6. *Hypothesis partly confirmed*: Children with PI showed a slower overall rate but only some patterns expected for children of similar language stages.

- Children w/PI showed slower communication rate than TD, which increased with language stage. However, children w/PI showed internally consistent patterns where more skilled communicators were faster. Rate may still indicate relative communicative skill.

#### B. Developmental patterns for nonspeaking children with PI

- Children who remain at the *prelinguistic* stage from 1<sup>st</sup> to last sessions tend to show: Slower rate of change in behavior development over time, Less gesture + vocalization coordination, but plenty of vocalizations. Possible “passive” communication patterns: increase gaze shifts, increase respondent acts (depend on adult cues), decrease reliance on communicative repairs over time, best communication in social routines w/ adults.
- Children w/PI who are *transitional* communicators tend to show: More behavior regulation, Poor gesture + vocalization, Communicative rates considerably poorer than TD children.
- Children who become the most *skilled communicators* tend to show: Increased joint attention, but not necessarily in gaze shifts, Continued reliance on vocalizations and distal gestures more than typically developing children, possibly to compensate for difficulty expressing words. Some possible passive strategies: anecdotal lag in repair initiation, responsive communication.

#### C. Summary: Differences & Clinical Implications for Children with PI:

*Communicative Function*: • If children produced joint attention behaviors, they tended to be more skilled communicators. This may provide an alternative perspective of communicative skill separate from rate or vocal production that is influenced by physical ability. Poorer communicators may have insufficient social benefit to offset motoric cost of these acts.

- While children w/PI tend to produce some gaze shifts that support joint attention development, 3-point shifts may be limited by difficulty in head/eye control. Behavior regulation & social interaction are hypothetically less dependent on 3-point shifts. Skilled communicators seem to be able to develop joint attention acts without more gaze shifts.
- Children w/PI tend to rely on social interaction and routines at all stages more than would be expected for typically developing children. Children are more likely to show their “best”

communication in the context of a familiar routine, which may be unconventional, and AAC should emphasize social routines to introduce new strategies.

- We need to teach joint attention skills as event-based communication, particularly using independently active toys or in the context of social interaction. It's difficult to demonstrate many types of joint attention acts without symbolic communication, so we need to provide AAC support for joint attention early (e.g. "what's that").

*Gesture/Vocalizations:* • Skilled PI communicators gradually increase their amount of coordinated gestures & vocalizations to approximate that of typically developing children, while prelinguistic communicators are significantly poorer than norms. This may be related to both physical control and cognitive processing skills, and coordinated acts are particularly important for skilled nonspeakers who rely less on complete verbal expression alone.

- Skilled nonspeaking communicators continue to rely on distal gestures more & longer than TD children, and use of distal gestures may be a sign of communicative skill rather than immaturity. Since conventional gestures are relatively complex movements, it is not surprising that children with PI rely on different types of gestures than TD children. This suggests that early AAC intervention emphasize idiosyncratic or unconventional communicative gestures as effective communication strategies through early childhood.

- Poor communicators do not consistently use distal gestures and may rely on vocalizations, which may be hard to interpret. Skilled and poor communicators using AAC continued to vocalize as much as TD, which supports that AAC does not interfere with vocal development.

*Initiations: Respondent Acts, Repairs, and Rate:* All three factors are consistent with patterns in older children relying on AAC who show passive communication styles.

- TD children may produce an appropriate balance between initiation and response, but children w/PI may rely too much on respondent acts (esp. poorer communicators). Some AAC strategies like partner-assisted scanning or yes/no questions require responsive strategies as appropriate communication. However, children relying on AAC are at risk for passive interaction styles and need support to independently initiate communication.

- When children produce communicative repairs, they tend to use relatively complex strategies of modifying their actions. Even though children with PI produce fewer repairs than expected for TD children, this may occur when they recognize that an initiated act should be effective and a second act has too high cost/benefit to produce without need.

- Slower rates with increasing communicative skill may result from children's effort to be explicit in their communicative messages. However, slower communication increases the risk that listeners will shift attention or reduce their response to the child. Rate vs. explicitness is a dilemma for augmented communicators of all ages.

- What might help to overcome a tendency for passive communication styles? Further research is addressing mastery motivation and partner/environmental factors that promote persistence and creativity in communication for children with PI.

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