STABILITY OF VOCAL REPERTOIRE IN TWO OLDER NON-VERBAL CHILDREN WITH AUTISM

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Abstract

Few studies have investigated the nature and temporal evolution of vocalizations produced by older non-verbal children with autism, although these vocalizations might be important as precursors of speech. Previously, we (Boner et al, IMFAR, 2004) reported a retrospective analysis of spontaneous vocalizations of AI (at age 12) and SR (at age 8). Some speech patterns were consistent with those of typically developing infants, yet some deficits suggested impairments in specific muscle groups used in sound production. The current study examined recordings from the same two subjects for any changes after a four-year interval, following participation in different training programs. Results to date show that AI, who was in the process of becoming verbal as the result of an intensive speech-training program (see O'Grady et al., IMFAR 2005), showed an increase in the number and complexity of sound and syllable types produced. SR, in a traditional training program, showed stability in vowel use, but a decline in the number of consonants, syllable combinations, and complexity of syllable forms.

Objectives

To compare the subjects' vocalizations from the first study period, Interval 1 (Int1), to the second study period (Int2), 4 years later, for any changes in:
- Phonemic repertoire within and between subjects
- Frequency, variety, and/or modality of communicative intent
- Frequency or variety of *intentional* vocalizations.

Subjects

AI: age12 at Int1; 16 at Int2 SR: age 8 at Int1; 12 at Int2
Both low-functioning males had a diagnosis of autism (diagnoses made independently). At the start of analyses, both were nonverbal and communicated almost exclusively using Picture Communication Symbols, as well as emotional expressions (guttural sounds, cries, squeals, and screams). Neither had learned any sign or gestural system effectively. Between the intervals studied, AI participated in an intensive speech-training program (see O'Grady et al., IMFAR 2005); SR participated in more traditional training focused on functional communication and skill training.

Methods

For each subject, two hours of videotapes from different types of activities (therapy sessions, breaks, and ADLs) were analyzed as previously described (Boner et al, IMFAR, 2004). Two speech-language pathologists (MMB and EA) coded gestures and transcribed vocalizations. 75% of the sessions were coded by both using the Noldus Observer 5.0* and checked for inter-rater reliability. Results were compared with previous data.

Results (Supplemental material in handouts)

Characteristics of Speech Sounds Produced

- Number of different vowels produced remained relatively stable
  AI: 14 (Int1 & 2) SR: 9 (Int1), 8 (Int2)
- Number of different consonants remained stable for one subject and declined for the other
  AI: 15 (Int1), 17 (Int2) SR: 10 (Int1), 5 (Int2)
- Both added alveolar and labiodental sounds to their repertoire; AI also added linguadentals
  AI: /s,z/, /f/, /ð/ SR: /s/, /v/
- Both added obstruents, continuants, sibilants, and non-sibilants
  AI: /f,p,ð,s,z/, /ð,f,s,z/, /z,s/, /f,ð,p/ SR: /v,s/, /s/, /s/, /v/
- Syllables containing /j/ ("y") remained the most frequently produced for both subjects
- AI increased the number of consonants and the complexity of syllables used, while SR used less complex syllable forms; most were open syllables (i.e., ending in vowels)
  AI: Int1 ex: ij,ji,je,ju SR: Int1 ex: ji,ijʌ,ʌji,gjɪ
  Int2: ija,ijei,ijʌ,nijʌ,dijʌia,wijʊ,jeja,jejai Int2: ji,ijʌ

Muscles Used in Production

- Both added sounds produced with the primary jaw elevators (temporalis, masseter, medial pterygoid)
- SR continued to have difficulty with sounds requiring simultaneous contraction of the vertical intrinsic muscles and genioglossus extrinsic muscles of the tongue and those requiring simultaneous contraction of superior longitudinal and styloglossus muscles of the tongue.

Communicative Intent

- Relative frequency of intentional communication increased significantly for both subjects
  AI: Int1: 51 instances in 11 hours of tape SR: 28 instances in 8 hours
  Int2: 412 instances in 2 hours of tape Int2: 205 instances in 2 hours
- Frequency, variety, and complexity of communications expanded to include imitation, response to questions, and word approximations

AI: 199 imitated & 55 responsive word approximations; 80 imitated vocalizations

SR: 80 responses via manual communication board; 25 imitated gestures; 28 spontaneous informal gestures

Discussion

Despite the ages of the subjects at the time of these analyses (SR 12, AI 16), changes were observed over the four-year interval in the frequency and variety of vocalizations and in intentional vocal communication skills. While participating in a traditional educational program that focused on non-verbal communication and assistive device use, SR showed a decline in the complexity and variety of sounds in vocalizations, yet an increase in gestural imitation and manual communication board use. AI, who participated in an intensive home program emphasizing speech production, showed improvement in the range and frequency of his sound productions (O'Grady et al., IMFAR, 2004,2005, report treatment methods and AI's further progress in the year after the period analyzed here). AI had progressed to the point of making whole-word approximations. These approximations were characterized by groping for articulatory postures, perseveration on previous productions, deleted syllables, reversed sequence of sounds, and inconsistent distortions and substitutions. With both subjects, the pattern of vocal productions was more consistent with disordered development, not with simple delays in development of articulatory capacity. However, AI's data suggest that the effects of this disordered development might be overcome, at least in part, by appropriate therapeutic focus.

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