



ACHIEVING SPEECH PRODUCTION IN A NONVERBAL ADOLESCENT WITH AUTISM



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ABSTRACT

We report a case of an individual with autism who was essentially nonverbal through age 14, who then learned prompted and voluntary speech production to the level of three-word utterances. The subject, A.I., had acquired the reliable use of nine consonants for communicative purposes and intermittent production of six vowels, between the ages of 14-16, as reported (O'Grady et al., IMFAR, 2004). Continued training was based on providing 1) a full-day, situation-rich environment, 2) reinforcement of successive approximations of targeted word or words, 3) provision of sentence frames, 4) both verbal and touch prompts, 5) constant opportunities to initiate speech, and 6) ready access to alternate methods of communication such as the Chat PC, communication books, and manual signs. Results: During a 12-month period, A.I.'s oral repertoire increased from imitating initial consonants/consonant-vowel combinations to 1-3 word utterances (e.g., "I want bathroom"), albeit almost always with prompting. The continued progress of A.I. demonstrates that oral speech production may be attainable in such individuals and that it may continue to improve over time. While causality cannot be proven, we suspect that the intensity of the training program and the re-introduction of manual signing, synergizing with his previously-learned abilities to initiate communication and to use visual symbols, were what were most critical in allowing him to accomplish oral communication.

BACKGROUND

It is generally assumed clinically that individuals with autism who do not speak by five years of age seldom learn to do so. There have been a few case reports of individuals who were still nonverbal after approximately age 5 who did learn to produce at least some speech (Benaroya et al., 1977; Colby, 1968; DeMyer et al., 1973; Thomke, 1977; Ross & Greer, 2003; Rutter, Greenfield & Lockyer, 1967; Windsor, Doyle & Siegel, 1994). But there are no detailed reports of anyone who was still nonverbal by age 14 learning to produce oral speech, to our knowledge. We took advantage of a full-time home schooling program for an individual with autism to not only attempt to train oral speech production, but to document when possible his accomplishments and their circumstances.

METHODS

Subject: Nonverbal male with autism, A.I. (not real initials)
 Preschool Language Scale-3 score 18 at age 10
 Peabody Picture Vocab. Test III standard score 38 (age 12), 42 (age 16)

General Procedures

- Study done as part of student's full-time, home-based educational program. Parental informed consent given for research elements in accord with JHMI IRB requirements.
- All words/word combinations/sentence frames targeted were functionally important for A.I.'s communication needs.
- Instruction and opportunities were presented in discrete trial format, during incidental teaching opportunities over the entire school day, in the community, and at the speech-language pathologist's office.
- Rewards with preferred items and with activities corresponded with the targeted word(s) (e.g., if A.I. imitated or spontaneously requested "I want candy," he was given candy).
- Preferred items and activities representing the targeted word(s) were presented directly to A.I. or made visually available.
- Shaping procedures were used for all words and word combinations.
- Reward criteria became more stringent as closer approximations of target sounds were produced.
- Verbal and touch prompts used for all consonant and vowel sounds were faded to facilitate independence.
- Incorrect response would immediately be followed with an error correction procedure. The instructor would model the targeted sound and provide a visual/touch prompt.
- If A.I. did not produce the targeted word after two attempts, then the instructor modeled the correct response and went to an unrelated task, then reintroduced targeted sound.

General Procedures (cont.)

- Initially, new words were introduced once a previous word was reliably produced five times per day. However, once A.I.'s speech started to increase, new words were introduced at every opportunity available.

Specific Procedures

- **Visual or Touch Prompt** (touch cues, Prompt Method [Hayden & Square, 1994]): When training a new word during error correction procedures, a visual prompt (the teacher modeling the word using a touch prompt) or a touch prompt was used on A.I. (touch throat, tongue depressor, Prompt Method).
- **Sign Language:** Sign language was used throughout the day for specific targeted words and phrases. Initially, a novel sign was modeled by the instructor 3 times; then A.I. was prompted to model the sign. The corresponding spoken word was always modeled by the instructor and a time delay was used to increase A.I.'s speech production while using sign.
- **Visual Communication Systems (Meyer Johnson®, text):** A.I. used a wallet-sized communication book that included >250 icons (mostly pictures). Icons containing pictures with text were also placed throughout his environment. Instructors modeled the use of words throughout the day. For example, after A.I. would use the soap, the instructor would point to the soap icon and ask "You used soap to wash your hands. What did you use?"
- **Voice Output Systems:** A.I. used a Chat PC/template that was set up similar to his communication book.

Data Collection

- Anecdotal Notebook: instructors recorded word or word combinations, their environment, and whether student or teacher initiated (see sample in handout). The anecdotal notebook was also used to log outside observations of speech (reports of sibs and/or parents).
- Data were taken throughout the day, every day. Generally, only student-initiated (spontaneous) communication was logged (see sample in handout). Coding [V=verbal, V/C=verbal + Chat PC, V/S=Verbal + Sign, V/O=Other] was used to indicate if spoken word was used in combination with another mode of communication.
- Student Program Book: Data were recorded on spoken words during discrete trial sessions. This format for data recording was discontinued when A.I.'s speech production increased to the degree it was no longer practical.
- Most speech sessions were also recorded on video and/or audio for confirmatory data analysis.

Analyses

- Data were analyzed within eight time blocks, broken down by age. The first time block spanned the time from when A.I. first started the home-based program, up until the time he produced the first complete spoken word that was formally targeted. Subsequent time blocks were each one month.
- A "spoken word" was defined as one that included the sound sequence of the entire word. Although word approximations were produced, these were not included in the analyses reported here.
- For analysis purposes, each distinct word was logged (for example, "I want bathroom" was logged as three spoken words, although also as a 3-word utterance).

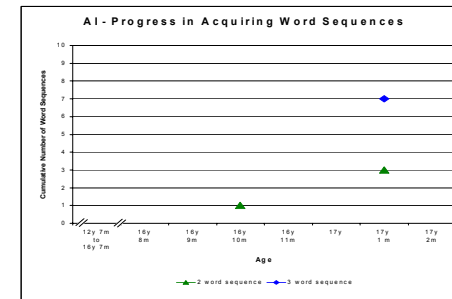
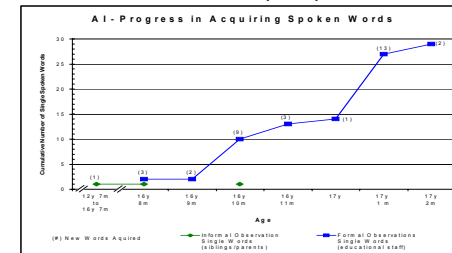
RESULTS

Single words: Approximately 32 different, understandable spoken words have been produced by A.I., and utterances up to 3 words long. By age 17 years 2 months, his teachers recorded a vocabulary of 29 different spoken words; his sibs and parents reported 3 other words.

Multi-word utterances

- At 16 years 10 months, A.I. spoke his first two word utterance: "hi, name."
- At 17 years 1 month, A.I. spoke 2 additional two word utterances, "I'm finished" and "I want"
- In the same time period, he spoke approximately 7 three-word utterances (all using the sentence frame "I want....").

RESULTS (cont.)



DISCUSSION

We strongly suspect that the frequency of efforts and insistence on speech production played the major role in A.I.'s accomplishments. Oral speech production had been tried before with him, by others as well as ourselves, but it became a major goal during this time period, pervasively integrated into all of his activities. Also of importance may have been the reintroduction of signing. Both occurred in the context of A.I.'s having become fluent in the semantics and understanding of all of the words and concepts that he ultimately used in oral speech. Of course, this single-case study cannot prove these relationships. However, we are aware of at least one other case (Shane, unpublished) where oral speech production may have been acquired at a relatively advanced age in a nonverbal individual with autism through a similar intense focus. It is possible that there have been other such cases that have just not been documented as we have been able to do. We cannot claim that A.I. has achieved "language" as is generally defined, as his speech is not clearly spontaneous, nor, most importantly, is there yet proof of syntax. However, his receptive and expressive use of auditory/oral speech have clearly become an independent means of communication. In fact, his Chat PC voice output system and his communication book are now rarely used in conjunction with speech. These results suggest that it may be possible to teach even older, nonverbal individuals with autism to produce usable oral speech, given enough of the right kind(s) of efforts. Given the cognitive and practical benefits that this may bring, we will be trying to continue and extend our own efforts. Our major future goals are to try to increase spontaneous use of oral speech and to try to teach and demonstrate elements of true syntax in A.I.'s comprehension and production.

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