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Training a Blind Autistic Child to Communicate Through Signs[1]

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Nonverbal autistic children have been successfully trained to communicate by the simultaneous use of speech and sign language. The advantage of this approach versus speech-only techniques may lie in these children's relative preference for visual input such as manual signs. Although apparently inapplicable due to its reliance on visual cues, sign language, accompanied by speech, has been used to train deaf-blind children. In the present case signs were used successfully with a blind 10-year-old autistic girl. After 8 months of training she was able to acquire a functional sign vocabulary, relying primarily on the tactile-kinesthetic and the auditory modalities. This newly acquired skill had a beneficial impact on the child's general functioning. The relevance of simultaneous communication or signed English for the blind autistic child is discussed.

It is now well documented and also an accepted fact that early infantile autism can be found in a variety of nosological entities (cf. Chess, 1971; 1977; Coleman, 1976; Wakabayashi, 1979). The first report of a marked similarity in the history and clinical picture of some blind children to that of autistic children was provided by Keeler (1958). The five blind children who presented with a strikingly similar symptomatology to autism in

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the Keeler series were all born prematurely, with a gestation period varying from 6 to 7 months, and with birth weights ranging from 2 to 5 pounds. All had been placed in an incubator, received oxygen, and, during the 3 to 14 weeks following this treatment, had developed blindness secondary to retrolental fibroplasia.

The main presenting features of these children were identical to those present in autistic children. They were self-isolation, lack of appropriate use of language, stereotypes, inappropriate use of objects, a preoccupation with music, and abnormal motility patterns (toe walking, body rocking, bizarre choreoathetotic posturings), among others. The behavioral pattern presented by these 5 children was quantitatively different from that presented by 35 blind children with comparable histories. This group displayed many of the characteristics of the smaller group but in very mild forms, allowing them normal, albeit "somewhat slower development." In an attempt to isolate the main factors contributing to the autistic symptomatology of the 5 blind premature children, Keeler concludes that a combination of emotional neglect due to prolonged absence of mothering or maternal rejection, near total blindness from birth, and perhaps brain damage might have contributed to these children's severe pathology. In a recent paper Blank (1975) reports a 25% incidence of severe autistic symptoms in the congenitally blind children. That autism can coexist with blindness is also recognized by others. In her tripartite classification of the autistic syndromes, Coleman (1976) considers the coexistence of sensory deprivation such as blindness with autism to fall under the rubric of the "neurologically impaired" autistic subgroup.

Most of the existing literature on the topic therefore points to (a) the relatively high incidence (perhaps 25%) of autism among congenitally blind children, (b) the fact that we have as yet very little systematic evidence documenting the possible obvious or more subtle differences in the symptomatology of those blind children who develop autism and their nonblind, autistic counterparts, and (c) the fact that the blind autistic children, much like all autistic children, have major difficulties in the communicative use of speech. Keeler (1958) reports, for example, that in his sample of five, "language had not developed normally, i.e., it appeared delayed and when it did develop consisted of echolalia, repetitive use of apparently meaningless words or phrases, and referring to oneself in the third person" (p. 65).

The central role of deficits in language and cognitive factors in autism is very well documented (Ricks & Wing, 1975; Rutter, 1978). Existing attempts to remedy this by teaching communication through speech training are also well publicized (Lovaas, Schreibman, & Koegel,

1974). Whether such attempts have been made with the blind children and how successful they have been is not very clear, as we were unable to find evidence directly addressing this issue.

In the recent literature, doubts have been raised about the effectiveness of speech training with all autistic children. Thus, Konstantareas, Oxman, and Webster (1978) have reviewed the considerable body of evidence on auditory processing difficulties in autistic children. They concluded that these difficulties might account for the poor responsiveness of many of them to speech training, since speech relies extensively on the auditory modality for its processing. An alternative approach, relying on the simultaneous use of speech and sign language, has been attempted with some success (cf. Konstantareas, Webster, & Oxman, 1979; Creedon, Note 1).

The possibility that this alternative, which relies primarily on the visual and kinesthetic modalities, might be particularly effective with the lower functioning autistic children has been raised (cf. Carr, 1979; Konstantareas & Blackman, Note 2).

In the sighted autistic child, then, the visual and kinesthetic modalities have been called upon to aid communication acquisition. In the blind autistic child the impact of auditory processing difficulties is likely maximized by the presence of the visual impairment. Thus, communication training with a mute blind autistic child of low cognitive ability could present a real challenge. It is of interest that sign language and speech training have been attempted with deaf-blind children of varying levels of cognitive ability for some time. The celebrated case of Hellen Keller, who acquired language through her teacher's persistent effort to spell words into her pupil's hands, is well documented (Keller, 1904). More recently, McInnes and Treffry (in press) provide an account of their own use of speech and sign language with deaf-blind children. Treffry (Note 3) reports that in many instances these children move beyond sign acquisition to speech-only production, although not infrequently they persist in using the sign prior to producing the word. It should be remembered, however, that the deaf-blind children, in these and other similar programs in England and North America, are not autistic and, in most instances, are of normal cognitive potential.

The present case presentation provides evidence on the successful application of sign and speech training with a blind, severely retarded 10-year-old autistic girl. The main aim is to highlight the differences in the training of the sighted versus the blind autistic children and to draw some additional implications for intervention with these blind, nonverbal children.

METHOD

Developmental History of Subject

B. K. is a 10-year-old girl, the eldest of three children born to a middle-class family. Both parents are university graduates, the father being a professional musician. B. K. was 2 weeks postmature and her delivery was protracted, lasting 36 hours, and difficult. B. K. did not cry during the 1st hour of life. When B. K. was 4 months old, the family doctor noticed that she was not responding to light and referred her for extensive testing. EEG, skull X rays, and air study revealed no abnormality. The possibility of blockage in the optic chiasma was raised, however. Exploratory craniotomy was therefore advised. After craniotomy, the cause of B. K's blindness was found to be chiasmatic arachnoiditis with bilateral optic atrophy.

B. K. had always appeared to hear normally, responding to sound with physical reactions. Developmental milestones were a little slow to attain. She sat at 8 months and walked at 13 months. As soon as she began to walk she began to explore, using her senses of taste, touch, and smell. Prior to the age of 30 months, B. K. used some words (i.e., *cookie* and *good girl*) but was heard to use them only once. At the age of 3 she could spoon-feed herself and walk about the house unattended without getting hurt. Although she whined most of the time, she was occasionally heard to use the syllables *mau* for "more" and *nigh* for "night." She was a very demanding child who responded quite negatively when she did not get what she wanted. In these situations she often resorted to head banging, scratching, or hitting herself in an attempt to control her environment. B. K's psychiatric diagnosis at the age of 2 was blindness with brain dysfunction. At the age of 3, the diagnosis was blindness with autism and mental retardation.

B. K. attended a number of different centers and was exposed primarily to sensory stimulation and behavior modification. Through this period she was unable to acquire speech, despite repeated efforts. Some attempts to employ a gesture system, but not formal sign language, were made with little success. At the age of 10 years 3 months, she was referred to our center for exposure to simultaneous (speech and sign) communication training.

Procedure

Psychological Testing. To our knowledge there are few formal psychometric instruments for assessing a blind, nonverbal, low-functioning

child. Langley (1979) provides a good review of available instruments and the manner in which they are employed or adapted to the blind. Of them, the Maxfield and Buchholtz (1957) and the Alpern and Boll (1972) Developmental Profiles appear to be particularly useful. Assessment of B. K.'s functioning was based on administering the Alpern and Boll Developmental Profile to her mother. At the age of 10 years 3 months, B. K.'s physical and self-help skills were estimated to be at the 2-year-4-month level. Social age was scored at the 1-year level, academic age was scored at the 1-year-2-month level, and communication age corresponded to the 1-year-4-month level. These findings were in essential agreement with previous testing, conducted 15 months earlier by another agency, using the Minnesota Child Development Inventory. Thus, no progress whatsoever was evident in B. K.'s functioning, despite the increase in her C.A.

To determine B. K.'s degree of autistic symptomatology, over and above the clinical diagnosis of autism, the Creak (1964) checklist and rating scheme was employed, by having two independent raters evaluate the existence, partial existence, or complete absence of any given symptom. A score of 7 out of a possible total of 9 was given by one rater and a score of 6.5 by the other. Agreement between raters was 97%. B. K.'s history and presenting symptomatology also indicated that she met all four of Rutter's (1978) criteria for early infantile autism.

Communication Training. B. K. has thus far been exposed to simultaneous communication training for a period of approximately 8 months. For the first 4 months, two, and later three, 2-hour-long sessions weekly were devoted to social interaction and communication training. Procedures for the implementation of simultaneous communication training differ across settings (e.g., Creedon, 1975; Miller & Miller, 1973). In our own work with sighted autistic children, we have used the Ontario Sign Language, which is closely related to the American Sign Language. Although signs from the Ontario Sign Language were used, however, it is important to note that, in sumultaneous communication training, it was Signed English rather than Sign Language that was used. This is contingent upon the need to utilize the spoken language as well as manual signs with the communication-impaired children. While syntax in English relies on word order, the syntax of sign language, as used by the deaf community, is a highly inflectional system, with minimal emphasis on word order; hence it does not lend itself to spoken correspondences, while Signed English does.

Our training in simultaneous communication follows a four-step sequence whose speed we adapt to each nonverbal child's needs and capabilities. These are: (a) In an informal, contextual, and playful manner we present the child with the target sign-word in the presence of a real-life

referent, both by forming the manual sign and by concurrently saying its corresponding word. The expectation is that the child will visually decode our sign and reproduce it (we also hope that she/he can auditorily decode the word). Early in training we sometimes have to "mold" the child's hands into forming the sign, as well as show the sign. Once, however, the first few signs have been imitated by the child, we rely exclusively on the visual auditory modalities and our input does not include the tactile-kinesthetic. (b) Soon thereafter we engage the child in *receptive* communication by asking him/her to demonstrate his/her understanding of the sign by picking up, by pointing (for objects), or by engaging in the required activity (for verbs). We clearly rely on the child's visual mode to decode our signs. (c) We *elicit* communication by either presenting an object and asking the child to sign for it or by providing the word and requesting its corresponding sign. (d) The last step, and the one all our efforts are aimed at, is to set up the context for the child's own initiation of interaction through sign, word, or both, or to expect an unknown external or internal stimulus to trigger the appropriate signed utterance. Needless to say, any vocal output in this *spontaneous* communication is also reinforced, if emitted (see also Konstantareas et al., 1979).

In utilizing the above scheme to teach B. K. to communicate, it became quickly apparent that procedures had to be modified to suit her sensory-perceptual processing capabilities. Table I provides an outline of the modalities that we have relied upon to train sighted autistic children. These are contrasted to the modalities we found necessary for teaching B. K. to acquire sign language. To simplify the task, and in view of the fact that B. K. is totally mute, we have omitted from this scheme productive vocal output, i.e., words, expected as the required response. Vocal input, however, is taken into consideration whenever it is appropriate. Clearly evident in this scheme is the need to rely on the tactile-kinesthetic and the auditory modalities, rather than the visual, for training. In B. K.'s case this has entailed (a) molding her hands into the signs while uttering the corresponding word, (b) providing the word for eliciting signing, (c) letting her feel around for her spontaneous communication in sign, and (d) allowing her to feel the objects before she picks the correct one, for receptive performance.

RESULTS

Communication

Videotape data of the eighth session, lasting approximately 30 minutes, were coded in terms of the two of the four categories outlined

Table I. Principal Modalities Utilized in the Acquisition of Sign Language by Sighted and Blind Autistic Children

Communication category	Stimulus-response	Modalities	Modalities for blind
Receptive	Sign for cooperation or pointing	Visual	Tactile-kinesthetic
	Word for cooperation or pointing	Auditory	Auditory
	Sign and word for cooperation or pointing	Visual and auditory	Tactile-kinesthetic and auditory
Reproductive	Sign for imitation	Visual	–
	Molding child's hands for sign production	Visual and tactile-kinesthetic	Tactile-kinesthetic
			–
Elicited	Object for child to sign	Visual	–
	Verbal request for child to sign	Auditory	Auditory
	Object and verbal request for child to sign	Visual and auditory	Auditory and tactile-kinesthetic
Spontaneous	Visual context to potentiate sign	Visual	–
	Tactile-kinesthetic context to potentiate sign	Tactile-kinesthetic	Tactile-kinesthetic
	Auditory context to potentiate sign	Auditory	Auditory

in Table I. Only these two categories, "elicited" and "spontaneous," were analyzed, since all the signs that could be elicited could also be reproduced or responded to by B. K. A total of 26 single signs could be elicited. In addition, combinations of 2- to 3-sign utterances could be elicited upon the request "What do you want?" Examples of these are "Jump please, Don," "Up please, Don," "Spin more," "Cookie please." Spontaneously, B. K. produced 7 signs that she mainly formed in 2- or 3-sign sequences of the same type as those elicited by her therapist. On session 36, B. K. had increased her signing repertoire to include 33 elicited and 19 spontaneous signs. Throughout this period, the sequence of relatively rapid acquisition followed by a plateau before the next acquisition, which we have also observed in sighted autistic children (cf. Konstantareas et al., 1979), was evident. Most of the signs acquired related to clothing, e.g., "shoe," "pillow"; food items, e.g., "drink," "apple"; and even more commonly, verbs of action, e.g., "tickle," "tired," "finished"; plus the markers "please" and "thank you".

In addition to looking at B. K.'s grammatical production, we have attempted to evaluate her "meaning potential." Halliday (1975) has proposed a functional interpretation of semantic acquisition that follows a three-phase sequence. In Phase I (from 9 to 18 months) the child masters the seven basic functions of language. These are the Instrumental (I want), Regulatory (Do as I tell you), Interactional (Me and you), Personal (Here I come), Heuristic (Tell me why), Imaginative (Let's pretend), and Informative (I have got something to tell you). During this phase, each of the child's expressions has only one function; i.e., there is a simple content-expression pairing but no grammar. This is the bistratal phase. It is later in Phase II (18-23 months) that the child makes the crucial discovery that he can both observe the environment and interact with it. Thus, a three-level sequence content-form-expression comes into play. Halliday (1975) proposes that progress to Phase II is characterized by advances in vocabulary, grammatical structure, and dialogue. During the last phase, Phase III (after 23 months), the child begins to utilize adult language with its abstract and multifunctional characteristics.

Although we cannot do full justice to Halliday's complex model here, we can use it to better appreciate communication acquisition in B. K., a child exposed to systematic language training relatively late in her life.

When considered in the context of Halliday's (1975) seven categories of sociolinguistic development, B. K.'s sign vocabulary was found to be restricted almost exclusively to the regulatory ("Spin please") and the instrumental ("Cookie, Don") functions or communicative intentions of language. None of the remaining five categories—i.e., the interpersonal, personal, heuristic, imaginative, and informative—were clearly represented

in her utterances. Furthemore, although B. K. has been able to engage in bistratal or "protolinguistic" communication, she has not reached the level of translating her intentions or "meaning potential" into a tristratal or conventional lexicogrammatical system. In this respect, of course, B. K. is not different from many sighted nonverbal autistic children exposed to simultaneous communication training after the 5th year of their life (cf. Oxman, 1981; Konstantareas & Blackman Note 2).

DISCUSSION

B. K.'s behavioral characteristics and history are comparable to the characteristics of the five blind children in Keeler's (1958) series who were not diagnosed as autistic, despite the striking similarities of their symptomatology to that of children with the autistic syndrome. Although Keeler considered brain damage as a "secondary contributing factor," stressing emotional neglect as a primary variable, more recent evidence tends to reverse the emphasis (cf. Hier, LeMay, & Rosenberger, 1979; Piggott, 1979). We now diagnose these children as autistic and also consider brain damage as at least a risk factor for their symptomatology. Yet the need to obtain more information on the characteristics of the blind who are also autistic, in order to better evaluate the impact of both autism and blindness, is clearly evident. (We additionally need to know the range of autistic symptomatology possible among the blind subgroup and variations in degree of symptomatology as a function of extent of visual impairment or caretaking casualty (cf. Pasamanick & Knoblock, 1966)).

With respect to intervention, the present case report provides the technique and some of the results of a successful application of speech and sign training with the blind, low-functioning, nonverbal autistic child. In addition to application in the treatment center, training was aimed at generalization across situations such as the regular school setting and the home. Parental input was considerable, with mother acquiring all the signs B. K. used in training and also expanding upon them by utilizing signs that were uniquely suited to the home, e.g., "soap," "bath," "daddy."

The impact upon family functioning of the changes in B. K.'s newly acquired communicative ability has been dramatic. The parents reported that thus far she has decreased considerably her self-abusive and negativistic behavior, is physically healthier and lovelier, and has begun to initiate contact with family members for the first time in her life. However, these reported changes in the home could not be systematically measured.

Interestingly, B. K. has also generalized to the clinic some of the signs she is using at home. More recently, she was able to accept a change in therapists and has continued to make small but steady progress with her new therapist.

Despite this progress, it is unclear at the present time how much B. K. will achieve beyond protolinguistic communication (cf. Halliday, 1975), although it is likely that she will acquire more than the first two linguistic functions she has been able to acquire thus far. Her low cognitive ability should have a restraining impact on her flexible and generative use of language in the future. Additional knowledge on rate of communication acquisition for sighted and for blind nonverbal autistic children might provide us with insights as to the relevance of vision for sign language acquisition. The striking element of this case study is the fact that a primarily visual mode of communication, sign language, can be acquired by a completely visually impaired child. This, of course, was only possible through the mediation of primarily the tactile-kinesthetic and the auditory modalities. Although B. K. is making speechlike sounds, she remains at present totally nonverbal. Some (approximately 25%) nonverbal sighted autistic children have been reported to have acquired speech after exposure to simultaneous communication training (Carr, 1979). The factors responsible for the emergence of speech in these cases are not clear, but it will be worth studying them with the mute blind autistic children as well as with their sighted counterparts.

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