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INTERACTION BETWEEN THE TEACHER AND THE CONGENITALLY DEAFBLIND CHILD

EMPIRICAL DATA on the development of interaction, communication, and language in deafblind children is very rare. To fill this gap, a case study was conducted in which the interaction between a teacher and a deafblind boy age 3 years 4 months was analyzed. Sequential analysis of their interaction confirmed some general clinical impressions about interaction with deafblind children, and provided the basis for suggestions on how the interaction pattern might be changed.

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Deafblindness refers to a condition affecting a widely varying group of individuals who have a combination of an auditory and a visual impairment. In children, the combination of visual and hearing impairments causes such severe and specific educational needs, especially, but not solely, in the areas of communication and language, that they cannot appropriately be educated in special education programs solely for children with hearing impairments or solely for those with visual impairments. Because of the dual, concurrent disabilities, children who are deafblind need supplementary assistance to address their educational needs (Akhil, 2000; Knoors & Vervloed, 2003).

Deafblind children belong to a low-incidence group. Some of them acquired deafblindness later in life, often as a consequence of a specific condition such as Usher syndrome. In many cases, such children develop communication and language to a reasonable extent via the auditory or visual mode before the onset of the dual sensory impairment. Other children are born with a combination of hearing and visual impairments. Because of their impairments, these congenitally deafblind children are limited profoundly in the development of communication, language, and concepts (Knoors & Vervloed, 2003).

A child develops language primarily by interacting and communicating with his or her parents. Parents adjust their communication to the proficiency level of the child, and, in turn, the child adjusts to the adult. During the course of development, there is a continuous refinement of this "transaction" between the child and the conversational partner (Sameroff & Emde, 1989). This process is based on the phenomenon that adults, in general, and parents, in particular, have the ability to notice the child's communicative signals and to respond appropriately. The child, on

the other hand, is also able to signal and interpret communicative signals. When the parent focuses attention on an object (e.g., by looking at it), the child may understand this to indicate a shift in the topic of communication. Voice modulation, change of gaze, body position, and touching are vital if an uninterrupted conversational flow is to occur (Rodbroe & Souriau, 1999).

This interaction process between adult and child, being highly facilitative of the language development of the child, proceeds most smoothly if the distal senses of hearing and vision in the child are functioning well. Not surprisingly, the process of interaction breaks down if a child has congenital deafblindness. Deafblind children do not respond in ways the adult is accustomed to interaction with children without disabilities. As a consequence, adults often are inclined to approach the child in a direct and very intense manner, which results in the child feeling overwhelmed and subsequently attempting to escape the interaction attempts of the adult by withdrawing into his or her own world. Social interaction is greatly affected by the lack of eye contact and the difficulties the adult experiences when attempting to "read" the child's body language. Imitation, which may be considered one of the basic aspects of learning, often fails to develop because congenitally deafblind children are unable to perceive the adult's model. The process is hampered even more when adult interaction partners find it very difficult to interpret the long pauses needed by deafblind children to process the information coming from their environment. The idiosyncratic behaviors of many deafblind children complicate the situation further, as do the stereotypic behaviors that many deafblind children exhibit. Behaviors such as rhythmic rocking, hand flapping, or finger biting are interpreted as being reactions to sensory deprivation (Berkson & Karrar, 1968; J. van Dijk, 1982, 1991).

Without exception, the challenges deafblind children face in participating in interaction and communication and, eventually, in developing language, are formidable. Nevertheless, deafblind children differ widely in their limitations and possibilities, as do their parents or professional teachers in their opportunities to provide such children with an adequate communication environment.

It is vitally important to plan educational intervention with deafblind children very carefully (Downing, 2002; Knoors & Vervloed, 2003; Nelson & J. van Dijk, 2001). Educational intervention must build on careful assessment and is facilitated by empirical data on the communication and language development of congenitally deafblind children.

A number of studies have been published that focus on the main characteristics of educational intervention with deafblind children, starting with the groundbreaking work of J. van Dijk (1968) and including the work of McInnis and Treffry (1982), Chen, Alsop, and Minor (2000), and Janssen (2003). Rather surprisingly, empirical data on development, interaction, communication, and language in deafblind children is very rare. It seems that many intervention approaches are based largely on clinical impressions and on examples of best practice (Rodbroe & Souriau, 1999), rather than on solid research data. An exception to this is the research published by Janssen, Riksen-Walraven, and J. P. M. van Dijk (2002). These researchers studied methods to enhance the quality of interaction between deafblind children and their teachers. In order to do so, they looked into interactions between deafblind children and their teachers and analyzed appropriate and inappropriate behaviors of the child as well as appropriate and inappropriate responses of the teacher. However, the variables in Janssen and colleagues' study were defined in behavioral terms and not in the context of communication and interaction facilitation. For instance, appropriate teacher responses were defined as, among other things, acknowledging a request, accepting the child's refusal, ignoring the child's behavior, and continuing the ongoing activity.

However, if one studies interaction and communication, and most certainly if one studies these processes in relation to the facilitation of language development, one will also want to study aspects such as initiation of interaction, contingent and noncontingent reactions of communication partners, and the functions of interaction turns. This is precisely what we did in our research. More specifically, whereas Janssen and colleagues (2002) studied interaction from a behavioral perspective, we took a communication perspective in the research reported in the present article. We also wanted to provide a statistical basis for the presentation of data on the communication between a professional teacher and a young congenitally deafblind child. We feel very strongly that intervention undertaken to enhance communication with deafblind children and, if possible, to stimulate the development of language, should be based on solid data. Because it is virtually impossible to test the communication possibilities and language development of deafblind children, one must resort to long-term, longitudinal observations. These observations need to be videotaped because otherwise it is extremely difficult to notice all the potential communicative signals exhibited by the deafblind child.

Transcribing and analyzing video-

taped interactions with deafblind children is not easy. Therefore, we decided to start our research by doing a case study. For our main research question, we asked to what extent it would be possible for the teacher to attend to the deafblind child's initiatives and responses and respond appropriately, with contingent interaction patterns thereby resulting.

Methods

Participant

The subject of the present study was a deafblind boy who was 3 years, 4 months old at the beginning of the study. He had been born after 32 weeks of gestation and was deafblind as a result of congenital rubella syndrome. Both his eyes showed a horizontal nystagmus. Cataract operations had been done on both eyes when the boy was 2 months old. Audiologic assessment (brainstem evoked response audiometry) showed no responses until binaural stimulation levels of 95 dB were reached. Several attempts were made to provide the boy with hearing aids, but all failed because he refused to wear them. This situation is not uncommon in rubella-disabled children because of recruitment problems. The boy was able to perceive sounds, but not speech, if they were presented close to his ears. To correct for aphakia and microphthalmia, contact lenses were prescribed. The boy was only able to perceive visual details at a very near distance. In situations in which he was more than arm's length away from his caregiver, he could be considered nearly blind and profoundly deaf.

Because his contact lenses were damaged or lost quite often and new lenses were usually not immediately available, the boy lived in visually deprived circumstances most of the time. This was the case during the time of the present study. Because this situation occurred often, as it does for other deafblind children, we decided to carry on with the study. Since, for various reasons, it is not unusual for deafblind children to lack access to optical devices or hearing aids for prolonged periods, we felt that it would be opportune to study teacher-child interactions during such times.

The boy had entered a boarding school for deafblind children when he was 1 year, 10 months old. Psychological assessment at the time of the present study revealed that he functioned at Piaget's sensory motor stage 2 (Piaget, 1952). The boy's teacher was a 44-year-old man with 20 years' experience in deafblind education. Prior to the present study, the teacher had worked with the boy for 7 months.

Data Collection and Equipment

Three target activities that offered many opportunities for close interaction were chosen for the present study. These activities were part of the study participant's curriculum and were carried out by the same teacher daily. The activities were bathing, dressing, and playing with favorite objects. These events were selected because they recurred daily and fit in the schedule of daily routines for this boy. It is widely accepted that such daily routines foster effective interactions and enhance memory processes (see, e.g., Hodges, 2000; McInnes & Treffry, 1982).

The teacher was naive as to the purpose of the video recording and was therefore not explicitly instructed to interact with the deafblind boy during recording sessions. The recording was done by the second author using a Panasonic VX 27 VHS Slimvision camera. Extra light was not used in order to avoid distracting the boy. The analog video recordings were digitalized in MPEG format and transferred to a CD-ROM. The data were analyzed with the help of Video Wave by MGI Software.

Procedure

Before data analysis began, specific events were chosen for video recording in order to capture the most favorable conditions for the elicitation of social interaction and communication. Over a period of 4 months, a total of 16 hours of recordings were made during bathing, dressing, and playing. Recording was done weekly on Wednesdays and once every fortnight on Fridays. Three criteria were used to determine if a scene would be included in the study:

1. Both the teacher and the child should be within reach of the camera.
2. The recordings should be of good quality, especially in regard to daylight.
3. There should be a period of communicative activity lasting at least several seconds.

As a result, the 16 hours (or less than 15 minutes), of recordings were reduced to 890.34 seconds of suitable scenes divided among 39 different sessions: bathing 384.35 s, dressing 400.11 s, and playing 105.88 s.

Category System

In studies of the interactions of persons with severe delays in communicative development, several category systems have been proposed and applied (e.g., Bjerkan, 1997; Daelman, 1993; Velthausz, 1987). However, these systems were not well suited to the analysis of the interaction between the subject of the present study and the teacher. With regard to the child's specific disabilities, the observation scheme of Menyuk, Liebergott, and Schultz (1995) was adjusted to suit the research questions. Menyuk and colleagues compared the development of interaction and communication between full-term and premature infants with the help of an observation mode

for vocal and nonverbal turn taking. The observation scheme we settled on is depicted in Table 1.

In Table 1, It may seem that some definitional dependency is present in the definitions of Child Reacts (CR) and Teacher Reacts (TR) that precludes sequential analysis of the data. However, that is not the case. The reactions of the child or the teacher were not necessarily preceded by actions on the part of, respectively, the teacher and the child that were intended to influence the interaction partner.

Reliability

Two persons independently scored all categories. One was the second author and the other was a recognized expert in the field of deafblindness, in particular the area of assessment. Prior to the scoring of the events under investigation, both assessors independently scored three events as many times as was needed to reach satisfactory interobserver agreement. These events were not included in the final study. Observer agreement was calculated for the total of 890.34 s of suitable scenes, containing 285 discrete observations. Interobserver agreement was computed by applying Cohen's kappa in order to control for chance agreement. The Cohen's kappa coefficients measured in the research for the present study are shown in Table 1. Since an average kappa coefficient of .60 can be considered satisfactory, all behavioral categories were regarded as reliably measured.

Statistical Analysis

The coding scheme permitted the collection of a sequential record of the actions of both the boy and the teacher. The raw sequential data were processed through a computer program that pooled the frequency of each behavior into the six main categories listed in Table 1. Sequential analysis can only be performed on an uninterrupted event or time series. Because the raw data consisted of 39 different scenes separated by 38 time breaks, the computer program that calculated the transitional probabilities had to take these breaks into account. We computed the transitional probabilities and z scores for each possible transition between events using the methods suggested by Bakeman and Gottman (1997). Conditional probabilities and z scores were not computed for transitions between two instances of the same behavioral category, or for transitions between two behaviors that were interspersed with a time break.

The rationale behind sequential analysis is based on lag sequential analysis (see, e.g., Bakeman & Gottman, 1997; Sackett, 1978). This method is based on principles of auto- and cross-lag correlation. Lags are defined by the number of event steps between sequential events. The method measures the number of times behaviors of interest follow (or precede) a selected behavior at various lag steps removed in the ordered data. Behaviors lagged against are called criterion categories. Behaviors looked for at lagged steps from the criterion are called matching categories (Sackett, 1978). In the present study, only matching categories at lag 1, that is, behaviors immediately following the criterion, were studied. Each variable listed in Table 1 was used as a criterion and as a matching category.

For all possible transitions between criterion and matching category, unconditional and transitional probabil-

Table 1
Observational Scheme

Observational category	*Cohen's kappa*
CAI. The child acts in order to influence the adult's behavior:	0.88
• CAI-1. by proximity seeking	
• CAI-2. by touching/manipulating/pushing his hand/arm/body in order to obtain a desired behavior or object from the adult	
• CAI-3. by touching/manipulating/pushing his hand/arm/body in order to avoid an undesired object/situation	
CR. The child reacts:	0.90
• CR-1. by following the teacher's initiative	
CANI. The child's actions were not in response to the teacher's initiatives, or there was no response at all. The child:	0.73
• CANI-1. does not follow the teacher's initiative	
• CANI-2. shows no response	
TAI. The teacher took the most initiatives to influence the behavior of the child:	0.92
• TI-1. by proximity seeking	
• TI-2. by touching/manipulating/guiding the child's hands/body	
• TI-3. by pointing	
• TI-4. by showing the child an object	
• TI-5. by calling to the child	
TR. The teacher reacts:	0.95
• TR-1. by initiating new behavior in response to the child's reaction	
• TR-2. by repeating the original behavior to obtain the same result	
• TR-3. by following the child's initiative	
TANI. Actions that did not have interaction with the child as the intent:	1.00
• TANI-1. not following the child's initiative	
• TANI-2. no response	

ities were computed. The unconditional probability is the probability that a given target event occurred relative to the total set of events. For instance, if there were 10 occurrences of "the child acts in order to influence the adult's behavior" (category CAI) in a total of 100 events, then the unconditional probability would be 10/100 = .10. A transitional probability is a form of conditional probability, namely the probability with which a particular matching event occurred relative to a criterion event. Thus, if the teacher responded five times to the 10 actions of the child intended to influence the teacher, then one should say that the probability of a teacher response occurring given a child's act intended to influence the other would be .5 (that is, 5 divided by 10). Transitional probabilities correct for differences in base rates for the criterion categories (Bakeman & Gottman, 1997). Transitional probabilities are tested for significance against a null hypothesis for the chances of matching the criterion at random; that is, there are no dependencies among the sequential events. If this is true, then a particular behavior will match the criterion in proportion to its occurrence in the data as a whole, that is, its unconditional probability.

According to Sackett (1979), an appropriate method of testing the reliability of the difference between observed and expected transitional probability is to apply the binomial test. With a reasonably large N for the total number of criterion occurrences and an expected probability that is not too close to 0 (.05–.10 or larger), we can estimate binomial probabilities by the z formula: $z = (P \text{ observed} - P \text{ expected}) / SD$ expected. The magnitude of z scores is affected by the number of tallies. For an effect of a specific size, the z score becomes larger as the number of tallies increases with the sample size. This makes the z score an inappropriate choice for analyzing individual or group differences (Bakeman & Gottman, 1997). Because no individual or group differences were studied in the present investigation, and transitional probabilities were only used descriptively, the z scores could be used as an index of significant transitional probabilities.

Results

The first, rather striking, result was that of 16 hours of filming, only 890.34 s were suited to the research purpose. That is, less than 2% of the recording time contained prolonged interactions between teacher and child. This is the more striking because the conditions that were chosen (bathing, dressing, playing) were thought to be favorable to the elicitation of social interaction and communication. Although some of the failures to analyze the recordings were caused by inappropriate conditions for video recording, most of the failures were due to the teacher being too far away from the child to be able to communicate properly or due to the total absence of prolonged communication periods between the two. In such cases, it was not possible to observe interaction over more than one category. Given the dual sensory impairments of the child, the distance between teacher and child was not only a problem for the video recording but also prevented adequate communication.

Table 2 shows the frequency with which different behaviors were observed, across the six categories. The child and the teacher acted nearly equally often in the interactions. Because the purpose of the study was to study the sequence of events, the durations of events was disregarded. The child initiated a kind of social interaction (category CAI) in 18.2% of the total interactions—for instance, pointing when he wanted a favorite object, such as the showerhead. There was rarely any proximity seeking on the part of the child, and avoidant behavior was often observed. The teacher took the most initiatives to influence the behavior of the child (category TAI). Of the observed behaviors, 38.1% fell within this category. These activities consisted mostly of touching, manipulating, or guiding the child's hands or other parts of his body. Only a small number of actions on the part of the teacher (2.0%) consisted of actions that did not have interaction with the child as the intent (category TANI).

Due to the fact that the total sample consisted of 39 different sessions, there were 38 breaks between sessions. Transitions between teacher and child responses were not calculated whenever a break interspersed the responses.

The transitional probabilities between the six behavior categories are provided in Table 3. Only those transitions that exceeded chance level were reported ($z > + 1.96, p < .05$).

The most prevalent categories were CAI (the child acts in order to influ-

Table 2
Behaviors' Frequency of Occurrence, by Category

Category	*Occurrences*	*%*
CAI	45	18.2
CR	36	14.6
CANI	44	17.8
Total, child	**125**	**50.6**
TAI	94	38.1
TR	23	9.3
TANI	5	2.0
Total, teacher	**122**	**49.4**

Notes. CAI: The child acts in order to influence the adult's behavior. CANI: The child's actions were not in response to the teacher's initiatives, or there was no response at all. CR: The child reacts. TAI: The teacher took the most initiatives to influence the behavior of the child. TANI: Actions that did not have interaction with the child as the intent. TR: The teacher reacts. There were 38 breaks.

ence the adult's behavior), CANI (the child's actions were not in response to the teacher's initiatives, or there was no response at all), and TAI (the teacher took the most initiatives to influence the behavior of the child). These three categories made up the nucleus of the teacher-child interaction. Figure 1 is a kinematic representation of Tables 2 and 3. Only transitional probabilities that occurred significantly above the level of chance ($z > +1.96, p < .05$), for criterion categories with reasonably large numbers of occurrence and probabilities of at least .10 are presented in Figure 1. Because there were too few TANI events to reliably compute z scores, these behaviors are disregarded for the remainder of the present article (see Sackett, 1979, for the rationale that the number of criterion occurrences and observed probability should be > .10). Significant transitions were found between

1. noninteractive actions of the child (CANI) and the teacher's initiatives (TAI) ($P = .85$)
2. the teacher's initiatives (TAI) and noninteractive actions of the child (CANI) ($P = .45$)
3. reactions of the teacher (TR) and the child's initiatives (CAI) ($P = .42$)
4. the child's initiatives (CAI) and reactions of the teacher (TR) ($P = .41$)
5. the teacher's initiatives (TAI) and reactions of the child (CR) ($P = .33$)
6. the teacher's reactions (TR) and initiatives (TAI) ($P = .26$)

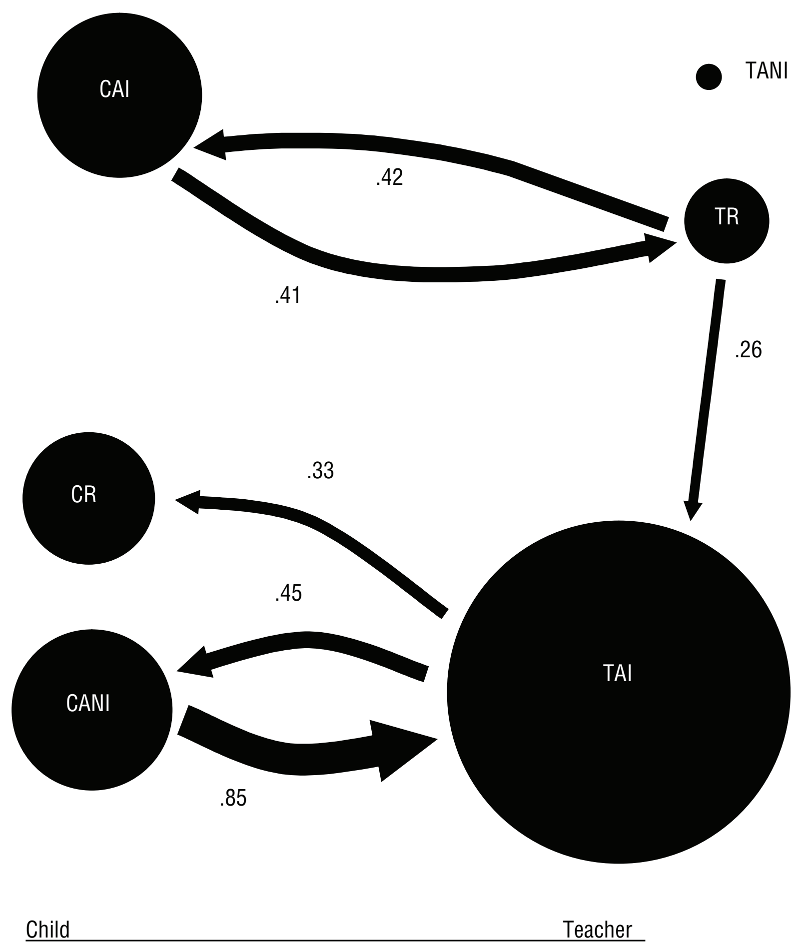
The results of the sequential analysis can be described as follows. There existed a true interaction between teacher and child, although each frequently missed the initiatives of the other. The teacher's initiatives evoked reactions from the child in 33% of the

Table 3
Transitional Probabilities Between the Behavior Categories Exceeding the Chance Level

To/From	*CAI*	*CR*	*CANI*	*TAI*	*TR*	*TANI*
CAI	—	.03	.00	—	.41	.12
CR		—	.04	—	—	—
CANI	.08	.05	—	.85	.03	—
TAI	—	.33	.45	—	.03	.00
TR	.42	—	—	.26	—	
TANI	.67	—	—	—	—	

Notes. CAI: The child acts in order to influence the adult's behavior. CANI: The child's actions were not in response to the teacher's initiatives, or there was no response at all. CR: The child reacts. TAI: The teacher took the most initiatives to influence the behavior of the child. TANI: Actions that did not have interaction with the child as the intent. TR: The teacher reacts.
$p < .05$.

Figure 1
Kinematic Diagram of the Transitional Probabilities of Teacher and Child Behaviors



Notes. CAI: The child acts in order to influence the adult's behavior. CANI: The child's actions were not in response to the teacher's initiatives, or there was no response at all. CR: The child reacts. TAI: The teacher took the most initiatives to influence the behavior of the child. TANI: Actions that did not have interaction with the child as the intent. TR: The teacher reacts. The frequency of occurrence of each category is indicated by the size of the respective circle. The thickness of the arrow represents the relative size of the transitional probability. The number next to the arrow indicates the transitional probability.

cases. The teacher was slightly more responsive. The child's initiatives resulted in reactions by the teacher in 41% of the cases, which means that the teacher missed 59% of the child's initiatives. If the teacher reacted, the child, in 42% of the cases, demonstrated a new initiative. Both teacher and child did not respond significantly to each other's responses. In 26% of the cases, the teacher's initiating interaction followed a response by the teacher. Together with the significant transitional probability of .85 between the child's noninteractive actions (CANI) and the teacher's initiatives (TAI), this might reflect attempts by the teacher to interact whenever the boy did not respond or took initiatives not directed at interaction with the teacher. Further inspection of Figure 1 shows that there is no significant transitional probability reported between the categories "the teacher reacts" (TR) and "the child reacts" (CR). This could lead to the conclusion that interaction between the partners stopped after one response.

Discussion and Conclusion

The case study described in the present article demonstrated that only a limited portion of the time when the teacher and deafblind child were together was devoted to communication and interaction. Because the teacher was naive to the purpose of the study, we believe that the amount of interaction was representative of normal daily interactions between this teacher and deafblind boy. The study also showed that the contributions of the child and the teacher in the interaction process were approximately equal. However, only relatively small percentages of the interactions were really communicative in nature and possibly stimulative of the development of communication and language. In this respect, we refer to the initiatives of the child in order to establish social interaction (18.2% of all interactions), the contingent reactions of the child to the teacher's initiatives (14.6%), and especially the contingent responses of the teacher to actions of the child (9.3%).

Although we stress that we are in favor of the principle that all deafblind children should be given optimal correction for vision and hearing, we do not think that visual and auditory hearing aids would have affected the results of the present study to a large extent. Inspection of the boy's ophthalmologic records showed that under optimal circumstances, which included the wearing of contact lenses, his visual acuity was 20/200. With this level of acuity, the teacher would still have to be close to the boy to be able to communicate with him. Therefore, the amount of interaction time suited for observation would not have been much larger.

Our results show that it is possible to quantify interaction between teachers and deafblind children, and that this can be accomplished in a way that gives insight into the elements of the interaction and communication processes that are important for the development of language. The results also show that the number of teacher initiatives exceeded the number of responses considerably. One might ask whether this is odd if one takes into account that a congenitally deafblind child of age 3 years 4 months will likely be unable to communicate through linguistic means. Perhaps it is understandable that the teacher attempted to take the initiative frequently in order to build an interaction when the child might not be able to do so.

Bates, Camaioni, and Volterra (1975) differentiate the early stages of interaction and communication into three somewhat overlapping stages. From the child's perspective, interaction and communication begin at the prelocutionary stage. This stage takes the child from birth to approximately 8 months of age. The child focuses attention on a person or an object and signals interest by showing enjoyment or surprise, but the child is unaware of the communicative value of the signals. During the illocutionary stage (8 to approximately 15 months of age), the child is able to share attention with a conversation partner. There is a beginning of intentional behavior that is planned to influence the partner's behavior. The child may nod yes or no, raise his or her eyebrows for questions, or request an object. In the locutionary stage (15 months onward), the child is able to take part in communicative situations using linguistic means. Linguistic rules begin to develop, and the child is able to apply these rules more adequately as language further develops. With regard to language and communication in deafblind children, the prelocutionary stage corresponds with preintentional (level 1) and intentional (level 2) behavior of communicative competence. The illocutionary stage corresponds with the unconventional and conventional presymbolic communication levels of communicative competence (respectively, levels 3 and 4). The locutionary stage corresponds with the concrete, abstract, and formal levels of symbolic communication (respectively, levels 5, 6, and 7). Rowland (1996), Rowland and Stremel-Campbell (1987), and Rowland and Schweigert (2000) provide further information on these levels of communicative competence.

The deafblind child we studied was clearly in transition between the prelocutionary and illocutionary stages. The child was aware of the communicated values of his signals. There were certainly examples of what Bjerkan (1997) has called communicative interaction.

Sometimes the child communicated in ways that could be characterized as regulating or at least attempting to regulate joint actions. On the other hand, examples of this behavior that would fit the illocutionary stage were relatively rare. More than 17% of the child's interactions could not be labeled as response to a teacher's initiative, nor were they meant to influence the adult's behavior.

In normal language development, one would expect a parent or a professional teacher to leave the initiative in communication to the child and to respond in a contingent way whenever the parent or teacher felt that it was possible for the child to take the initiative. Only in this manner does the child have the opportunity to explore his or her communicative possibilities and build a communicative and linguistic repertoire. Communication will only lead to language development if the child is enabled to actively take part in communication. The pace of language development becomes more rapid when the child is allowed to take the lead in interaction and communication and when the responses of parents and teachers are contingent. For example, teachers rephrase utterances of a child when the child does not yet have the means to be linguistically correct in his or her utterances. Another example can be seen when a parent expands on the utterances of a child (H. Papoušek & M. Papoušek, 1987; Wells, 1985).

From research on the interactions between parents and deaf children, we know that parents often have a tendency to control interaction with a deaf child because they cannot fully understand the utterances of the child. Although understandable, this control is in itself detrimental to language development. The more parents try to control the responses of a child, the turn-taking interaction, and especially the topic of conversation, the more slowly language development will proceed (Chen, 1996; Traci & Sanford Koester, 2003; D. J. Wood, H. A. Wood, Griffith, & Howarth, 1996). There is solid empirical evidence that use of a less controlling interaction style by parents facilitates not only higher-quality interaction between parents and deaf children but also the process of language development. In our opinion, there is no reason to think that this is not also the case in children who are deafblind.

Obviously, our research should be replicated and extended to more deafblind children as they interact with their parents or teachers. The type of analysis we explored, and the statistical foundations we employed, likely would be fruitful in this extended research. Once an extended study confirms our current results, it will become necessary to find ways to ensure that the amount of interaction time between teachers and deafblind children increases, and subsequently to discover ways for teachers to leave the initiative of interaction more to the children who are deafblind and respond contingently more frequently. The diagnostic intervention model developed by Janssen and colleagues (2002, 2003a, 2003b; see also Janssen, 2003) seems very promising in this respect

Note

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