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DEAFNESS AND ATTENTION IN DEAF CHILDREN

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HE STUDY SHOWS the differences between hearing parents and deaf instructors interacting with deaf children and directing their attention. Data were collected at home and at a service for special needs in Bristol, England. The mother or instructor was asked to play naturally with the child with the toys provided. When the child's attention was focused during their play, the mother or instructor had to try to direct the child's attention to each of the toys. The results suggest that both groups (mothers and instructors) were effective in directing attention to objects not in the immediate area of play; however, hearing mothers were more successful than deaf instructors.

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According to Bruner (1983), the earliest and most primitive phase of joint attention is the establishment of sustained eye-to-eye contact. When the mother and child start to have eye contact, the mother starts to vocalize much more with the child. This is as if the eye contact is the sign that now the child is a "real human being." By the end of the second month, eye contact and vocal accompaniments have become well established. Soon, mother and infant start to show turn taking. In the next stage, the mother starts to introduce some objects between the child and herself as targets for joint attention. However, once a spoken language appears, the tendency to show objects to the child decreases. When the child shows a reliable orientation reaction to objects, the mother starts

to establish a routinized way of preparing for presentation when the child is not in eye contact with her. Generally, the mother will say the child's name as an attentional vocative. Soon, the mother starts to add more words and simple sentences to attract her child's attention. By the end of the first year, these expressions become general alerting signals to the child about the possibility of a shift in attention focus.

When the mother and infant are hearing, the establishment of joint attention is relatively simple. Attention can be focused visually on an object or activity, and the mother can provide the verbal message at the same time without disrupting the child's activities.

Some children have problems with attention; the effects are seen in all areas of development. Some children

have difficulty with shifted attention, not because of cognitive problems but because of problems with "sharing." Deaf children are such a group for whom easy communication with an adult cannot be taken for granted.

It is a common belief that deaf infants have problems with attention and turn taking because the complementary nature of the early interaction is disturbed. They cannot hear the language of their hearing mothers, and the fine-tuning that should happen does not. The result is a mismatch in language expectations, with deaf children acquiring language competence in a visual form while their families are more reliant on a spoken form.

The ability of a hearing parent to discuss an object or event while a child is observing is an important feature of interaction in infancy and early childhood; if a "deaf child engages with an object, however, the communication channel (visual) is cut off" (Kyle & Sutherland, 1993, p. 8). Deaf mothers overcome this problem by signing rather less than hearing mothers speak, and referring to objects prior to engaging with them (Kyle, Woll, & Ackerman, 1989).

So in a task that involves directing the child's gaze, deaf mothers characteristically refer to the object when they have eye contact with the child and then point to it:

While the child is looking, the mother does not communicate and only as the child's eye contact is returned is there any further information provided by the mother. The purpose of this sort of interaction (which appears very limiting by hearing-speaking standards) is to establish attention routines, so that much more extended interaction and turn taking can occur in the second year, as language develops. It is noticeable

that hearing mothers of deaf children do not naturally develop this skill. (Kyle et al., 1989)

For deaf people, unlike hearing people, both the linguistic message and related paralinguistic information carried on the face must be received through the visual channel, and learning appropriate visual attention and visual turn taking becomes crucial. In conversations between deaf adults or between a deaf person and a hearing person, the receiver of the message must pay close visual attention. Hearing listeners are not required to watch the face during conversations, because visual attention is generally not necessary for receiving the spoken message, and they are therefore free to use the eyes for other purposes.

According to Ackerman and Woll (1990), visual attention to the interlocutor is crucial for a deaf person to receive information. Spencer (2000) indicates that early visual attention is associated with and potentially influenced by a complex interaction of maturation, communicative experiences, and developing skills. The fact that interaction is often unsatisfactory in older deaf children in hearing homes is indicative of earlier failures in dealing with divided attention.

When the deaf mother signs about objects, the attentional requirements are different. Deaf mothers are aware that the child must switch visual attention between reference and information, so these mothers know how to respect the parameters of visual communication (Spencer, 1998). Consequently, language input and attention happen sequentially, making the task of grasping the connection between language and experience much more complex. In this situation the child must divide attention, retain information in memory, and integrate information from activities and language

input. Despite this situation, the sign language acquisition of deaf children of deaf parents is similar to hearing children's acquisition of spoken language in spoken-language settings. Therefore, the need for divided attention may not necessarily impede language development.

Loots and Devisé (2003) also show that deaf parents differ significantly from hearing parents in their use of a visual communication style. When the deaf baby is about 4 months old, the deaf mother begins to train the baby's attention by intruding on the infant's line of sight. This happens when the mother moves from side to side in front of the infant, or waves a hand or object. Sometimes the mother touches the infant to gain eye contact. When the mother obtains the infant's attention, she signs the name of the object she wants the baby to look at, and points to it. When the mother points at the object she does not sign, but carefully monitors the baby's attention. She may then sign the name of the object again within the child's line of gaze. As their deaf children become more mobile, deaf mothers have a tendency to change their strategies, to ensure continued accessibility of linguistic utterances and contextual cues. All of these strategies enable the child to see both the sign and what it refers to, and increase the probability of a connection being made between the two. The basis for language development is thus established.

At this stage, mothers shift their signing from the previous displaced locations back to the conventional signing space, using some mechanisms that help the child regulate divided attention. One important mechanism is "bracketing." This involves signing the name of an object, then pointing to the object, then naming it again. The mother's hand movements arrange the child's attentional shifts and also

provide repeated information to reduce the weight of memory and stress the link between the referent and the sign.

Loots, Devisé, and Jacquet (2005) analyzed the impact of visual communication on the quality of early interaction between deaf and hearing parents and their deaf children ages 18 to 24 months. Loots and colleagues' data analyses indicated that the use of sign language in a sequential visual way enabled the deaf parents to involve their 18-to-24-month-old deaf infants in symbolic intersubjectivity. Hearing parents using Total Communication were more similar to deaf parents using the same amount of intersubjectivity, though they differed from deaf parents in how they exchanged and shared symbolic and linguistic meaning with their deaf child.

Hearing mothers fail in dealing with divided attention (Mohay, Luttrell, & Milton, 1992). Most of these mothers point to one object, and when the child is looking at the object referred to, the mother signs or says the object's name. So deaf children of hearing parents generally lose part of the information, although their mothers have the impression that their communication is appropriate.

In hearing families with deaf children, there is a failure to establish appropriate patterns of prelinguistic communication and a lack of awareness of strategies adequate for access to language. When the child is deaf, there is competition between the need to use vision to look at the object and the need to watch signed or speechread comments. Deaf children have to have their eye gaze focused on an event or have eye contact with a person in order to take in information. Deaf parents are sensitive to eye contact. Compared to hearing parents, who begin interaction before gaining their child's attention, deaf

parents always have to have the child's eye contact before communicating. Gradually children develop a monitoring behavior; they break their play and glance at their mothers, who treat this action as a signal to sign to them. This results in a lengthening of interaction between mother and child. Another strategy deaf parents use with their children is articulating signs over or beside the object with which the child is playing. This kind of strategy assumes joint reference in the absence of eye contact.

MacTurk, Meadow-Orlans, Koester, and Spencer (1993) showed the effect of early cognitive, social, and communicative experiences on later social and language development in deaf infants with hearing mothers, and concluded that the interactions were positively influenced by social support provided to mothers in the early months of the deaf children's lives. Generally, this support occurs in intervention programs exclusively for hearing parents. A Brazilian study by Brito and Dessen (1999) points out that, unfortunately, most Brazilian research on deafness still focuses only on the cause of deafness and the therapeutic evaluation methods. Instead, Brito and Dessen assert, studies should be focusing on families with deaf children, and especially on the interactions and relationship between child and family.

Rocha, Caporali, and Lacerda (2003) have also described deaf education in Brazil as very problematic, given the frequent imposition of oralization, which generally causes a delay in language development. Consequently, as Caporali, Lacerda, and Marques (2005) point out, in Brazil it is very difficult for a deaf child with hearing parents to acquire sign as a first language. These parents have to be introduced to a program that promotes bilingualism and the deaf adult contact, but Brazilian

thinking is still focused on oral language. This approach restricts the deaf child's contact with deaf adults, as well as the deaf child's exposure to strategies that are important for language development.

Agreeing with Caporali and colleagues (2005), Oliveira, Simionato, Negrelli, and Marcon (2004), in another Brazilian study, say that communication is the main problem in hearing families with deaf children. Mothers use oral language, and deaf children use a visual approach and gestures.

Because of the importance of family and visual attention in the deaf child's first years, the focus of the present study is on the issue of joint reference. We questioned how well hearing mothers manage to succeed with their deaf children. As these mothers usually have had no previous experience of deafness, they appear to have major problems adjusting their methods of interacting to the needs of their deaf children. It would seem that these mothers could learn a great deal from deaf adults. We suggest that teaching hearing mothers to use the same attentional strategies used by deaf adults could significantly improve these mothers' communication with their deaf children.

The present study compares hearing mothers with deaf instructors in directing attention in a formal task. In this way, it aims to determine effectiveness in directing attention to objects not in the immediate area of play and to compare deaf and hearing adults in this directing of attention.

We predicted that deaf instructors would be more willing than hearing mothers to wait for the child to make eye contact before communicating, and that if the child lost eye contact, deaf instructors would reestablish it before continuing to communicate. Deaf instructors are skilled at estab-

lishing eye contact and at turn taking (McCracken & Sutherland, 1991). Deaf instructors are also be more consistent in their strategies. Finally, we predicted that deaf instructors would have more successful trials than hearing mothers in directing deaf children's attention.

Method

Participants

Three profoundly deaf children, whose parents had previous sign experience with deaf people, participated in the present study. It is important to emphasize that the parents' experience with sign language varied from one family to another. All the children were filmed at home with their hearing mother and subsequently at a "deaf-deaf" group (a deaf sign language immersion/enrichment group) with a deaf instructor in Bristol, England, at the service for special needs. In the deaf-deaf group, deaf children and deaf instructors interact with no hearing persons present. At the time of assessment the three subjects were 36, 38, and 49 months old, respectively.

Materials and Procedure

Each child was videorecorded for 30 minutes at home and at a service for special needs in Bristol, England. During the videorecording, the mother or the teacher played with the child with a variety of toys. Before filming, the researcher set out four toys: a teddy bear, a blue van, a red van, and an airplane with a teddy bear pilot, in convenient positions approximately at the four corners of a square 2 to 3 m from where the child would be sitting when filmed. All the toys were about 15 cm tall and were chosen because it would be easy for the child to see them when the mother or instructor pointed toward them, but they were not big enough to distract the child during the interaction.

Table 1
Coding Scheme for Attention Direction Strategies

C =	Eye contact. Expected at the start of the sequence. The mother's gaze is on the child, and the child's gaze is on the mother.
R =	Reference. Can be either signed or vocalized.
P =	Pointing. This is expected to be held for some time during the sequence. The sequence is deemed finished once the point is withdrawn.
G =	The mother's eye gaze at the object after pointing.
Ch =	The mother's eye gaze at the child after looking at the object.
Voc =	Vocalization, whether during the reference or not.
Sign =	Sign, whether during the reference or not.
CG =	Child's eye gaze at the object.
SU =	Successful.
Y =	Positive attempt.
No =	Negative attempt.

The camera was placed on a tripod about 3 m from where the child would be sitting. Filming was interrupted if necessary if the child became very restless. During the sessions, the only people present in the room were the mother or instructor, the child, and the researcher. At all filming sessions at the service for special needs, two researchers were present.

The aims of the study and the methods to be used for filming were explained to the mother or instructor. The mother or instructor was requested to play naturally with the child with the toys provided. When the child's attention was focused during their play, the mother or instructor had to try to direct the child's attention to each of the four toys that had been set up before filming.

Ideally, a deaf person should direct attention first through eye contact. After establishing eye gaze with the child, the adult refers to the object by signing, then points to the object and looks at it. After that, the child looks at the object. The adult looks at the child to make sure that the child has seen the object. This is an example of one successful trial.

The attention strategies used by the mothers and instructors to direct the children's attention were coded

on the basis of a technique provided by Kyle and colleagues (1989), which is described in Table 1.

Each adult's attempt to direct the child's attention was considered a trial. However, the mother or instructor had to have the child's eye contact before directing the child's attention. Some trials were considered as beginning without eye contact—that is, when the mother pointed directly to one object or perhaps showed an object, and the children looked directly at the mother's pointing without any eye contact. The criterion that was used to indicate the start of a trial was that the mother or instructor pointed to one of the objects.

The trials were coded as successful only when the child redirected his or her gaze to the object to which the mother was trying to direct attention. All other trials, when the child lost eye contact, or lost interest, or did not look, were coded as unsuccessful.

Results

Table 2 shows an example of one deaf instructor directing a deaf child's attention. The table shows that the deaf instructor had 5 trials. In 4 of these trials, the deaf instructor had eye contact with the child at the start of the sequence. In 3 trials, the instructor re-

ferred to the object (signing or using speech). As pointing was one of the criteria in the present study, the instructor pointed in all trials. In all trials, the instructor's gaze was on the object after he or she pointed to it. In 4 trials, the instructor's gaze was in the direction of the child after looking at the object. In 3 trials, the child looked at the object after the instructor pointed to it. Thus, 3 of 5 trials were successful.

Table 3 shows results for a hearing mother directing a deaf child's attention. The table shows that this mother had 4 trials. In 2 trials, the mother had eye contact at the beginning of the sequence. In 2 trials, the mother referred to the object at the beginning of the sequence. In all cases, the mother pointed to the object. In 4 cases, the mother looked at the object after pointing to it, and in 3 trials the mother looked at her child after looking at the object she had pointed to. In 3 trials, the mother used speech and signs. The child looked at the object in all trials after the mother pointed to it. All trials were successful.

Each of the main predictions was examined in turn, following a general examination of attention strategies.

Table 4 displays the summary figures comparing hearing mothers and deaf instructors for all directing attention acts (trials) and the number of successful acts. The table shows that the deaf instructors had more trials, but in contrast to what was expected, the hearing mothers were more successful than the instructors.

Table 5 provides a comparison between the number of occurrences of the code scheme items for the mothers and the instructors. As the table shows, deaf instructors had more eye contact than hearing mothers (92% vs. 50%). The deaf instructors also referred to the objects before pointing at them more often than the hearing

Table 2
Example of One Deaf Instructor Directing a Child's Attention

	<i>C</i>	<i>R</i>	<i>P</i>	<i>G</i>	<i>Ch</i>	<i>Voc</i>	<i>Sign</i>	<i>CG</i>	<i>SU</i>
Trial 1	Y	Y	Y	Y	Y	Y	Y		No
Trial 2			Y	Y					No
Trial 3	Y	Y	Y	Y	Y	Y	Y	Y	Y
Trial 4	Y	Y	Y	Y	Y	Y	Y	Y	Y
Trial 5	Y		Y	Y	Y	Y	Y	Y	Y
Total	4/5	3/5	5/5	4/5	4/5	4/5	4/5	3/5	3/5
<i>Note.</i> A code scheme is provided in Table 1.									

Table 3
Example of One Hearing Mother Directing Her Child's Attention

	<i>C</i>	<i>R</i>	<i>P</i>	<i>G</i>	<i>Ch</i>	<i>Voc</i>	<i>Sign</i>	<i>CG</i>	<i>SU</i>
Trial 1	Y	Y	Y	Y	Y	Y	Y	Y	Y
Trial 2	Y	Y	Y	Y	Y	Y	Y	Y	Y
Trial 3			Y	Y	Y	Y	Y	Y	Y
Trial 4			Y	Y				Y	Y
Total	2/4	2/4	4/4	3/4	3/4	2/4	3/4	4/4	4/4
<i>Note.</i> A code scheme is provided in Table 1.									

Table 4
Instances of Directing Attention

	<i>Trials</i>	<i>Successful trials (%)</i>
Hearing mothers	12	11 (91.7%)
Deaf instructors	13	10 (76.9%)

Table 5
Occurrences of the Code Scheme Items: Hearing Mothers and Deaf Instructors

	<i>C</i>	<i>R</i>	<i>P</i>	<i>G</i>	<i>Ch</i>	<i>Voc</i>	<i>Sign</i>	<i>CG</i>
<i>Hearing mothers (N = 12 trials)</i>								
Occurrences	6	6	12	12	11	7	10	11
%	50.0	50.0	100	100	91.6	58.3	83.3	91.6
<i>Deaf instructors (N = 13 trials)</i>								
Occurrences	12	10	13	13	12	8	12	10
%	92.3	76.9	100	100	92.3	61.5	92.3	76.9
<i>Note.</i> A code scheme is provided in Table 1.								

mothers did (77% vs. 50%). As predicted, the deaf instructors were more willing than the hearing mothers to wait for the children's eye contact before communicating. It appeared that if the child lost eye contact, the instructor would reestablish it before continu-

ing to communicate. In contrast, when the hearing mothers lost eye contact they did not reestablish it; they just continued to communicate without eye contact or gave up attempting to establish communication. One interesting fact we noted concerning eye

contact is that the hearing mothers always paused for a second or two after establishing eye contact and before starting to communicate. That is, they established eye contact, looked at the child for one or two seconds, then started to communicate. However, the deaf instructors always started to communicate immediately after establishing eye contact.

Statistical analysis of the data was difficult with so few subjects. All numbers of occurrences for mothers and instructors were tested with a two-sample proportion test to see if there was a significant difference between both groups and if there was a significant difference in each of the categories. Significant results occurred only in the category of eye contact. This category had significance at the 5% level (.05), with $p = .00288$. Results in all others categories were not significant. This shows that because the sample was too small, the only significant difference was related to the use of eye contact by the deaf instructors, though there were a lot of differences between the mothers and the instructors.

As Tables 6 and 7 show, both the hearing mothers and the deaf instructors effectively directed attention to objects not in the immediate area of play. However, the strategies the two groups used to attract the children's attention differed in many ways.

Moreover, the hearing mothers and deaf instructors always gazed at the object after pointing at it, and they almost always watched the child after looking at the object. In contrast to what was expected when the data for all of the deaf instructors were combined (Table 5), the instructors used more vocalization than the hearing mothers. However, these results may be skewed since one of the mothers almost always used just signs without vocalization, and one of the deaf instructor always vocalized with signs.

Table 6

Success Rates for Deaf Instructors' Efforts to Attract Deaf Children's Attention

<i>Instructor</i>	<i>C</i>	<i>R</i>	<i>P</i>	<i>G</i>	<i>Ch</i>	<i>Voc</i>	<i>Sign</i>	<i>CG</i>	<i>SU</i>
1	4/4	3/4	4/4	4/4	3/4	2/4	3/4	2/4	2/4
%	100	75	100	100	75	50	75	50	50
2	4/4	3/4	4/4	4/4	4/4	1/4	4/4	4/4	4/4
%	100	75	100	100	100	25	100	100	100
3	4/5	4/5	5/5	5/5	5/5	5/5	5/5	4/5	4/5
%	80	80	100	100	100	100	100	75	75
Total	12/13	10/13	13/13	13/13	12/13	8/13	12/13	10/13	10/13
%	92.3	76.9	100	100	92.3	61.5	92.3	76.9	76.9
<i>Note.</i> A code scheme is provided in Table 1.									

Table 7

Success Rates for Hearing Mothers' Efforts to Attract Their Deaf Children's Attention

<i>Mother</i>	<i>C</i>	<i>R</i>	<i>P</i>	<i>G</i>	<i>Ch</i>	<i>Voc</i>	<i>Sign</i>	<i>CG</i>	<i>SU</i>
1	3/5	3/5	5/5	5/5	4/5	5/5	3/5	5/5	5/5
%	60	60	100	100	80	100	60	100	100
2	1/5	2/5	5/5	5/5	5/5	1/5	5/5	4/5	4/5
%	20	40	100	100	100	20	100	80	80
3	2/2	1/2	2/2	2/2	2/2	1/2	2/2	2/2	2/2
%	100	50	100	100	100	50	100	100	100
Total	6/12	6/12	12/12	12/12	11/12	7/12	10/12	11/12	11/12
%	50.0	50.0	100	100	91.6	58.3	83.3	91.7	91.7
<i>Note.</i> A code scheme is provided in Table 1.									

As the sample was so small, the possibility that the mothers vocalized less than the deaf instructors is just a biased one.

In general, it was found that the deaf instructors used British Sign Language (BSL) and sometimes simultaneously spoke the name of one sign in English, but used BSL grammar. The deaf instructors also used more signs than the hearing mothers. Even though the deaf instructors used more expressive movements in signing to create joint visual attention than the hearing mothers, it appeared that the instructors were not more successful than the hearing mothers. One may postulate that this is because the instructors used a lot of signs and complex sentences in sign language, assuming that the children could understand all the signs that were used.

It seems more likely that the children could not comprehend all of the signs, however. The mothers, in contrast, used a mixture of Total Communication and Sign Supported English (SSE), a linguistic system somewhat different from that used by the deaf instructors.

It is interesting to note that during the videorecordings the deaf instructors used many signs that the children wished to imitate, or that the children watched with fascinated expressions on their faces. However, in general it seemed that the children could not fully comprehend the fluent signers' utterances.

It was also seen that when the deaf children were with their mothers, they tended to look more at the object that had been drawn to their attention than when the deaf instructor attempted a

similar strategy. This may have happened because before pointing the deaf instructors sometimes signed complex sentences to the children, and as the children did not understand the signs, they simply gave up and lost interest. Another possible reason is that the hearing mothers appeared to have different ways of pointing. Sometimes they used referential pointing, that is, "pointing or touching a picture or object either to name it or to indicate its position, or distinguish it from the other pictures or objects, without any attempt to make eye contact with the experimenter" (Goodhart & Baron-Cohen, 1993, p. 229). At other times they used protodeclarative pointing, that is, "pointing at or touching a picture or object to show it to the experimenter, in combination with eye contact alternating between the object and the experimenter" (Goodhart & Baron-Cohen, 1993, p. 229). Protodeclarative pointing is the same kind of pointing used by deaf people to establish joint attention.

The hearing mothers also appeared to differ greatly from each other and from the deaf instructors in how they pointed at objects. They did not take the child's position into consideration when pointing at an object; that is, for them it did not matter if the child sat on their lap or was in front of them. On the other hand, the deaf instructors always positioned themselves so that the child could see the arm and hand while they were pointing. Almost all of the time, the deaf instructors were in front of child or positioned side by side with the child.

Another difference is that the deaf instructors used ample space to point; that is, they stretched the arm and the finger and held the point for several seconds. However, the hearing mothers pointed sometimes with only the finger, also moving their chin in the object's direction and raising their eye-

brows. This variation can be noted in hearing people; for example, sometimes when a hearing person wants to indicate an object, the person just moves the chin in the object's direction rather than point at the object. Another variation was when a hearing mother would keep her elbow on the table and move her hand and finger to point. In general, hearing mothers' points were not as spacious and were articulated very quickly; the mothers pointed to the object and immediately stopped to point. Then they would look at the object and, just when they looked at the child, they would point again. In contrast, the deaf instructors pointed to the object, and, while still pointing, looked at the object and then at the child.

Finally, as shown in Table 4, in contrast to what we expected, the deaf instructors had fewer successful trials than the hearing mothers in directing children's attention. This may have happened because the mothers were less didactic and took less of a controlling role during their interactions. Interactions with the mothers were found to be much more relaxed, since both mother and child were familiar with the filming situation. In contrast, the deaf instructors found themselves in a recording situation for the first time. Another possible reason is that the deaf instructors were found to use complex sign-language constructions with the children. These proved to be too difficult for the children to understand and led to a breakdown in attention direction.

The deaf instructors also had a tendency to persist even when the child lost the interest in the interaction. In contrast, the mothers gave up when the child lost interest. It is possible that these children are not familiar with fluent adult BSL, and that the instructors were not sensitive to the children's attention span.

Discussion

The results show that there were many differences among hearing mothers themselves and between the hearing mothers and the deaf instructors in the attempts to direct children's attention. It was found that the mothers were more successful than the instructors, and though these differences seem superficially to be significant, the sample was too small to reach statistical significance once tested.

There were also differences between individual mothers in interaction style. The first mother sat in front of the child all the time, and did not have eye contact on all occasions when she wanted to direct her child's attention. She always pointed with her elbow on the table, using her hand and finger, and did not hold her point while she was looking at the object. She also used more vocalizations than signs to refer to objects. In contrast, the second mother sat partly facing the child or with the child on her lap. She almost never had eye contact before attempting to direct her child's attention, and in general just pointed with her finger at the object. She never held her point but removed it very quickly. She did not use vocalizations to refer to objects, but signed all of the time when referring to objects. The third mother pointed just twice to four possible objects of attention. However, she referred to the other two objects by naming rather than pointing. (As the present study only addressed pointing for referential purposes, referential naming was not included in the scoring.) This mother pointed at the objects and looked around the room before looking at the object. This is a very rare situation for a deaf person, because when a deaf person points at something, he or she will always look in the object's direction and not around the room. When this mother pointed at objects

she stretched her arm and finger, just as one would expect a deaf person to. This mother also signed constantly when referring to objects, and vocalized only once.

While the hearing mothers differed a lot among themselves in their ability to direct their children's attention, it appeared that all of the deaf instructors directed attention in basically the same way: First, the deaf instructors would establish eye contact with the child, then immediately start communication. They almost always referred to the object, signing and sometimes vocalizing at the same time, and then they pointed to the object so that the child could follow the instructor's arm and finger, that is, the direction in which the instructor was pointing. The instructors' pointing was very deliberate, and they held the point while looking at the object and when they looked at the child again. In general, when using signs to refer to objects, the instructors employed complex sign sentences.

It seems that the hearing mothers were more successful than the deaf instructors in gaining the deaf children's attention. Despite the hearing mothers' own differences in strategy, the strategies they implemented seemed appropriate for the children in the present study.

The mothers used multiple strategies, though it seems that their behavior did not match that of the ideal deaf/deaf communication. Though the children in the present study had little access to BSL, they had an ability to internalize a "mother tongue" with ease. The deaf instructors really needed to adapt their interactive style to suit the needs of the children, since they did not notice that sometimes when they were using a lot of signs the children did not understand. The results suggest, therefore, that these deaf instructors should have more training in

communicating with deaf children who have limited access to BSL, since they are essential language models for such children and their parents.

The present study suggests that there is much important variation in the use of attention strategies from one mother to another. In the study, this variation prevailed from one session to another for each individual mother. The findings indicate that there are some differences between mothers and deaf instructors in their attempts to direct deaf children's attention. Surprisingly, hearing mothers were found to be more successful than deaf instructors. A number of possibilities for this difference suggest themselves. First, the mothers differed from each other and from the instructors in how they pointed to objects. Second, the instructors used complex sentences in sign language when referring to objects, and it seemed that the children could not fully comprehend the fluent signer's utterances. Third, the instructors almost always had eye contact with the child before communicating, and it seems that if the child lost eye contact, the instructor would reestablish it before continuing to communicate. However, when hearing mothers lost eye contact, they did not reestablish it. Although one would think that this difference would reflect positively on the deaf instructors, it appeared that the children were not in fact accustomed to having eye contact. It seemed, rather, that the fact that the deaf instructors had eye contact with the children was not enough to guarantee success in the instructors' attempts to direct the children's attention, since these children had become used to their hearing mothers' way of directing their attention almost always without eye contact.

The results suggest that both groups (mothers and instructors) were effective

in directing attention to objects not in the immediate area of play. However, the hearing mothers, despite their interaction differences, were more successful than the deaf instructors. This may have occurred because of the three reasons we have provided, and possibly also because the mothers were more familiar with their children and had developed appropriate strategies to gain their attention.

It seems reasonable to suggest that the mothers and children in the present study should have much more contact with a deaf person and sign language, since the children were found to have many difficulties in understanding complex sentences in sign. The mothers and children also should learn how to use certain attention strategies, particularly specific strategies that may scaffold deaf children's developing ability to alternate attention between objects and persons (Waxman & Spencer, 1997). Meadow-Orlans, Mertens, Sass-Lehrer, and Scott-Olson (1997) have confirmed that parents give highly favorable evaluations to intervention programs. Lebedeff (2001) and Mecca, Gomes, and Akyama (2004) also suggest that hearing families should participate in appropriate programs to help them interact with their deaf child.

In light of the results of the present study, it seems that the deaf instructors' methods for attracting the children's attention were in accordance with those used by deaf mothers with their deaf children. The deaf instructors were sensitive to the need to gain eye contact; indeed, they almost always obtained the child's eye contact before communicating. They also referred to an object before or after pointing in the object's direction. They held the point, so that the child could establish the direction in which they were pointing. Initially, the instructors gazed at the object, then gazed at the

child again. Even though these strategies were appropriate for deaf children interacting with deaf parents, it seems that they are not appropriate for use with deaf children who have already established communication with a hearing parent not fluent in sign language. Thus, it seems that deaf instructors should have specific training to succeed with deaf children of hearing parents.

We conclude, therefore, that an intervention program for the hearing families of deaf children should include not only modules for hearing parents, but also for deaf adults who wish to work with these deaf children, since exposure to deaf adults is essential to the education of deaf children, especially those with hearing parents (Mohay, Turner, & Milton, 1992).

Note

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