Reception of Mothers’ Referential Messages by Deaf and Hearing Children

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Hearing children 4, 6, and 8 years of age and deaf children 6 to 10 years of age who communicated orally (speech only) or bimodally (speech plus sign) participated in two receptive communication tasks. In Task 1, their mothers described, orally or bimodally, a designated picture from a set of four pictures so that the child could identify the intended referent from the four alternatives. In Task 2, the child was not given the stimulus set until the mother had completed her description. The presence or absence of the referential array had no differential effect on hearing or deaf children’s ability to select the intended referent. Age-related improvements were apparent in the performance of hearing children, with 6- and 8-year-olds making more correct selections than did 4-year-olds. Deaf children performed more poorly than did hearing children but the performance of orally and bimodally communicating children did not differ. In a subsequent experiment, two adults with appropriate communicative competence acted as “receivers” for each mother’s videotaped messages. The receptive performance of these adults revealed that the messages of bimodally communicating mothers were less adequate than those of orally communicating mothers. When the inadequate messages of mothers were excluded, the receptive performance of deaf children who communicated bimodally was found to be better than that of deaf children who communicated orally.

In contrast to the increasing interest in communication between mothers and their deaf preschool children (for a review, see Meadow-Orlans, 1987), there has been little comparable research with deaf school-age children. The research with deaf preschoolers has revealed mother-child communication that is greatly impoverished when compared with matched hearing dyads (Meadow, Greenberg, Erting, & Carmichael, 1981; Schlesinger & Meadow, 1972). However, there is evidence to suggest that the early use of bimodal (oral with manual) communication may prevent some of these problems by promoting mutually satisfying interaction between mothers and their deaf children (Greenberg, 1984). It is unclear, however, whether bimodal communication is facilitative in structured as well as unstructured situations between mothers and children and whether its advantages continue beyond the preschool period. Because exclusively oral as well as bimodal programs represent alternative educational options for deaf children, it is important to consider the likely implications of such choices on mother-child communication.

Recent research on communication between parents and hearing children indicates that communication accuracy in structured contexts has important implications for children’s subsequent development. For example, skill exhibited in referential communication tasks between mothers and preschool children predicts various aspects of ability and school readiness 1 to 2 years later (Dickson, Hese, Miyake, & Azuma, 1979) as well as academic achievement some 8 years later (McDevitt et al., 1987). As McDevitt et al. have noted, successful referential communication between mother and child depends not only on the skills of each participant but also on the mother’s skill at supporting her child’s communicative efforts.

Recently, MacKay-Soroka, Trehub, and Thorpe (1987) examined the referential messages provided by deaf schoolchildren for their mothers. They found that deaf children generated poorer messages than hearing children, their messages being less likely to differentiate the referent from possible alternatives. Even after deaf children received feedback regarding the inadequacy of their messages, they were less able than hearing children to provide appropriate reformulations of the messages. Instead, they tended to repeat the inadequate message or to add new but irrelevant information that failed to differentiate the referent from the remaining alternatives. MacKay-Soroka et al. demonstrated that this difficulty in message formulation was not attributable to inadequate visual processing of the referential array, because deaf children performed as well as hearing children on a visual memory task with comparable materials. Rather, deaf children seemed to be deficient in some of the procedural subskills involved in successful communication, such as the ability to specify the unique features of the target display and the ability to use feedback from the message receiver to
guide reformulations (for a discussion of these skills, see White- hurst & Sonnenschein, 1985).

MacKay-Soroka et al. (1987) found that the mode of communication was related to message quality, in the sense that deaf children who communicated bimodally (i.e., through speech and sign) provided more differentiated messages than those who communicated with speech alone. This difference is particularly noteworthy because the orally communicating children had a lesser degree of hearing loss, received more intensive intervention, had more years in their current educational placement, and came from families with higher incomes.

Interestingly, this superiority of bimodal over oral communicators was not reflected in the outcome of communication. Mothers of bimodally communicating children, despite receiving more differentiated messages and reformulations, were no more successful at selecting the correct referent than were mothers of orally communicating deaf children. This finding suggests that some of the bimodally communicating mothers, for whom sign was a secondary communication code, may have been limited in the ability to support their child's communication efforts.

In the present study, we examined another aspect of this maternal support by exploring the receptive or message-receiving skills of deaf schoolchildren in relation to their mother's messages. The same children who participated in the MacKay-Soroka et al. (1987) study of child-to-mother communication took part in the present study of mother-to-child communication. The object of the communication "game" was for the mother to formulate a description of a preselected target picture so that her child could choose it from his or her set of four pictures. No restrictions were placed on the mode and style of communication, so that participants were free to use speech, sign, informal gesture, or any combination of these to accomplish the goals of the game. The inclusion of mothers as message senders was expected to contribute to the child's comfort in the experimental situation, and the mother's knowledge of the child's receptive strengths and weaknesses was expected to enhance communicative success.

Experiment 1

In this experiment, mother-to-child communication was examined in two different contexts. In the first, the referential array was available to the child during the mother's description. In the second, the set of pictures that included the referent was provided to the child only after the mother had completed her description. This second task permitted consideration of the deaf child's ability to comprehend information transmitted about objects or events not present in the immediate context.

There are indications that young deaf children may have particular difficulty communicating about objects, events, or situations that have no shared visual referent. For example, mothers of deaf preschoolers have bemoaned their inability to exchange information about absent referents (Collins, in Meadow, 1975). Indeed, approximately 95% of communication exchanges between hearing mothers and their deaf preschool children concern topics with a shared visual referent (Schlesinger & Meadow, 1972). Finally, observations of peer interaction have revealed that 5-year-old deaf children, in contrast to their hearing counterparts, confine their communication almost exclusively to the "here and now" (McKirdy & Blank, 1982).

Method

Subjects

The subjects were three groups of mother-child dyads consisting of mothers (mostly hearing) with their (a) orally communicating deaf children, (b) bimodally communicating deaf children, or (c) hearing children. Children in the orally communicating group (N = 15) had prelingual hearing losses of 63 to 110 dB (M = 91 dB) and participated in educational and therapeutic programs that focused exclusively on oral communication. These programs were highly structured, requiring parents to devote considerable time to prescribed speech and language lessons. The children were 6 to 10 years of age, with a mean age of 7 years, 6 months. All of the mothers in this group had normal hearing.

Children in the bimodally communicating group (N = 15) had prelingual hearing losses of 65 to 120 + dB (M = 106 dB). The hearing loss of this group was significantly greater than that of the orally communicating children, t(28) = 2.46, p < .01. All children participated for at least 1.5 years in an educational program that used simultaneous manual and oral communication. Few families (N = 3) received intervention focusing on manual communication from the time of the diagnosis or shortly thereafter. The length of time in bimodal intervention or educational programs ranged from 1.5 to 7.5 years, with a mean of 4.5 years and a median of 3 years. Some families (N = 7) participated in intensive oral programs, but with little success, prior to the onset of manual communication training. The children in the bimodally educated group were 6 to 10 years of age, with a mean age of 8 years, 4 months. The age difference between bimodally and orally communicating children was not significant, t(28) = 1.99, p < .10. (The mothers in this group had normal hearing, except for two who were profoundly deaf.)

Information regarding the hearing loss of all deaf children was verified from records of local hospitals and schools. From these records, we also ascertained that all children had normal intelligence (i.e., IQ scores within the normal range) and no other handicapping condition that might affect their level of functioning. Further details on the two groups of deaf children are presented in Table 1.

The third group consisted of three subgroups of normal hearing children, 4, 6, and 8 years of age, each consisting of 15 subjects.

Stimuli

Each of 13 stimulus sets, one for each trial, consisted of four individually mounted pictures (20 X 20 cm). One picture in each set was designated as the target referent. The pictures were brightly colored graphic representations of objects and events. Stimulus sets varied in the degree of difference between the target and alternative pictures, the difficulty of vocabulary items that could be used to label differentiating features, and the familiarity of the component items. For some sets, the target referent was differentiated from the alternatives by one feature; for other sets, up to four features were required for identification of the target referent. These variations between stimulus sets allowed for the inclusion of a wide range of referential difficulty but precluded the establishment of a precise metric of set difficulty. Nevertheless, on the basis of pilot testing with hearing children, stimuli for the two experimental tasks were selected to encompass an approximately equivalent range of difficulty. Miniature line drawings of sample stimulus sets are shown in Figure 1.

Apparatus

Video and audio recordings of the session were made to facilitate subsequent coding and the preparation of transcripts for each trial. Two
Table 1
Subject Characteristics

<table>
<thead>
<tr>
<th>Group/Age range (years)</th>
<th>n</th>
<th>Range (dB ISO)</th>
<th>M</th>
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<tr>
<td>Oral (6–10)</td>
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<td>8.5–9.4</td>
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<td>65–120+</td>
<td>106</td>
<td>1</td>
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<td>101–110</td>
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<tr>
<td>10.1</td>
<td>1</td>
<td>111–120+</td>
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black-and-white video cameras fixed atop tripods were used. One was adjusted to focus on the child, the other on the mother. The cameras were aimed to film at an angle of about 45° from midline in order to make manual communication optimally visible. The signals from the two cameras were fed into a special-effects generator, which was used to display the signals on a split screen. This signal was recorded on video-cassette with a VHS video recorder. Stereo audio recordings were made with a four-track, reel-to-reel tape deck at a tape speed of 3½ in./s. Two microphones were suspended above the table at which the participants sat, one near the child, the other near the mother.

Procedure

Mother and child were seated facing one another at opposite sides of a table, with wooden trays for the stimulus sets between them. The study was introduced as a communication game, and the rules were described in simple, standardized fashion in the child’s preferred mode of communication. For all of the dyads with deaf children, two experimenters were present at all times, one of whom was the first author, and the other; a hearing individual (certified interpreter), who had extensive experience with deaf children and adults and fluency in various signed communication systems. In all cases in which sign was used, the second experimenter communicated simultaneously in oral English and in the sign system with which the child was familiar (typically Signed English). All communications to the mothers of such children were also signed and spoken simultaneously.

The outcome of mother-to-child referential communication was explored in two tasks administered on the same day as the two tasks described in MacKay-Soroka et al. (1987).

Task 1 (referent present). For this task (seven trials), the mother and child were given an identical stimulus set at the start of each trial; the target referent in the mother’s set was designated with a red dot. After the mother described the designated picture, the child chose from his (or her) set the picture thought to be the intended referent and showed it to the mother. If the child’s choice was incorrect, the mother provided another description, after which the child made a second selection. This procedure continued until the child chose the correct referent.

Task 2 (referent not present). During the second task (six trials), the child again acted as message receiver but was not given the picture set until mother had completed her description of the target referent. The 4-year-old children were excluded from this task because of their lesser inclination to participate happily for the full 1 or 1½ hours required for completion of the two production tasks (MacKay-Soroka et al., 1987) and the two reception tasks of the present study.

Results

There were two measures of outcome or success of mother-to-child communication: the percentage of correct first choices and of errors to correct selection (i.e., a maximum of three errors on each trial). Because both measures showed a similar pattern of findings, only the data on first choices are presented. Preliminary analyses revealed no influence of sex on the dependent measure; accordingly, the data were collapsed across sex. Further comparisons of the two groups of deaf children, with...
age covaried, revealed the same pattern of significant group differences as those reported below and no significant effect of the covariate.

**Task 1 (Referent Present)**

A percent-correct score was calculated for each dyad on the basis of the number of correct first selections made by the child. A one-way analysis of variance (ANOVA) on these scores revealed a highly significant main effect of group, $F(4, 70) = 12.47, p < .0001$. Newman-Keuls pair-wise comparisons revealed that the number of correct first choices made by the 6- and 8-year-old hearing children did not differ significantly and that both of these groups performed better than the two deaf groups and the hearing 4-year-olds ($p < .05$). There were no differences in the percentage of correct first choices by hearing 4-year-olds, orally communicating deaf children, and bimodally communicating deaf children. The means for percent-correct first choices are displayed in Figure 2 (upper panel).

![Figure 2](image_url)
Task 1 Versus Task 2

A percent-correct score was calculated for each dyad participating in Task 2 (i.e., 8-year-olds, 6-year-olds, oral, and bimodal children). These scores, together with the percent-correct scores for Task 1, were entered into a 4 (group) × 2 (task) mixed-design ANOVA. There was a significant main effect of group, F(3, 56) = 12.77, p < .0001, no effect of task, and no Group X Task interaction. Group means for percentage of correct first choices on Task 2 are displayed in Figure 2 (lower panel). Newman-Keuls pair-wise comparisons revealed that the performance of 6- and 8-year-old hearing children did not differ, and that each of these groups made more correct first choices than did the orally and bimodally communicating deaf children (ps < .05), whose performance did not differ.

Discussion

These findings indicate that, regardless of the mode of communication, deaf children’s reception of their mother’s referential messages is deficient compared with that of hearing peers. The performance of orally and bimodally communicating dyads with deaf children (children’s M age = 8.0 years) did not differ from each other or from dyads with 4-year-old hearing children. These youngest hearing children and the two groups of deaf children selected the incorrect referent on from 33% to 50% of all trials. The outcome of mother-to-child communication was considerably more successful for 6- and 8-year-old hearing children, who made incorrect selections on fewer than 20% of the trials.

The absence of the referential array did not differentially affect the outcome of mother-to-child communication for hearing and deaf children. This indicates that 6- to 10-year-old deaf children, whether they communicate orally or bimodally, can receive and understand information about referents not present in the immediate physical context and are no more affected by decontextualized referents than are 6- and 8-year-old hearing children. No conclusions about the relative difficulty of the two reception tasks can, or should, be drawn from the present study, which involved two different sets of stimuli that were not equated systematically for complexity or for maternal message clarity.

Experiment 2

The findings of Experiment 1 indicated no differences in the outcome of mother/deaf-child communication as a function of mode of communication. The communicative success of orally and bimodally communicating dyads was comparable to that achieved by mothers and their 4-year-old hearing children and significantly poorer than that of mothers and their 6- and 8-year-old hearing children.

Children’s receptive proficiency is influenced not only by their own receptive skills but also by their mothers' expressive skills. Under normal circumstances, mothers’ communicative proficiency would not influence outcome in any systematic way, because adults, for the most part, could be expected to formulate adequate referential messages for their children. For bimodally communicating mothers, however, assumptions about expressive skill may be unwarranted. There are indications, for example, that most parents of signing children have little more than a beginner’s level of facility in manual communication (Bornstein, Saulnier, & Hamilton, 1980).

The dual purpose of the second experiment was to obtain independent estimates of the adequacy of mothers’ messages to deaf children and to examine whether the receptive competence of bimodally communicating children had been underestimated in Experiment 1 as a result of less than optimal messages from their mothers. Competent adult communicators (two for each mother), who were fluent in speech or sign, were recruited to act as receivers for each mother’s videotaped messages. A message-adequacy score was calculated for each mother on the basis of the average number of correct identifications made by the two adult receivers. Messages that resulted in an incorrect choice of referent by either of the two adult receivers were operationally defined as inadequate. A conditionalized reception score was then calculated for each deaf child on the basis of the child’s performance on trials with adequate messages only. Comparable ratings derived from the performance of adult receivers have been found to correlate highly with experiment-generated ratings (e.g., Asher, 1976).

Method

Subjects

Two adult receivers were recruited to view the referential messages of each mother–child dyad (i.e., a total of 82 adult receivers). The receivers for the messages of hearing dyads and orally communicating mother/deaf-child dyads were undergraduate students at the University of Toronto. The receivers for the messages of bimodally communicating dyads were either hearing interpreters for the deaf or well-educated deaf adults. Receivers for the bimodally communicating dyads were fluent in American Sign Language and manually coded English and used each on a regular basis. One hearing interpreter and one deaf adult were assigned as receivers for each of the bimodal dyads. Preliminary analyses revealed no differences in the performance of hearing interpreters and deaf adults.

Stimuli

The materials for the present experiment were videotaped messages of three groups of mother–child dyads from Experiment 1:

1. Fourteen orally communicating mother/deaf-child dyads (The videotape of 1 dyad in the original group was not used because of poor audio quality. It would not have been comparable to use separate audio and video records for this single dyad.)
2. Thirteen bimodally communicating mother/deaf-child dyads (Tapes of 2 dyads in the original group were not used because one dyad used no sign and the other used very little sign.)
3. Fourteen randomly selected hearing-mother/hearing-child dyads (The children from this group were five 4-year-olds, four 6-year-olds, and five 8-year-olds.) The hearing dyads were included only as a reference group for evaluating the message adequacy of the two groups of mothers of deaf children.

Procedure

For each trial, the initial referential messages of the mother were shown to the adult receiver, who was required to select the intended referent from the relevant set of four stimulus pictures. The videotapes

RECEPTION OF REFERENTIAL MESSAGES
signed message and also with its inaudibility for most of the signing
the messages of the hearing and orally communicating dyads. For the
were edited so that children's repetitions or questions about the message
the video-tapes. The adult receivers were free to request up to three "replayings"
children. Given a mean hearing loss of 106 dB on the part of the bi-
sage had higher message-adequacy scores than did bimodally commu-
mothers of hearing children and the
excluded from the analysis. Because it is likely that inadequate
moms between the target referent and one nonreferent (rating of
This analysis confirmed that the visual messages of the bimodal
errors on approximately 10% of the messages of both groups of
bimodally communicating mothers made correct first choices on 76% of trials with adequate messages, compared
achieved perfect message-adequacy scores. The reception scores of the bimodally com-
time, however, mothers deliberately omitted information from the data analysis. To enable comparisons with hearing
children, one 6- and one 8-year-old hearing child were also ran-
did not participate in Task 2, they were excluded from the analysis. Because it is likely that inadequate
mother's messages. Correct first choices made across Tasks 1 and 2 were summed
for each of the two adults who acted as receivers for each moth-
the target referent uniquely (rating of 1, whether it was ambigu-
nearly equal in difficulty, were screened according to the condi-
the videotapes were shown with sound for
children did not participate in Task 2, their message-adequacy
scores were based on adult receivers' performance on Task 1
and reanalysis of children's receptive performance on adequate
this revealed that the conditionalized reception scores
samples, and children whose reception scores were based on
After partial elimination of "inadequate" messages, the accuracy scores of each child
were averaged to derive a message-adequacy score for the mother. The mes-
the majority made their choices after a
were eliminated. Obviously, the videotapes were shown with sound for
messages were produced more often for more complex stimulus arrays or more difficult trials, the exclusion of
trials resulted in a comparison of children's receptive skill on a subset of trials of lesser difficulty than the set as a whole.
conditionalized reception scores, calculated as the percentage of correct first choices on "adequate" trials, were entered into
a one-way ANOVA, which revealed a significant main effect of
Procedure
scores of adequate maternal messages were produced more often for more complex
moms. Bimodally communicating children made correct first choices on 76% of trials with adequate messages, compared
59% for orally communicating deaf children. On the same
with 59% for orally communicating deaf children. On the same
conditionalized reception scores for all ages are shown in Figure
Correct first choices made across Tasks 1 and 2 were summed
for each of the two adults who acted as receivers for each mother's messages. Because mothers of the 4-year-old hearing children did not participate in Task 2, their message-adequacy scores were based on adult receivers' performance on Task 1 only. The accuracy scores of the two adults were then averaged to derive a message-adequacy score for the mother. The message-adequacy scores of all mothers were converted to percent-correct scores and entered into a one-way ANOVA. This revealed a significant main effect of group, $F(2, 38) = 4.2, p < .025$. Newman-Keuls pair-wise comparisons revealed no difference in the message adequacy of mothers of hearing children and the mothers of orally communicating deaf children. Both groups had higher message-adequacy scores than did bimodally communicating mothers ($p < .05$). The mean message-adequacy scores of mothers of hearing children and of orally and bimodally communicating mothers of deaf children are displayed in Figure 3 (upper panel).
To ensure that differences in adult receiving skill did not lead to biased estimates of maternal message adequacy, we generated independent estimates of message adequacy. Each of the mother's initial messages (i.e., those presented to the adult receivers) was given a rating according to whether the message described the target referent uniquely (rating of 1), whether it was ambiguous between the target referent and one nonreferent (rating of 2), or whether it referred equally to three or all four pictures (ratings of 3 and 4, respectively). An overall score was calculated by summing the ratings across the 13 trials of Tasks 1 and 2. This analysis confirmed that the visual messages of the bimodal mothers were less differentiated than the messages of their orally communicating counterparts, $t(25) = 2.16, p < .05$.
Conditionalized Reception Scores
Deaf children's receptive performance was reevaluated as a function of adequate messages only. Every bimodally communicating deaf child ($N = 13$) was randomly paired with an orally communicating deaf child, and trials for which any adult receiver made an incorrect choice of referent were eliminated from the data analysis. To enable comparisons with hearing
Discussion
The referential messages of bimodally communicating mothers were less adequate than the messages of mothers of hearing children and those of mothers of orally communicating deaf children. The elimination of "inadequate" maternal messages and reanalysis of children's receptive performance on adequate messages showed the receptive performance of bimodally communicating children to be superior to that of orally communicating deaf children and comparable to that of hearing 6-year-olds. Bimodally communicating children made correct first choices on 76% of trials with adequate messages, compared with 59% for orally communicating deaf children. On the same trials, 8-year-old hearing children achieved near-perfect reception scores (97%), a finding that undoubtedly reflects the exclusion of some of the most difficult trials.
Adult receivers did not differ in their reception of messages produced by mothers of hearing children and by mothers of orally communicating deaf children. These receivers made errors on approximately 10% of the messages of both groups of mothers, compared with 18% errors on the messages of mothers of bimodally communicating children. Somewhat surprisingly, however, neither group of orally communicating mothers achieved perfect message-adequacy scores.
Detailed study of the videotapes confirmed that mothers occasionally omitted one or more critical cues from their messages. In fact, 97% of the inadequate messages produced by orally communicating mothers were the result of incomplete or ambiguous information about the target referent. Often this occurred as a result of the mothers' failure to notice that the target referent was differentiated from the alternative pictures by a combination of two or more differentiating features. On occasion, however, mothers deliberately omitted information presumed to be beyond the comprehension of their child. For example, one mother, after commenting to the experimenter that her child did not know left from right, proceeded to
formulate her message without mention of this critical spatial cue.

As was the case with orally communicating mothers, the majority of inadequate messages produced by bimodally communicating mothers resulted from the omission of differentiating information about the target referent. It was reasonable to expect that these mothers would combine complete verbal messages with less-than-complete signed messages. Instead, most of the messages of the bimodally communicating mothers consisted of parallel signed and spoken messages. Independent ratings of inadequate bimodal messages indicated that the signed content was no less differentiated than the combined (signed and spoken) content. Indeed, 92% of inadequate bimodal messages were equally undifferentiated in both modalities. Messages with adequate verbal content but one or more incorrect signs were much less prevalent (8%). The omissions that characterized most inadequate messages seemed to indicate that mothers structured their messages around their knowledge of sign and simply verbalized what they were signing. It is unclear, however, whether these verbalizations served a self-monitoring
function (i.e., guiding maternal signing behavior) or whether they were provided for the child's benefit (i.e., providing lip cues). If the latter were the case, then one would expect mothers to go beyond their limited signing skill to provide richer verbal messages.

General Discussion

The results of this investigation revealed that mothers achieved high levels of communicative success with their 6- and 8-year-old hearing children but considerably less success with their orally or bimodally communicating deaf children. These findings indicate that previously documented difficulties in mother/deaf-child communication (e.g., Meadow et al., 1981) persist beyond the preschool period well into the primary school years. Given the dyadic context of the present referential communication task, it is difficult to attribute success or failure to either of the participants. (For a discussion of the joint problem-solving nature of communication, see Deutsch & Pechmann, 1982.) Nevertheless, the results of Experiments 1 and 2, taken together, indicate that the quality of information exchange between a mother and her child was limited not only by the child's receptive communication skill but also by the mother's skill at producing unambiguous messages that were appropriately tailored to the needs of her child. In the case of bimodal dyads, some mothers' attempts to support their child's communicative success were compromised by deficits in maternal signing skill.

Although inadequate signing skill characterizes many mothers of children enrolled in bimodal preschool programs, these bimodally communicating dyads still seem to engage in more complex social interaction than do orally communicating dyads (Greenberg, 1978, cited in Meadow, 1980). This suggests that the expressive and receptive skills of many oral preschoolers may be insufficient for productive social interchange with their parents. As the children mature, gains in linguistic and communicative competence are likely to be evident, regardless of the communication mode. Thus, continued social facilitation from bimodal communication would seem to depend on parents' achieving a level of sign proficiency that is consistent with that of their developing children.

The extent to which maternal signing skill contributes to the deaf child's overall communicative competence, expressive and receptive, remains to be determined. Evidence is emerging to support the view that children's acquisition of manually coded English is facilitated by parental involvement and proficiency (e.g., Babb, 1979, cited in Quigley & Paul, 1984; Brasel & Quigley, 1977; Crandall, 1977).

Our videotaped records provided hints that several factors, beyond inadequate maternal messages, contributed to children's errors. Some children chose a picture before their mother had completed her description. Such impulsive responding is considered to be characteristic of deaf children (Harris, 1978) but has also been observed in referential communication situations with hearing children (e.g., Lloyd & Beveridge, 1981). Incorrect selections occasionally resulted from difficulty in establishing and maintaining an effective strategy of picture scanning. Rather than locating all of the critical features in the same picture, some children located one feature in one picture, then found a second feature in a different picture, the latter of which was selected. This type of error reflected the child's ignorance of the fact that the correct referent contained all of the critical information.

Some children's responses, or lack thereof, may have misled mothers to assume that a message had been understood. Few of the less competent receivers requested clarification or additional information. For example, whereas only two of the seven orally communicating deaf children with poorer receptive skills (median split by errors on first choice) provided such queries, all but one of the seven better receivers did so. Children may appear to confirm their understanding of a message with a nod of the head or an appropriate conventionalized vocalization (e.g., uh-huh) but then go on to select an incorrect referent (Karabenick & Miller, 1977).

The phrase-by-phrase echoing of the mother's message by some of the orally communicating deaf children provided a different but equally misleading type of feedback. Consider the following exchange between a mother (M), who provided an adequate description, and her 7-year-old deaf son (C).

M: O.K., listen. Listen to mommy. It's a round ball . . .
C: Round ball.
M: That's pink . . .
C: A pink.
M: And it has a triangle . . .
C: Triangle.
M: On top of the ball.
C: On top of the ball.
M: O.K., the triangle . . .
C: Triangle.
M: It's on top of the ball. It's sitting on top.
C: On top of the ball.
M: [indicates she is finished]
C: [selects incorrect referent with different features]

Such echoing by the child seemed to indicate that he had decoded sufficient information to enable a correct choice of referent, but his incorrect choice revealed that he did not comprehend the echoed message. Perhaps mothers are unaware that young children are often ignorant of their own failure to understand a message (see Markman, 1977). Moreover, they may mistakenly assume that their deaf child knows the meaning of all of the words that he or she can produce.

Limited vocabulary and a poor understanding of conventional word usage almost undoubtedly impeded the performance of orally communicating deaf children as well as the youngest hearing children. For example, the word first was used by many mothers to refer to the left-most in a series of objects, but was often misinterpreted by children to mean the right-most object. Mothers differed in their awareness of and ability to compensate for their children's vocabulary deficits. One mother of an orally communicating deaf child described the horizontal lines on a butterfly's wings as sleeping or lying down. Another mother somewhat comically helped her 4-year-old child find the right side of the picture by exclaiming, "the right side, you know, that's the hand you're picking your nose with." Other mothers were less creative communicators and simply labeled critical features with conventional terms, even though these were likely to be absent from the child's vocabulary (e.g., diagonal). The bimodally communicating mothers with limited sign vocabulary or fluency may have lacked the flexibility to
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adapt their messages appropriately to the needs of a young signing child. Thus, some of the messages that were adequate for adult receivers may have been less optimal for younger receivers.

In summary, the findings of this study reveal differences in the accuracy of information exchange between mothers and their school-age children as a function of hearing status and mode of communication. What remains unclear is how children's skill in comprehending maternal messages is related to their skill in deciphering the messages of others such as fathers, siblings, teachers, or strangers. It is important to determine the extent to which the receptive performance of orally and bimodally communicating deaf children depends on specific adjustments to their language level and world knowledge. These issues are particularly relevant to informed decisions regarding optimal educational placements for deaf children.

References


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