Psychol. Belg.
1975, XV-1, 63-74.

University of Liege, Belgium
University of Minnesota, U.S.A.

DEAF CHILDREN : LANGUAGE DEVELOPMENT AND EDUCATION

JEAN A. RONDAL
Aspirant F.N.R.S.

Several issues in language development and language teaching of deaf children are considered. First, the methodological controversy between oralism and oral-manualism is discussed. Empirical data favoring oral-manual methods are reported. The question is raised whether this superiority is due to the use of the visual modality or to the larger amount of stimulations reaching the deaf individual at the same time in oral-manual programs. A proposal is made to extend the teaching of standardized forms of sign language to hearing children concomitantly with their learning of oral language. This would help specific subgroups of hearing children who experience difficulties in developing and structuring their oral language. Second, the fact that early in their life deaf children communicate by signs, together with the recognition of sign language as a language in the fullest sense is discussed in a retrospective examination of the conclusions drawn from recent developmental studies in cognition using deaf children as subjects. Finally, the structural similarities and differences between American Sign Language and natural oral languages are considered. Preliminary data on the acquisition of sign language by deaf children are also mentioned.

This paper is organized along the following three subdivisions. First, a summary of the literature and a conclusion on what appears to be the central debate in the methodological problems of the education of the deaf child today, i.e. the controversy *oralism versus manualism* in teaching language to deaf children. Related to that topic, one additional issue will be considered and one suggestion will be made. The additional issue is the problem of assessing the causal factor responsible for the relative efficiency of the various educational techniques used in teaching language to deaf children. Is it some specifiable manipulation along a given sensory modality or is it the total number of symbolic stimulations reaching the child in a given amount of time? The suggestion consists of a proposal to generalize the teaching of sign language to the whole school population from nursery to secondary levels as a regular part of the curriculum. As a result, every child, hearing or deaf, could be communicated with in oral as well as sign language. This would have several interesting advantages for specific subgroups of the children population who learn language, and it would create no disadvantage for the present-day educational habits with hearing children.

Second, issues related to the cognitive development of deaf people

will be discussed. The literature on deafness reveals that the commonly held belief according to which deaf individuals are 'a-linguistic' until some age is no longer sustainable. On the contrary, it appears that very early in their life profoundly deaf children are communicated with and do communicate themselves through the medium of signs and develop a first language in the fullest sense of the term. This has very important implications for the study of the interactions between language and cognitive development. It calls for a re-evaluation of some of the conclusions drawn be several researchers who used deaf subjects in their 'language and thought' studies.

Third, I will consider the similarities and differences between sign languages and oral languages as they appear in the work and the analyses of Stokoe and a few others.

EDUCATION OF THE DEAF : ORALISM VERSUS MANUALISM

The central question in teaching the deaf child to communicate is a methodological one. Shall we teach the child to master oral conventional language by confining him from the beginning to the auditory-vocal channel or shall we allow him to communicate by gestures and teach him sign language before progressively bringing him toward the domain of oral communication? As is abundantly demonstrated in the current literature, the second method may pretend to be more realistic and more efficient than the first one. It is said to be more realistic on two grounds. First, it has been observed that profoundly deaf children [1] spontaneously develop sign systems of their own even when not taught to do so (1), that they tend to sign and keep signing even when prohibited e.g., in the context of purely oral educational programs (2;3), and that deaf children or reasonably well speaking deaf adults resort to sign language (more or less formally depending on the context) when they are or feel free to do so (1;4).

Second, it is quite clear that the capabilities of the deaf for expressive speech have been definitively impaired. However intelligent or purposeful he may be, whatever amount of practice he may receive, the hope of seeing a deaf person get access to the realm of speaking persons on a peer basis is just a dream that will never come true (1). This does not mean – and it has to be well understood – that deaf children should not be taught an oral language. In 1953, the number of deaf persons in the United States amounted to 188.100 out of a total population of

[1] The comments made here must be understood as addressing themselves to the problems and the education of congenitally or prelinguistically profoundly deaf persons. Profound deafness or simply deafness as opposed to hearing loss, being defined by using a criterion of a loss of 75 Decibels in the better ear over the speech frequency range. When postlingually deaf persons or persons suffering from mild or moderate hearing loss (hard-of-hearing persons) are considered, the educational problem is of course completely different. In those cases, oral language programs have proved successful in stimulating and developing language.

159.500 million (5), i.e. a ratio of about 12 deafs per ten thousands persons. Granted that a good deal of them know and use sign language, the number of persons who can communicate this way is still very small so that every bit of speech that a deaf person masters increases his social power considerably.

The second teaching method is also more efficient. Recently numerous studies have attempted to assess the relative efficiency of oral versus so-called manual methods[2]. In general, manual, or more exactly, oral-manual methods show a marked superiority over oral methods in developing language and cognition and in leading to higher academic achievement and social competence in deaf children. In the area of speech development both types of method prove to be equivalent (6;3;7;8;4;9). Russian specialists also seem to have realized the relative failure of purely oral methods in teaching deaf children and since the early sixties they have shifted toward oral-manual techniques (10).

As pointed out by Bonvillian et al. (4), experimental evidence casts doubt upon the appropriateness of strictly oral programs. Despite this evidence, the great majority of programs for the education of the deaf in the United States and elsewhere (except apparently in the Soviet Union) are still using oral methods (4). When sign language is permitted and a decision is made to exploit it in the school program, most often the teachers' lack of training in this direction is revealed crudely. Moores states "It is difficult to imagine such a program (i.e. an oral-manual program) today in many parts of the United States. Large numbers of teachers of the deaf, perhaps a majority, do not know how to sign well. Until recently, only a few teacher preparation programs had any courses in manual communication (p. 8)". This apparent resistance to the introduction of oral-manual programs on a large scale in the education of the deaf, may reflect the common basic tenet among linguists (and among laymen as well) that language is predominantly a matter of sounds. The French structuralist school of linguistics has often expressed its belief that 'true' language, as opposed to other kinds of communication, necessarily implies speech. Martinet's definition of 'language' (12) makes it clear that the term has to be reserved for "un instrument de communication de manifestation orale (p. 20)". Benveniste (11) also states that there is no language without voice. Although less explicitly, the oral-aural mode of transmission is also considered as one of the essential properties of human languages by Chomsky and the new school of generativist grammarians (13). This common conception probably finds its roots in the belief that the simultaneous and spontaneous emergence of

[2] The label 'manual method' is misleading. 'Oral-manual' or 'manual-oral' method should be preferred, for no program is restricted to manual communication only. There are a variety of oral-manual programs. Among the best known are the 'Cued Speech' (38), the Rochester Method (39), the Simultaneous Method or 'Total Communication method' (40) and the 'SEE' or 'Seeing Essential English' (41). They vary according to which manual resources are used in implementing the development of oral language and how they are used.

reflective thinking and oral-aurally transmitted language in man is neither accidental nor correlational but causative in essence and that this provides a criterion for defining the 'trueness' of the true languages.

Psychologists have usually been more cautious regarding such matters because they tend to look for communalities in various types of human behavior. Many of them have argued quite convincingly and on different grounds that the above conception relies on a conceptual confusion between speech and language. Skinner (14) defines language behavior as a behavior reinforced through the mediation of other persons, thus without any specific reference to speech. Brown (42) sees semanticity, productivity and displacement as more important elements of a definition of language than oral-aural transmission. 'Primate psychologists' like Premack (15) and the Gardners (16) have been moderately successful in teaching the rudiments of language to chimpanzees, using other than aural-vocal channels. Freud (17), Piaget (18) and others clearly demonstrated that speech and language, as functions, were nothing but the manisfestations of a more fundamental function, namely the semiotic function. As to syntactic or processing devices, Lashley (19) convincingly argued that speech is not the only behavioral system to be hierarchically organized. The same principles that preside to its organization must be supposed to sustain any serial (non-repetitive) behavior. It is about time to abandon such naive positions as those reported above concerning a separation between 'true' and 'untrue' languages. There are neither 'true' nor 'untrue' languages like there are no specific speech organs. What does exist is a semiotic function and what may be called a general syntactic (in the etymological sense of 'sun-taxis', i.e. organize, put in order, arrange) function, whose primitive forms may be observed in animals and which sustain or may sustain several communicative systems in man. Sign communication, visual communication "à la Premack" (if tomorrow transportable personalized computers allow a multiplication of the power of our short and long term memories) and oral communication are different in several respects. However, they are all possible for the same set of reasons and basically they rely on the same mechanisms and propensities. It must be concluded that they are in essence 'the same thing'.

Let me now consider two additional issues. The first concerns the problem of the causes for the superiority of some educational programs for the deaf over others. The question is not purely academic, because eventually it will be profitable to devise minimal-cost and maximal-efficiency techniques for teaching language to deaf people. As said earlier oral-manual programs are better than purely oral programs. Moores and his associates (9) recently did an assessment study, comparing several programs representing the range of methodologies currently used with deaf children in the United States. Combined oral-manual methods of communication proved to be significantly superior to the more traditional methods in developing receptive

abilities in deaf children. The data of the receptive communication test given to the subjects suggest an often significant improvement of the scores as more dimensions are added. That is, as one moves from modes of communication defined as speech alone (34 percent correct responses) or printed word alone (38 percent of correct responses), to sound plus speechreading (56 percent), to sound plus speechreading plus fingerspelling (61 percent), to sound and speechreading plus signs (72 percent) the scores continue to improve. This is an indication that, at least within the limits of the investigation, the more relevant the stimulations processed by the brains of deaf subjects, the better the receptive performance. It is not clear from the Moores et al. investigation whether this is always true or whether this is restricted to the simultaneous or successive stimulation of a given number of sensory modalities with a given number of stimuli. In other words, it is not known whether the use of additional relevant (or even irrelevant) stimulations and/or more sensory modalities for some time in an educational program would result in improving the receptive scores obtained by Moores et al. on the sound plus speechreading plus signs paradigm for example. Hudgins (20) and Klopping (21) suggested that simultaneous visual and vocal presentation of material facilitates the reception of information. Would simultaneous visual, vocal and tactual (e.g. through a vibrator) presentation of several relevant visual stimuli coupled with visual and tactual presentation of language material, or any other additional combination improve the receptive scores? Or is there a ceiling or a critical amount of stimulation beyond which any additional stimulation results in a disturbance of the whole information processing activity? Ways of tackling the question are easy to imagine. For instance, one could deliver 'new programs' for some time to matched groups of deaf children and then compare their performance on expressive and receptive abilities with the other programs. A new program, for example, could use sound (amplified) plus written language plus speechreading plus signs plus fingerspelling (the last two ones at the same time). Another program could use the preceding components plus several vibrators disposed on the body, which would permanently translate sounds into tactual messages for the benefit of the deaf person.

The second issue is based on the idea that learning a standardized sign language (whose relationship with the oral language should be systematic) and an oral language simultaneously would be beneficial for hearing people too. The suggestion follows: let us start teaching sign language to young hearing children as well as to deaf children. As will be argued there are no real disadvantages to such a strategy. On the contrary there would be several advantages particularly for mentally retarded and borderline children and also for the category of intellectually normal children known as 'deviant' language users. In general it would be advantageous for those children who experience difficulties in the structuration of their developing language. The advantages do not lie in communication itself for, quite obviously, those

children communicate well enough through the verbal medium, but they would lie in consolidating and supporting oral language.

Let us start by considering the possible disadvantages of such a suggestion. One might argue that if it were put into practice it would result in seriously delaying the language acquisition process of normal children. They would tend to keep using signs instead of words. The simultaneous learning of two systems would also have a negative effect on the rate of language development, or worse, it would take us back to an earlier stage of the evolution process (as some people now think that sign languages may have been the first languages of evolving humanity). It could transform the way human beings think and communicate, which would not be a gain because oral languages ar more efficient than sign languages in many respects.

I would answer that chances of a return to an exclusive use of signs in communication are probably very small. Signs are to some extent the natural complements of sounds and words. The segmental features of our everyday life language are deeply inserted and largely complemented by the highly meaningful supra-segmental features of prosody and the 'supra-supra-segmental' features, so to speak, of facial mimicry and body gestures. To the author's knowledge, there has not been any trend in the last centuries toward a replacement of verbal communication by musical notes and rhythm or by transitive gestures, admitting that some ethnic groups communicate remarkably well in complementing their speech with expressive gestures. The argument that language acquisition would be seriously delayed if children had to learn two systems of expression at the same time, also relies on the assumption that words and gestures stand in an opposite relation to each other. As was said earlier in this paper, this assumption is false. Words are the mechanical products of gestures, they are gestures. Both oral and sign languages reflect the same central ability and psychophysiological organization of the language function. There is no opposition between words, sentences and signs. They are not the products of opposite systems. They are more likely to interact positively with each other rather than to compete, as is currently being demonstrated by the use of oral-manual programs with deaf children. This bring us to the advantages of the proposal.

Clearly, one advantage for deaf persons is that it would facilitate their communication with hearing people and extend their social integration in the 'hearing world', but the advantages that I have in mind are on the side of hearing people. A sign language like the American Sign Language shows two interesting characteristics. First, if one tentatively generalizes from the results obtained with deaf children, the simultaneous use of sign and oral languages helps to sharpen the development and the structuration of oral language. Second, American Sign Language presents three differences (besides many similarities, see the third part of this paper) with oral language that might make it more 'accessible'. The differences are : first, in sign language, certain signs may be produced simultaneously while oral

words and morphemes are always sequential (22). Second, sign language allows a greater number of reduplications compared with the usual single repetition in spoken language (23). Third, the syntax of American Sign Language may be characterized as resembling short, simple declarative English sentences arranged sequentially in chronological order (24). It seems to me that an instrument of communication like the American Sign Language may constitute an interesting adjunct system particularly for those children who experience difficulties in their language development, be they called language deviant users (25;26;27;28), borderline or mentally retarded children. There are two reasons, why this might be the case. First, sign language presents many of the caracteristics of an intermediate system on a continuum of structural complexity, with its simpler sentencial structure, its relative paucity in function words and its allowing for more reduplications than oral language. Consequently, its mastery would allow the child to possess a simple competence that would constitute a solid and inalienable basis for further grammatical development. Second, the relatively less sequential character of sign language as compared with spoken language may be also interesting to our target children as they are usually described as having difficulties in temporally integrating auditory stimuli. This is true for those normally intelligent children who encounter difficulties in developing language as well as for mentally retarded children. Recently, several studies using the Illinois Test of Psycholinguistic Abilities or its predecessor, the Differential Language Facility Test, demonstrated that mental retardates are markedly deficient on the automatic-sequential aspects of language functioning (29;30). In this respect, a sign language may contribute to provide an intermediate step in the progressive development of the mechanism of sequential coding that appear to be so important for language processing.

From a theoretical point of view, a supplementary system of coding experience should result, by the additional feedback it provides to the central nervous system, in strengthening the central processes of analysis and synthesis that are basic to language production and comprehension, and to thinking. According to Sokolov (31), kinesthetic impulses arising in overt or covert articulation of words, leading from the speech musculature to the cerebral cortex and strengthened by the reticular formation of the brain stem and the thalamus, can evoke generalized and local cortical speech activation. As a result, speech kinesthesia are the true regulator of the flow of cortical associations. Although Pavlov pointed to the dominating significance of speech kinesthesia, kinesthetic cortical regulation and activation are not restricted to speech reafferentation. The motor cortical analyser integrates other kinesthesia as well (32;31). Among those, reafferent impulses from gestures and particularly from meaningful gestures, by the connections they have with verbal thought, seem perfectly suited to play a significant role in cortical regulation as well. Pavlovian conception of the prevalence of the motor analyser in central neuro-

dynamics and the importance of reverse afferentation for cortical regulation thus supplies the psychophysiological basis on which combined sign and oral languages may be expected to interact with each other rather than to interfere negatively.

YOUNG DEAF CHILDREN ARE NOT 'A-LINGUISTIC' BEINGS

As research moved from school settings toward the naturalistic observation of deaf persons (particularly in their families) it became increasingly clear that the common belief according to which young deaf children are 'a-linguistic' until they start learning language in special schools has to be abandoned. Indeed very soon in their life, young deaf children are communicated with and communicate themselves by signs. Their signing may be somewhat esoteric at first and for some time its understanding may be restricted to the child's close relatives, but the same holds true for young hearing children. As the child acquires new signs however, he extends his system as to include the conventionalized or more conventionalized signing that he encounters around him, at least when he is allowed to do so, and when he has models and signs to imitate. It is therefore unjustified to think that his long-standing and true linguistic practice does not contribute to cognitive development. Nevertheless, this assumption was made repeatedly by distinguished scholars in the field of cognitive development. Several researchers have come to use deaf children in studying cognitive development, on the assumption that this would allow them to separate language from intellectual development, hereby bringing the old 'language and thought' issue in the development of cognition somewhat under control. Furth's studies are best known in this area. On the basis of a review of the literature in the field as well as his own research on concrete thinking development in profoundly deaf children, he concluded that deaf children develop in much the same way and reach about the same levels of intellectual development as hearing children. This seems to be correct but he added, as a general conclusion for intellectual development of both deaf and hearing children, that "language does not influence intellectual development in any direct, general, or defective way (p. 160)" (33). This conclusion is completely unwarranted because it relies entirely on the false assumption that deaf children constitute perfect a-linguistic controls. In view of the large impact of Furth's ideas on contemporary developmental cognitive literature and education, it is not without importance to emphasize that his assumption confuses speech and language. Indeed he supposes that deaf children, because they are drastically limited in their expressive functions, are impaired to the same extent in language functioning.

Another questionable assumption, implicitly present at least, can be found in Furth's work and also in the work of many authors who wrote about language and thought relationships in cognitive development

(also in aphasiology). It is the belief that the language used in the thinking process has to be structurally similar to the communicative or external language. According to this view, language for self must bear all the complexity of external language so that someone impaired in communicative language is easily considered equally impaired in verbal thinking. This view completely ignores more than 25 years of research on inner speech starting with the genial views of Lev Vygotsky. A look at this literature is enough to convince oneself that verbal thinking is not bound to expanded language and syntactical organization to the same extent as external language. The structure of 'true inner speech' has to be distinguished from 'inner speaking' according to the suggestion of Leontiev (34). Inner speaking, i.c. syntactically more complex forms of inner speech, may accompany verbal thinking when the tasks are very complicated or when verbal thinking is at the point of being made explicit for purpose of communication, but this is definitively not a necessary condition. True inner speech is best defined as a system of maximal syntactic simplification (a few words being expressed at the same time with or without respecting the standard syntactic rules of external speech), together with important enrichments in the 'meaning weight' of the words or combination of words (the 'key-words' of Vygotsky). With this comprehensive notion of inner speech in mind, it is clear that the somewhat syntactically restricted medium used by deaf children is as perfectly adapted to a use in verbal thinking as any other coding system, including oral language. In conclusion, the field of deafness *is not and has never been* the ideal territory to test hypotheses about language and thought relationships on the assumption that deaf persons achieved cognitive development without any interference between language and concrete thinking. All the conclusions based on this assumption have to be revised.

SIGN LANGUAGES AND ORAL LANGUAGES

So far the term 'sign language' has been used without specifying exactly what was meant by this expression. As pointed out by Moores (2), there is a great variety of visual-motor communication systems from 'home-made' gestures, understood by only a few people in close contact with other, to standardized systems "capable of expressing all the levels and nuances of spoken English (2, p. 2)". They also vary considerably as to the relationships they have with oral language, from closely connected independent systems to spoken language. What we had in mind in this paper in talking about sign languages, are the abstract and standardized sign systems that are closely connected to spoken language. The American Sign Language (ASL) can serve as an example. I shall try to characterize it by relying on the work done by Stokoe and a few others. American Sign Language consists of a rule-based syntactic system plus a lexicon of signs. Both components indicate structural consistency. Just as in spoken languages, the meaning

associated with most of the signs in ASL are arbitrary and have to be learned. Contrary to the popular belief, there is no universal natural sign language (2). The motoric equivalents for onomatopoeic words are not more numerous than in spoken languages. As to the syntactic component, ASL appears to be a language in its own right with a true syntax although a bit simpler than that of spoken languages. It has a majority of simple, declarative sentences chained in a way that duplicates the temporal order of events referred to, and it has a relative paucity in function words. Morphology is somewhat different in its grammatical aspects as ASL does not inflect signs for grammatical purposes as most spoken languages do for words or morphemes (24).

Thanks to the work of several pioneers the structural properties of ASL begin to be known better. Still, the problem of how the deaf child acquires and develops competence in sign language is still a largely unexplored field, despite its intrinsic relevance for cognitive and linguistic theory in general. As is well known, the problems one faces in elucidating the language development of hearing children are enormous. It is therefore unrealistic to expect that investigating the sign language acquisition process will be any simpler. Some studies have already been reported (35;36;37). They seem to suggest that the acquisition of sign language by deaf children parallels in many respects that of spoken language by hearing children. Like their hearing peers, deaf children proceed through holophrases, pivot-like constructions, and the same set of relational meanings at the 'two-sign-stage'. The acquisition of negative and interrogative sentences also follows like patterns in both categories of children. Much more information is needed but the available evidence clearly confirms the view that deaf children are fully comparable to hearing children in their basic language capabilities. The latter observation makes the study of their language development a relevant and fascinating topic for developmental psycholinguistics.

REFERENCES

1 CICOUREL A.V. & BOESE R.J., Sign language acquisition and the teaching of deaf children. In: CAZDEN C.B., JOHN V.P. & HYMES D. (Eds), *Functions of language in the classroom*. New York, Teachers College Press, 1972.

2 MOORES D., Communication — Some unanswered questions and some unquestioned answers. In: O'ROURKE T. (Ed.), *Psycholinguistics and total communication*. Silver Spring, Maryland, American Annals of the Deaf, 1972, p. 1-10.

3 MUELLER W.M., Comparison of psycholinguistic patterns of gifted and retarded children. *Journal of School Psychology*, 1964 (3), 18-25.

4 BONVILLIAN J.D., CHARROW V., & NELSON K., *Psycholinguistic and educational implications of deafness*. Unpublished paper. Stanford University, Stanford, California, 1972.

5 FRISINA R., Statistical information concerning the deaf and the hard of hearing in the United States. *American Annals of the Deaf*, 1959 (104), nr. 2, 265-270.

6 QUIGLEY S.P. & FRISINA D., Institutionalized and psychoeducational development in deaf children. *Council for Exceptional Children Monograph*, 1961, No. 3.
7 STUCKLESS E.R. & BIRCH J.W., The influence of early manual communication in relation to the deaf's intellectual, social, and communicative functioning. *American Annals of the Deaf*, 1966, 111, 452-466.
8 VERNON M. & KOH S., Early manual communication and deaf's children achievement. *American Annals of the Deaf*, 1970 (115), 527-536.
9 MOORES D., WEISS K. & GOODWIN M., Receptive abilities of deaf children's across five modes of communication. *Exceptional children*, 1973 (39), 22-28.
10 MOORES D., Neo-oralism and education of the deaf in the Soviet Union. *Exceptional Children*, 1972 (38), 377-384.
11 BENVENISTE É., *Problèmes de linguistique générale*. Paris, Gallimard, 1966.
12 MARTINET A., *Éléments de linguistique générale*. Paris, Armand Colin, 1970.
13 CHOMSKY N., The general properties of language. In: MILLIKAN C.L. & DARLEY F.L. (Eds), *Brain mechanisms underlying speech and language*. New York, Grune and Stratton, 1967, p. 73-88.
14 SKINNER B.F., *Verbal Behavior*. New York, Appleton-Century-Crofts, 1957.
15 PREMACK D., A functional analysis of language. *Journal of the Experimental Analysis of Behavior*, 1970 (14), 107-125.
16 GARDNER R.A. & GARDNER B.T., Teaching sign language to a chimpanzee. *Science*, 1969 (165), 664-672.
17 FREUD S., *La science des rêves*. Paris, Alcan, 1903.
18 PIAGET J., *La formation du symbole chez l'enfant*. Neuchâtel, Delachaux et Niestlé, 1945.
19 LASHLEY K., The problem of serial order in behavior. In: JEFFRESS L.A. (Ed.), *Cerebral mechanisms in behavior*. New York, Wiley, 1951, pp. 112-136.
20 HUDGINS C., The response of profoundly deaf children to auditory training. *Journal of Speech and Hearing Disorders*, 1953 (18), 273-288.
21 KLOPPING H., Language understanding of deaf students under three auditory-visual conditions. *American Annals of the Deaf*, 1972 (119), 389-396.
22 STOKOE W.C., *Semiotics and human sign languages*. The Hague, Mouton, 1972.
23 FISCHER S.D., *Two processes of reduplication in the American Sign Language*. Unpublished paper, The Salk Institute, San Diego, California, 1971.
24 FANT L.J., *Some preliminary observations on the grammar of American Sign Language*. Unpublished paper presented at the California School for the Deaf, Berkeley, January 1972.
25 MENYUK P., Comparison of grammar of children with functionnally deviant and normal speech. *Journal of Speech and Hearing Research*, 1964 (7), 109-121.
26 MENYUK P. & LOONEY P., A problem of language disorder: length versus structure. *Journal of Speech and Hearing Disorders*, 1972 (15), nr. 2, 264-279.
27 MENYUK P. & LOONEY P., Relationships among components of the grammar in language disorder. *Journal of Speech and Hearing Research*, 1972 (15), nr. 2, 395-406.
28 LEONARD L.B., What is deviant language? *Journal of Speech and Hearing Disorders*, 1972 (37), nr. 4, 427-446.
29 BATEMAN B. & WHETERELL J., Psycholinguistic aspects of mental retardation. *Mental Retardation*, 1965 (3), 8-13.
30 MUELLER W.M., Comparison of psycholinguistic patterns of gifted and retarded children. *Journal of School Psychology*, 1964 (3), 18-25.
31 SOKOLOV A.N., Speech motor afferentation and the problem of brain mechanisms of thought. *Voprosy Psikhologii*, 1967 (13), nr. 3, 41-54.
32 LURIA A.R., *Higher cortical functions in man*. New York, Consultants Bureau, 1966.
33 FURTH H., Research with the deaf: implication for language and cognition. *Psychological Bulletin*, 1964 (62), 145-164.

34 LEONTIEV A.A., Inner speech and the processes of grammatical generation of utterances. *Soviet Psychology*, 1969 (7), nr. 3, 11-16.
35 SCHLESINGER H.S. & MEADOW K.P., *Deafness and mental health*. Final Report, 1971. Department of Health; Education and Welfare; Social and Rehabilitation Service.
36 BELLUGI U., *The signs of language and the language of signs*. Unpublished paper presented at Stanford University Psychology Colloquium, November 1970.
37 MOORES D., Oral vs manual... "old prejudices die hard, but die they must". *American Annals of the Deaf*, 1970 (115), 667-669.
38 CORNETT O., Cued speech. *American Annals of the Deaf*, 1967 (112), 3-13.
39 SCOUTEN E.L., The Rochester method, an oral multisensori approach for instructing prelingual deaf children. *American Annals of the Deaf*, 1967 (112), 50-55.
40 SANTA ANNA Unified School District, Staff of the hearing impaired program, Santa Anna, California. Unpublished paper presented at the Convention of American Instructors of the Deaf. Little Rock, June 1971.
41 WASHBURN A.O., *Seeing Essential English, a comparative approach*. Unpublished paper, Anaheim Union High School District, Anaheim, California, 1972.
42 BROWN R., *A first language*. Cambridge, Massachusetts, Harvard University Press, 1973.

220c Institute of Child Development
University of Minnesota
Minneapolis, Minnesota 55455
U.S.A.

Received September 1974