

TODAY AND TOMORROW IN THE EDUCATION OF THE DEAF*

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SUMMARY

The need to base programmes for young deaf children on an understanding of the composite of their capacities is stressed. A number of these capacities, among many, are cited in regard to sensory input and language acquisition and pertinent questions associated with them are raised.

OPSOMMING

Die behoefte om programme vir jong dove kinders te grond op begrip van samestelling van hul vermoëns word beklemtoon. 'n Aantal van hierdie vermoëns, uit vele gekies, word aangepas met betrekking tot sensoriese ontvangs en taalverwerwing en pertinente vrae wat daarmee in verband staan, word geopper.

Author's note:

It is a privilege for me to be invited to contribute to the *Journal* of the South African Speech and Hearing Association honoring my friend and colleague Prof. Pierre Pienaar. I look back with pleasure and appreciation to my visit, in 1967, to South Africa, arranged by Prof. Pienaar. The intellectual stimulation, the warm hospitality, and the new experiences made the trip a memorable one for Mrs. Silverman and me.

I was invited to contribute an article on the education of the deaf. I suggested to the editor that I submit for consideration, my keynote presentation on the subject to the International Congress on Education of the Deaf, in August of 1970 at Stockholm. The suggestion was made for two reasons. First, the talk represented my current thoughts on the subject and second it had not appeared in the periodical literature. Here it is unedited from the original version.

The subject assigned me by your chairman for the opening lecture of this Congress is "Today and Tomorrow in the Education of the Deaf." It appears to call for an updated version of my keynote address to the 1963 International Congress in Washington titled "The Education of Deaf Children - Past and

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Prologue.”¹⁸ I hope that the omission of the “past” in the present assignment is not a deliberate rejection of the recent history of our profession and the lessons it has to teach. Who knows, maybe it is an unconscious bow to the credo of rebellious youth for whom the past is irrelevant. What is more likely is that the planners wisely recognize the great abundance of stimulating and provocative activity now going on in the education of deaf children and in the interest of economy of time have chosen to focus on the significance of this activity for the future. Furthermore, they rightly assume that those interested enough to commit their time, energy and means to attend the Congress require no tutorial in the history of our field.

We recall that the 1963 Congress was organized sequentially from assessment and diagnosis of children, through their educational experiences to their economic, psychological and social accommodation to the world about them. However, reflection on activities since our last meeting, especially as they are expressed in the subjects of this Congress, suggests that this necessarily brief exposition concentrate on a topic that is particularly timely today with stress on the questions it raises for tomorrow. I draw liberally on the writings of those who have given serious and sustained attention to the topic. This is the increasing emphasis on *very young children*. After all, they are the school children of tomorrow. This is not to say that it is the only one that merits attention or that it is unrelated to such topics as curriculum and the latter day concern for the formulation of objectives against a background of an overwhelming accumulation of knowledge, media, mental health, vocational and technical training, participation by more deaf persons in educational planning, professional training, organizational and administrative arrangements, philosophic outlook and realistic aspirations for the deaf including its relation to the “sub-culture” syndrome and a host of other problems of mutual concern. It simply expresses the opinion of your keynoter operating within the time and context assigned him. I am aware too, I hasten to point out, that the education of deaf children reflects the distinctive traditions, trends and aspirations for general education of each nation represented here. I trust, nevertheless, that these differences, whatever they may be, are put aside to consider problems singularly common to all deaf children.

This audience does not need to be reminded how the encouraging progress in the identification and assessment of hearing impairment in young children has underlined the necessity and, yes, the opportunity for effective preschool programs. We all realize how important for learning and over-all development of children is the period from birth to the age of five. Indirect, but importantly suggestive evidence from neurophysiology points to the substantial influence on the developing nervous system of sensory experience. And we are all familiar with the emphasis placed by psycholinguists on the notion of an optimal period for acquisition of language, particularly its structural features. The implication of all of this for parents, too, properly commands our earnest attention.

It is interesting to mention here that Davis underlines the need for early treatment by suggesting a hypothesis about the etiology leading to an “aphasic”, “language handicapping”, “difficult learning” problem in children or what-

ever you choose to call them. In the latest edition of *Hearing and Deafness*⁷ he says:

"It is postulated that the auditory system requires sensory input during the early years, particularly during the second year when the normal infant begins to learn speech, in order to complete its development, and that if this normal organization does not occur, it is more difficult to bring it about later, even though sounds are then made audible by amplification. The failure to recognize the partial hearing loss leads to false expectations and inappropriate management. The child develops what may be called a "habitual disregard" for sound as a means of communication. It makes no difference whether the hearing loss is hereditary, congenital, or acquired, but it is important that the loss is present during the years when children normally learn to talk."

"This interpretation is still a hypothesis, . . . Important is the clinical experience that young children in whom the partial hearing loss is detected early and who are given the benefit of early and habitual exposure to loud speech, with a hearing aid as soon as they are old enough, do develop speech and effective use of their residual hearing much better than children with similar audiograms who have not had the advantage of early auditory exposure and training. The practical implication of this hypothesis is, of course, to recognize early the auditory defect and to initiate the proper management."

Davis also suggests a new term. "Dysmathia is a more appropriate term than congenital aphasia. Dysmathia is an old Greek word that means exactly what we want to say, namely, difficulty or slowness in learning. If we wish to be more specific and say difficulty in learning speech and language, we can form a new word, dyslogomathia. The familiar root *logos* carries the connotation of both speech and language."

"In summary, true congenital aphasia based on an anatomical defect or birth injury does occur, but it is rare. Dyslogomathia, based on partial sensory deprivation, is a more probable explanation in a majority of the cases in which children show some reactions to fairly loud sounds but do not spontaneously develop speech, and often have great difficulty learning speech later. Further study should clarify the situation and allow us to accept, reject, or modify this working hypothesis."

Having agreed on the general propositions stressing the need we must ask what is a sensible program. Obviously any program for tomorrow will exploit our expanding knowledge of assessment of those capacities of children that are important for their educational management. For example, in studying auditory capacity we shall supplement, wherever possible, determination of auditory thresholds with information about perception of pattern, ability to use minimal auditory cues for "total" communication, attentiveness to sound and differential sensitivity. A pertinent experiment in our laboratory by Gengel,¹⁰ studying differential sensitivity for frequency and its change with training, demonstrated a reduction in the difference limen in hearing impaired children after only limited practice. He found that a number of hearing impaired children discriminated differences of 4% at 2 standard frequencies, 250 and 500 Hz (comparing rather favorably with normals) and suggesting that proper practice could greatly improve discrimination among vowels and voice-pitch

changes. The point made here is that these features of auditory capacity need to be identified and subsequently cultivated. It emphasizes that we need to be cautious about regarding hearing in a simple two dimensional way. We look forward to making better use of improved description, if not always measurement, of all kinds of perceptual responsiveness and of intellectual, motor, emotional and social competence.

Granted the hopeful prospect that we shall be equipped with more useful information about young children we shall still face a number of alternatives for management that on first consideration are very appealing. Consider, if you will, sensory stimulation and the options for channel, mode, and stimulus coding. Here we are immediately confronted by the uni-multi-sensory issue. Does a deliberate bisensory approach confuse and distract or does it reinforce with associated cues a primary channel of communication of another sense? And if it does either of these, how much, when and under what conditions? There is some evidence that tactual vocoders^{12,17} or acoustic cues at the level of detectability, may help speechreading.⁸ The evidence for cooperation or competition between the auditory and visual senses is not all clear nor too abundantly at hand.

We are not too much better off for convincing evidence for a bimodal uni-sensory tactic such as finger spelling combined with speechreading. Some view these as the essential components of "total communication" to develop speech, speech reception and language, including reading.¹⁴ In the symposium last week, a number of systems cueing speech was discussed as an alternative bimodal approach. Incidentally, they varied substantially in their primary objectives and in their relation to the utterances they are designed to cue. Some are related to acoustic features, others to articulatory gestures, and still others to arbitrary differentiating cues for non-visible features.

An impressive effort has gone into the coding of stimuli particularly auditory. The emphasis has been on making available crucial information-bearing elements of signals to the part of the auditory channel that may possibly detect and transmit them – most often in the low frequencies. Clever methods of frequency transposition, insertion of discriminable surrogate signals and amplification of various sorts in association with particular training regimes are being attempted. Here too the evidence for special methods of coding are not overwhelmingly convincing but impressionistic and anecdotal evaluation points to continued efforts in these directions. Also we shall watch with interest the attempts to adapt finger spelling to phonetic correspondence and to expand and to refine syntactical features of the language of signs.

It becomes clearer as we ponder these alternatives for sensory input that we need to ask more fundamental questions such as the effects of a particular strategy on the operation of short term memory, the place of immediate, delayed, ambiguous or distorted feedback over any sensory system, and of the storage of rules of sequential probabilities of linguistic units.

The task of improving our programs for young children is complicated further by the imposing and awesome array of theoretical alternatives and their application having to do with language acquisition. The ideas of Piaget¹⁶ stressing that mental growth does not depend on quantitative addition of experience

but that the development of thought and language is primarily qualitative has had substantial influence. Thought precedes language and they are eventually interrelated. And even without language a child is capable of developing a logical-symbolic system. Relevant to this we have said in *Hearing and Deafness*¹⁹

“There appears to be a significant movement to introduce the language of signs as a major mode of communication with young deaf children on the grounds that the capacity for thinking must be developed early and should not be confused with the capacity for using language. It is argued that we deter the development of thinking in deaf persons by emphasizing at the outset verbal means of communication, be they speech, the manual alphabet, or a combination of the two. In his book on the subject, Furth⁹ indicates that by present methods we foster an ‘experiential deficiency which would be avoidable if nonverbal methods of instruction and communication were encouraged both at home in the earliest years and in formal school education’. The assumption that this is the only alternative to certain conventional unproductive methods is open to question. For example, we must weigh carefully the accomplishment of parent guidance and the early intensive use of residual hearing, and also the impressive academic, vocational, and communicative attainment of many deaf persons.”

“The idea has been advanced that oral language be taught as a second language preceded by the language of signs aimed at cognitive development and that the latter be used to bring out the advantages of oral language. The sign language, it is suggested, ought to be enriched so that it is less rigidly concrete and situation-bound.”

“The ‘oral-manual’ controversy is not yet settled. It is encouraging, however, that numerous investigations are under way to study not only the linguistic, conceptual, and intellectual effects of modes of communication for deaf persons but also their influence on features of personality such as emotional maturity and self identity.”

Skinner,²⁰ as we know, emphasizes environmental conditioning and reinforcement. The child in discriminating the many stimuli in his environment emits sounds that get reinforced. The emphasis here in shaping verbal behavior is external and the child’s internal structure is not of much importance. Some of us believe that a primary cause of so called “oral failures” is the absence of a reinforcing environment for oral communication. Skinner’s views appear to be directly opposed to those of Chomsky⁴ who postulates a theory of linguistic universals common to all cultures. Chomsky asserts that a valid model of linguistic behavior must account for the extraordinary fact that we use language we have never heard before. Very young children are able to construct and understand an impressive number of utterances that are quite new to them. From earliest childhood the human use of language goes far beyond what is “taught”. Therefore, there must be some fundamental process at work independent of input from the environment. In the absence of his ability to know what goes on in the mind the linguist imputes to it a finite set of rules that specifies the deep abstract grammatical structures that underlie sentences and then further transformational rules that relate these deep structures to

surface structures (i.e. real sentences). The possibility of developing a better language program growing out of these ideas has become very intriguing to teachers of deaf children. The sequence of structured word strings in the language of normal children could be a model for teaching young deaf children. There would need to be contrived activities to do this for deaf children, not to mention a sorting out of "performance" and "competence" in our observations of a child's linguistic behavior. The reason for making the distinction is that it is in the description of linguistic competence that rules seem unavoidable as explanatory concepts.⁵ In a meeting which we both attended, (Princeton) I asked Prof. Chomsky, "How can we tap these (language) universals in creating a command of language in deaf children." I quote his answer:

"One would expect that unless the appropriate stimulus conditions are realized, the instinctive behavior would not appear. It may be that the appropriate stimulus condition is hearing enough linguistic noises in your environment. So it just might be that there is no way to tap the system, any more than there is a way of initiating the system of flight in birds without putting them in the situation in which they have to flap their wings."⁶ Note the phrase "appropriate stimulus condition".

O'Neil's¹⁵ word of caution about the application of psycholinguistics to teaching is worthy of mention:

Linguistics thus seeks to find explanations of the structures of language, for the relationships among structures, consistent explanations of the complicated and fragmentary data of language. It is further concerned to offer explanations of the way in which the grammar is used and the way in which it is acquired and internalized by infants growing up in society. The grammar does not purport to be a model of how the human mind puts sentences together in speaking or takes them apart in hearing. But the grammar does presumably constitute the knowledge of his native language that the human being brings to bear on the tasks of speaking (and writing) and of hearing (and reading). Very little of this is at all well understood, but there is much interesting work in progress in psycholinguistics and some tantalizing bits of information are emerging.

Much of the psycholinguistic research is entering areas of interest to educators. But only entering, not yet there. It would be a serious mistake to begin building educational programs in areas where our understanding is so dim. In fact we have nothing like a completely formulated grammar of any language, much less a complete understanding of language in general.

Of interest to us, of course, is Vygotsky's²¹ notion of "inner speech." It does suggest that we must develop ways, as I have said elsewhere, of rummaging around in the psyche of deaf children to study the relation of the symbols they use for expressing themselves be they oral, finger spelling or signs and their thought processes. This need is underlined by Lennenberg's¹³ views that language behavior derives from peculiarly human cognitive processes like categorization and abstraction. It is a human mode of analysing experiences into conceptual units and rules that link them. The child matures in this process biologically but language stimulation is necessary in his formative years.

Bronowski and Bellugi² tell us that "most of what we regard as objects in our environment, however, are sophisticated concepts. Thus the logic by which a child unravels the sentences he hears and his experience of the environment together is much more than a capacity for language and expresses in miniature

a deeper human capacity for analyzing and manipulating the environment in the mind by subdividing it into units that persist when they are moved from one mental context into another." So even learning the name of an object by a deaf child is a much more cognitive act than heretofore supposed and should influence our methods accordingly.

In *Hearing and Deafness*¹⁸ we have said, it is appropriate, in discussing the young deaf child, to mention the increasing amount of information and guidance available for parents of deaf children. Although here and there an effort may be misguided, the proliferation of parent institutes and clinics, and of correspondence courses, reading lists, and literary output is one of the most constructive and forward-looking developments in the education of the deaf. One parent put it succinctly:

. . . the tough thing about deafness is likely to be social isolation, social adjustment. There is no one in the world, and there never can be anyone, as important in determining any child's social adjustment as that child's own parents and his family at home. For that reason parents are important.

In general there appear to be no universally accepted specific aims or procedures in guiding parents of very young children. The emphases vary. For some, the primary aim is to create realistic "acceptance" of the child's condition, and counseling is weighted toward psychotherapy. For others, the emphasis is on conveying information in order to create an understanding of sensory deprivation and its effect on the total development of the child in general and of his communication deficit in particular. Whenever possible there is a growing trend toward carrying on parent "training" in homes and homelike settings, sometimes called demonstration homes, where, by demonstration and practice, parents learn to contrive and take advantage of natural situations in the home to sharpen perceptions and foster communication.

Of great interest to educators of deaf children is the knowledge likely to be gained from the programs of early education such as Head Start directed at "culturally disadvantaged" children³ in the U.S.A., in the U.S.S.R.¹, and in the kibbutzim of Israel. Here too, vigorous schools of thought appear to be taking shape. On the one hand, there are those who would emphasize "cognitive" approaches that stimulate intellectual functioning. In its extreme form it has been labelled the "pressure-cooker" view, which aims to compensate for the lack of opportunity for perceptual development. Others would stress the child's social and emotional growth without too much "structured" teaching. Here, too, we need a better understanding of the role of shaped sensory experience in the cognitive development of infants.¹¹

Such evidence as exists for the value of particular procedures and programs of parent counseling is meager and is generally anecdotal or based on studies (frequently retroactive) of children's records. It will be helpful, for the parent programs we undertake, to evaluate all of the following: genetic counseling for deaf married couples and parents of deaf children; the use of the high risk register; the adaptations necessary because of differences in the intelligence, motivation, and education of parents; the emotional needs of parents; the special training necessary for those who counsel parents; and the implications of the concept of critical periods in development.

We have seen in these necessarily selective and illustrative remarks that the rising tide of proposed approaches is swamping teachers with more untested devices and strategies than they are prepared to absorb or evaluate. We also need to note that our investigators may be properly criticised for violating any number of principles of scientific inquiry having to do with accurate description of methods being compared, with recognition of individual differences among deaf children, with statistical treatment, with poor measuring instruments, with asking wrong questions, and with premature judgments that do not wait on longitudinal effects to appear. Yet in the today and tomorrow of our field we must look to constructive collaboration of investigators and practitioners to the end that we may choose our alternatives on a rational basis.

REFERENCES

1. Bronfenbrenner, U. (1970): *Two Worlds of Childhood. U.S. and U.S.S.R.* Basic Books, New York.
2. Bronowski, J. and Bellugi, U. (1970): Language, name and concept. *Science*, 168, 669-673.
3. Caldwell, B.M. (1970): The rationale for early intervention. *Exceptional Children*, 36, 717-726.
4. Chomsky, N. (1964): *Current Issues in Linguistic Theory*. Mouton, The Hague.
5. Chomsky, N. (1965): *Aspects of the Theory of Syntax*. The M.I.T. Press, Cambridge, Mass.
6. Chomsky, N. (1967): General properties of language. In *Brain Mechanisms underlying Speech and Language* (page 73), Darley, F.L. ed., Grune and Stratton, New York.
7. Davis, H. (1970): Chapter 4, In *Hearing and Deafness*, Davis, H. and Silverman, S.R. (eds.), Holt, Rinehart and Winston, New York.
8. Erber, N.P. (1970): *Auditory and Audio-Visual Reception of Words in Noise by Observers with Normal and Impaired Hearing*, Unpublished Ph.D. thesis, Washington University, St. Louis, Missouri.
9. Furth, H.G. (1966): *Thinking Without Language: Psychological Implications of Deafness*. The Free Press, New York.
10. Gengel, R.W. (1969): Practice effects in frequency discrimination by hearing impaired children. *J. of Speech and Hearing Research*, 12, 847-855.
11. Kagan, J. (1970): The determinants of attention in the infant. *American Scientist*, 3, 298-305.
12. Kringlebotn, M. (1968): Experiments with some visual and vibrotactile aids for the deaf. *American Annals of the Deaf*, 113, 311-317.
13. Lenneberg, E.H. (1967): *Biological Foundations of Language*. M.I.T. Press, Cambridge, Mass.
14. Moores, D.F. (1970): Psycholinguistics and deafness. *American Annals of the Deaf*, 115, 37-48.
15. O'Neil, W.A. (1968): Paul Roberts' rules of order: the misuses of linguistics in the classroom. *The Urban Review*, 2, 12-16.

16. Piaget, J. (1954): *The Construction of Reality in the Child*. Translated by Cook, M., Basic Books, Inc., New York.
17. Pickett, J.M. and Pickett, R.H. (1970): Communication of speech sounds by a tactual vocoder. *J. of Speech and Hearing Research*, 6, 202-222.
18. Silverman, S.R. (1964): Education of deaf children – past and prologue. In *Report of the Proceedings of the International Congress on the Education of the Deaf and the Forty-First Meeting of the Convention of American Instructors of the Deaf*, U.S. Document No. 106, U.S. Government Printing Office, Washington, D.C., 113-122.
19. Silverman, S.R. and Lane, H.S. (1970): Chapter 16, *Hearing and Deafness*, Davis, H. and Silverman, S.R. (eds.). Holt, Rinehart and Winston, New York.
20. Skinner, B.F. (1957): *Verbal Behavior*. Appleton-Century-Crofts, Inc., New York.
21. Vygotsky, L. (1962): *Thought and Language*. M.I.T. Press, Cambridge, Mass.