THE DEVELOPMENT OF THE VERBAL REGULATION OF BEHAVIOUR IN CEREBRALLY PALSIED (MULTIPLY HANDICAPPED) CHILDREN

R. BURLAND
Meldreth Training School, Meldreth, Royston, Herts.

Introduction

A few retarded cerebrally palsied children make surprising early educational progress given suitable treatment and opportunity. Mein (1968) suggests there are some initially diagnosed as severely subnormal who show accelerated intellectual development which can be detected by using standardized tests. But he adds: "There appears to be no objective method of detecting such cases on initial psychological examination".

The writer has used an assessment procedure suggested by Schubert (1964, 1966, 1969) which together with a detailed examination of a child's specific handicaps may enable us to detect this educational potential.

This is a preliminary comment on research started at the Spastics Society's residential school for severely subnormal cerebrally palsied children. Much more work will be needed before we can be confident about our prognoses, but early results have been dramatic.

The procedure used is based on the experimental work and theories of Luria and his colleagues in Russia, (Luria 1961, 1963).

The Second Signalling System

For Luria there is one basic law of child development:

> " . . . . the child, physically linked to his mother when in the womb and still biologically dependent on her during infancy, remains socially bound up with her for a long time. He is linked to her at first directly and emotionally, and later through speech; by this means he not only enlarges his experience but acquires new modes of behaviour and then new ways of organizing his mental activities. By naming various surrounding objects and giving the child orders and instructions, his mother shapes his behaviour. Having carefully observed the objects named by his mother, after he acquires the faculty of speech, the child begins to name them actively and thus organize his acts of perception and his deliberate attention. When he does as his mother tells him he retains the traces of verbal instructions in his memory for a long time. Thus he learns how to formulate his own wishes and intentions independently, first in externalised and then in inner speech. He thus creates the highest forms of purposive memory and deliberate activity. What he could previously do only with adult help, he is now able to do unassisted. *This fact becomes the basic law in a child's development*". (Luria 1961)

As Schubert points out, Soviet psychologists have tended to equate the second signalling system with verbal development, but any stimulus may become a second signal stimulus. O'Connor (1966) and Furth (1966) present evidence of non-verbal

thought. The second signalling system is normally verbal and so we talk about the verbal regulation of behaviour; Luria (1961) states:

> " . . . . the accomplishment of a simple action on verbal instruction can be regarded as the core of voluntary behaviour regulated by speech". With regard to the severely subnormal he says,
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> "Pathological changes in the activity of the cerebral cortex which are peculiar to oligophrenia considerably disturb the general mental development of the child; as a result, the formation of normal speech activity, whose regulatory function has been described by us in the process of its development, does not take place here. . . . "

Hypothesis

We can make the hypothesis that if the development of the verbal regulation of behaviour is a sine qua non of intellectual development, it may be possible to detect this ability in children who are going to make accelerated progress *before* that progress is in itself realized.

It seems safe to assume that in some sense there must be considerable unrealized educational potential among retarded cerebrally palsied children. Almost any specific handicap is likely to result in some degree of retardation (rather than mental defect) and retarded cerebrally palsied children usually suffer a number of learning handicaps. Many are associated with cerebral palsy rather than resulting from cerebral dysfunction and in themselves may account for considerable retardation. Obvious examples are defects of hearing and vision. One can say that a child whose hearing and vision are very poor may be severely retarded by these peripheral defects rather than mentally defective. Seguin was postulating two kinds of mental handicap in the middle of the nineteenth century; feeblemindedness, due to peripheral impairment, and mental deficiency, a result of damage to the central nervous system. More recently O'Connor (1966) has discussed the effects of sensory deprivation (one form of which is due to peripheral impairment) on mental development. Generally speaking sensory deprivation seems to mean a loss of experience but not necessarily of education potential. O'Connor finds that the ability to reason may be unaffected by sensory deprivation. One might in such cases be able to demonstrate a relatively well developed second signalling system regulation of behaviour.

Visual-perceptual and auditory-perceptual discrimination may be impaired where peripheral defects are minimal or seemingly do not exist and one is dealing with central nervous system dysfunction. Luria (1961) has demonstrated that visual perceptual and visuo-motor performance can be impaired while verbal regulation of behaviour remains relatively good.

A measure of the development of the verbal regulation of behaviour and one of general intelligence should normally prove closely related, but where there are multiple peripheral and "lower level" central defects the verbal regulation of behaviour may be well developed while intellectual development is limited by experiential deprivation or inconsistency due to the peripheral and lower central impairment.

The writer's hypothesis is that a measure of the development of the verbal regulation of behaviour would, in multiply handicapped children, be an index of educational potential. Some peripheral and lower central defects may prevent the realization of such potential while others may prove amenable to remedial training.

Assessment Procedure

Schubert (1964, 1966, 1969) has provided a standard means of investigating the development of the verbal regulation of behaviour. The only visual ability required of the child for his standard series of procedures is the ability to distinguish between lights of different colours and the only motor response to squeeze a rubber bulb or depress a key. Even if a child cannot distinguish one primary colour from another it is possible to present comparable problems. If a child cannot see the lights, differently pitched bells can be used and it should be possible to use differing tactile stimuli. Also, any voluntary motor movement can be used to operate the response switch mechanism. Sensory, perceptual-motor and motor abilities required are thus reduced to a minimum while verbal instructions can be made as complex as the experimenter wishes.

Schubert describes the stages in the development of the verbal regulation of behaviour, as seen in the type of experimental procedures of Luria and his colleagues, as follows:—

"(a) Age 1-2 years: behaviour is not yet regulated by speech. The word is yet a part of the total concrete situation. It may initiate behaviour, but only if the verbal instruction does not interfere with the current activity of the child. Once an activity has been initiated, there is gross motor perseveration: . . . . "

"(b) At age 2-3 verbal instruction may interrupt current activity, and initiate a new activity. Behaviour begins to assume an active voluntary character, but no future activity is planned. . . . "

"(c) At the age 3-4 years, words may regulate subsequent action. The child is capable of following a simple conditional instruction, and can wait for the appearance of a signal. . . . "

"(d) Age 4-5: "The regulatory function is steadily transferred from the impulse side of speech to the analytic system of elective significative connections which are produced by speech. Moreover, and this is most interesting, it simultaneously shifts from the external to the internal speech of the child".

"The child easily grasps complicated instructions. . . . "

"(e) Age 6-7: silent speech is predominant. Internalized speech ". . . constitutes an essential component of thought and volitional action. . . . The verbal analysis of the situation begins to play an important role in the establishment of new connections; the child orients himself to the given signals with the help of the rule he has verbally formulated for himself" . . . . . " (Schubert 1969*)

Schubert's experimental procedures link with these developmental stages.

He compared the results of the first 216 children he investigated with their I.Q. scores obtained on standard tests of general intelligence. Most of the children were seen in the out-patients department of a children's hospital. They were a heterogeneous group, but few were both severely physically and severely mentally handicapped. Age norms were not established but criteria emerged, on the basis of the comparison with I.Q. scores, for making distinctions between children with I.Q.'s above and below 70, and above and below 50. In other words there were performances characteristic of S.S.N., of E.S.N. and normal groupings.

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* Schubert's quotations are from Luria (1961).

Experimental Results obtained at Meldreth

All the children at Meldreth have I.Q.'s below 50, although much proration and extrapolation of norm tables is necessary to obtain I.Q.'s. All are multiply handicapped. Each child has been assessed by at least two psychologists experienced in the assessment of cerebrally palsied children. 17 children have very poor sight or hearing. For them a modified series of procedures has been used which will be reported in due course. The remaining 78 were tested according to Schubert's instructions.

On the basis of their performances and Schubert's comparative I.Q. data, one would predict 31 (39.74 per cent) to be severely subnormal, 40 (51.28 per cent) educationally subnormal and 7 (8.97 per cent) normal. We know, however, that all are severely subnormal on the basis of standard scales of intelligence.

In a series of studies of non-cerebrally palsied subnormal children, as yet incomplete, we have very strong evidence to support Schubert's criteria for the general population of severely subnormal children.

It seems reasonable to conclude that the ability to verbally regulate their behaviour is relatively well developed in a large proportion of severely "retarded" cerebrally palsied children, whereas it is poorly developed in most other severely "subnormal" children. As far as can be judged the children who do best on this test of the verbal regulation of behaviour (among the severely retarded cerebrally palsied children at Meldreth) are the more heavily and multiply handicapped. A scoring system for rating by number and degree of specific handicaps is being designed, for comparison with the experimental results obtained and I.Q. and other test scores.

The relatively normal development of the verbal regulation of behaviour in these children is compatible with the view of many workers in the field of mental subnormality that cerebrally palsied children give the impression of being "brighter" than most other mentally handicapped children (when equated on an I.Q. basis) but that educationally they achieve less.

The importance of the verbal regulation of behaviour

Luria (1961, 1963) believes this ability to be at the very basis of intellectual development and Schubert finds a high correlation with standard measures of general intelligence (V.R.B. rating related to measured intelligence classifications—CHI-SQUARE $P.<.001$.

Of practical importance are the experiments reported by Luria (1961) which demonstrate that "lower level" defects can be compensated for by a relatively well developed system of verbal regulation. Luria reports both improved visual-perceptual discrimination and improved motor control. Schubert (1964) has demonstrated how a spastic child can eliminate errors and give a more positive motor response by combining a verbal with a motor response.

If the general thesis here is correct, not only should it be possible to predict which multiply handicapped children will achieve accelerated intellectual development given appropriate educational experience, but more children might achieve similar accelerated progress if trained in the way Luria describes. Where a well developed system of verbal regulation exists it would seem desirable to amalgamate existing methods of physiotherapy and educational techniques with the type of training procedures suggested by his experiments. Interesting in this respect is the system of "conductive education" designed by Peto. (Hari 1969, Cotton and Parnwell 1967)

Research at Meldreth to date suggests there are three groups of severely subnormal cerebrally palsied children requiring rather different educational programmes.

1. A small group with normally developed second signalling system regulation who are severely multiply handicapped.
2. A large group with some second signalling system development but not enough to suggest formal educational potential. This group can be taught simple practical skills very easily by operant learning methods provided they have the motor ability. A conditional response is easily established.
3. A substantial group who achieve a stable conditional response only after very long training or not at all.

All these distinctions can be tested using the same apparatus (Schubert 1969).

For the first group the well developed second signalling system regulation can be used to compensate for peripheral and lower level defects. This is also possible with some of the second group for whom second signalling system regulation is well developed compared with lower level systems. For others in the second group and for the third group such compensatory processes cannot be established.

The children at Meldreth may or may not be a sample representative of the total population of cerebrally palsied children in the approximate I.Q. range 30-50. This will need careful study. For Meldreth the percentage of the school population (now 101 children) for each group are approximately:

Group 1. 10%
Group 2. 50%
Group 3. 40%

About half of group 2 have comparatively well developed second signalling system regulation.

The general implication is that for any cerebrally palsied child, the further his score for the development of the verbal regulation of behaviour from that typical for children of the same I.Q. in the general population, the further in the other direction will be a "score" of the effectiveness of lower level and peripheral systems. The I.Q. is a function of the development of the verbal regulation of behaviour and of lower level and peripheral systems.

References

Cotton, E. and Parnwell, M. (1968). Conductive Education. *The Journal of Mental Sunbormality*, Vol. 14, 50-56.

Furth, H. B. (1966). Development of thinking in the deaf. Implications for the relation of thinking and language. *Abstracts. International Congress of Psychology*, Moscow.

Hari, M. (1969). Unpublished address given at Castle Priory College, Wallingford, Berks., by the director of the Institute for Conductive Education of the Motor Disabled, Budapest, Hungary.

Luria, A. R. (1961). *The role of speech in the regulation of normal and abnormal behaviour.* Pergamon Press.

Luria, A. R. (ed.) (1963). *The mentally retarded child.* Pergamon Press.

Mein, R. (1968). Changes in intelligence test scores in cerebral palsied patients under treatment. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency.* Michael Jackson Publishing Company Ltd.

O'Connor, N. (1966). Sensory defects and mental development. In Mental Development and Sensory Defects. *Thirty-third symposium. International Congress of Psychology. Moscow, U.S.S.R.* pp. 30-48.

Schubert, J. (1964). *Verbal regulation of behaviour and intellectual development. Learning problems of the cerebrally palsied.* The Spastics Society, London.

Schubert, J. (1966). Experiment in verbal regulation of behaviour. Speech and mental development in children. *Symposium. International Congress of Psychology, Moscow.*

Schubert, J. (1969). The V.R.B. apparatus: An experimental procedure for the investigation of the development of verbal regulation of behaviour. *The Journal of Genetic Psychology.* 114, pp. 237-252.