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## 2. Psychological studies in subnormality

A summary of previous work concerning learning in subnormal children (O'Connor, 1958) drew on a review by McPherson (1948) which mentioned 16 studies. These led McPherson to conclude, along with Gardner (1945), that motivation must be maximal for the effective study of learning and performance, and that, in motor learning, neither starting level nor mental age was a good guide to the ultimate level of achievement. These few experiments and their modest conclusions were not widely extended during the intervening decade until the review quoted. Studies of unskilled motor performance and motivation were noted, and also a limited number of investigations on word learning and the phenomenon of transposition. These were along the same lines as earlier, classical studies, but there were a few in addition, concerned with reaction time and its relation to intelligence. Such experimental work was limited to a few studies and gave no hint of the renaissance of work in this area which was to follow in the next decade. However, the second edition of the review (1965) was extended by several pages to cover the already considerable expansion of experimental studies. In these pages the work of Clarke and Blakemore (1961) on transfer, Lyle (1959) and Mein and O'Connor (1960) on language, Spitz (1963) on perception, House and Zeaman (1958) on discrimination, and O'Connor and Hermelin (1963a) on learning were listed among others. The general trend of these studies was to break with the tradition of psychometrics and factor classification and to examine psychological processes experimentally. Cognitive structure involving perception, learning, coding, and recall became the centre of interest in the place of intelligence and factor structure.

This was the beginning of a movement which has led since to many experimental studies of short-term memory, long-term memory, cross-modal transfer, visual discrimination, language usage, and attention. Such experimental investigations as those of Ellis (1963), Zeaman and House (1963), O'Connor and Hermelin (1963b), Spitz (1963), Woodward (1963), and Luria (1961) have usually had two major intentions. They were aimed at adapting the techniques of experimental psychology to the study of process deficit in the subnormal child and at relating normal to abnormal development. Other investigators have applied the resulting knowledge to the rehabilitation and treatment of all grades of subnormal children, and this extensive and useful work has been an important element in motivating the analysis of the psychological assets and deficits of the subnormal individual.

In my opinion, the analysis of function represented by short-term memory experiments (Ellis), attention (Zeaman and House), cross-modal transfer and verbal usage (O'Connor and Hermelin), and arousal and perceptual phenomena (Spitz) represents significant advances in the psychology of subnormality, just as in an earlier group of studies Gordon, O'Connor, and Tizard (1954), O'Connor and Claridge (1955), and, more recently, Zigler (1969) have outlined the significance of motivation, and Clarke and Blakemore (1961) and other co-workers have shown the value of studies of transfer in understanding subnormal learning processes. The proliferation of such studies might be said to have transformed the areas of concern of the clinical psychology of subnormality. Issues common to experimental psychology have become the concern of psychologists in subnormality hospitals. However, it could also be said that advances in this field have reached an impasse and that the experimental exploration of subnormality may now be contributing as much to normal psychology as to the study of those who are subnormal.

It is conceivable that behaviour therapy, token reward systems, and other off-shoots of operant conditioning may make a contribution. A recent book by Gardner (1971) summarized studies in this area. However, it seems unlikely that theoretical development will proceed along these lines, although practical handling may be considerably benefited. Too often the lack of basic operants may constitute a difficulty for the development of appropriate behaviour, and as some recent studies suggest, lack of generalization beyond the confines of a particular experiment may prove a difficulty, as it did with Pavlov's (1927) initial trials with classical conditioning. It is, however, early days to offer a decisive view on this approach.

My own preference or prejudice is for the extension of comparative studies across sub-diagnostic groups, and for research based on one psychological phenomenon which may itself be partly independent of the diagnostic groups in which it is observed. Berkson, Hermelin, and O'Connor (1961), Hermelin and Venables (1964), and O'Connor and Berkson (1963) each carried out such studies, using, for example, alpha rhythm, reaction time, and eye movement as dependent variables and studying differences between groups. Hermelin and O'Connor (1971) and O'Connor and Hermelin (1972) made the technique a basic feature of their approach in recent experimental reports. At that stage the approach or tactic emerged as part of a campaign directed at specific problems, but, in more recent work, these two authors have made the technique a basic feature of their strategy in comparing specific and general handicap.

One of the disadvantages for a psychologist working in the field of autism, for example, is the difficulty experienced by the psychiatrist in providing a clearly delineated group for study. Undifferentiated subnormality would present the same problem if subnormality were not itself a descriptive term or a complaint rather than a diagnosis. Many of the 200 to 300 types of sub-diagnosis found in such texts as Hilliard and Kirman (1965) have in common low intelligence, but also many other features. Similarly, in autism, short gaze fixation and stereotype of movement are features of behaviour which overlap with other groups of different categorization or diagnosis (Hermelin and O'Connor, 1970). So long as this difficulty exists, which it does especially in relation to abnormalities and disturbances in children, then the alternative of studying a phenomenon or unit of behaviour is an attractive one for the basic or preclinical scientist. This is one consideration.

A second, of equal importance, is the question of developmental anomalies as opposed to specific or localized disorders. An example of the former is presumably any form of severe subnormality, and an example of the latter, localized brain injury, or deafness or blindness due to peripheral causes and occurring in an otherwise intact and mature nervous system. A special case is the type of generalized infection such as encephalitis which may, in its psychological consequences, resemble subnormality.

The differentiation of specific and generalized handicap and their respective effects on psychological phenomena might be expected to be revealing and productive. If, for example, coding is a phenomenon basic to the learning process—whether in perception, memory, or retrieval—then the effect of a specific or of a general handicap on this one phenomenon could be of considerable interest.

The attempt to analyse this phenomenon in different conditions of handicap has been the aim of several recent papers by Hermelin and O'Connor (1971) and O'Connor and Hermelin (1972).

Coding as observed in the short-term memory of deaf, aphasic, and some subnormal children in the particular conditions of these experiments takes on a novel and unpredicted form. Such children do not code verbally, and hence sequentially, but by reference to visual imagery. Although this might be an expected alternative in those deprived of useful speech, its consequences for learning may be fundamental and extensive. This process of coding or categorizing in terms of iconic cues must be studied further elsewhere. In the present context, its interest lies in the way in which a phenomenon closely observed under control conditions and across diagnoses indicates new groupings which break old boundaries. The experimental results are simple: a series of three digits is presented visually to deaf and hearing subjects. Their presentation is incongruent from the point of view of temporal sequence and spatial layout. The normal hearing subjects report the temporal, but the deaf the spatial or left to right series. They do not remember what they have seen temporally. So if the digits occur in three windows in the temporal order three (middle), nine (right), and seven (left), the deaf will remember them as 739 and not 397. The normal always remember them as 397.

This difference between the deaf and the normal child gains further significance because it can be shown that autistic children who do not suffer any obvious auditory impairment behave as if they were deaf. In addition, it can be shown that subnormal children fall into two groups, those who behave as if normal in their response to such ambiguous visual displays and those who behave as if deaf. Therefore, most autistic children and most young deaf children and some several subnormal children constitute a group which consistently displays one kind of reaction. Thus, one can reasonably suggest the existence of some communality between them from a psychological point of view. It is conceivable that their responses indicate a basic common deficit of a complex linguistic kind. At least this group, and perhaps others such as those with aphasia, should be considered together from this point of view.

Other examples of behavioural similarities across groups can be suggested and explored. It is with this aim in mind that our current research is being pursued. Other possible areas of interest might be the developing of coding strategies to cope with limitations of dimensional as distinct from sense modal input. At present such possible limitations of output as in expressive aphasia must remain as speculations. The results presented above which suggest a cross-diagnostic linguistically handicapped group seem to us to be of interest, in so far as it opens up the possibility of a new strategy for clinical psychologists and at the same time bears on the problem of the psychology of mental handicap.

N. O'CONNOR

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