

the correlations were significant at the .01 level.

Discussion

The high reliability coefficients found for each of the seven scales indicate that this instrument can be used reliably with severely and profoundly retarded children. The high indexes of consistency for each of the six scales on which scalogram analyses were performed indicate that these scales are ordinal with severely and profoundly retarded children. The intercorrelations among the seven scales were substantial, though somewhat lower than those found with nonretarded infants (Uzgiris & Hunt, 1975). The lower correlations of the present study can probably be accounted for by biological and experiential deficits of severely and profoundly retarded children. Because of these deficits, these children would be expected to progress at different rates in the various areas of the sensorimotor period, depending on their biological makeup and experiences. These correlations are still substantial enough to lend sup-

port to Piaget's theory and to the validity of these scales with this population.

It appears that the Uzgiris and Hunt instrument, with the exception of the Schemes scale, can be used reliably and validly with severely and profoundly retarded children. Before any statement of its validity can be made, the Schemes scale needs to be studied longitudinally to establish its ordinality. Research is needed to establish the relationship of sensorimotor period functioning and the readiness to learn various skills by severely and profoundly retarded children.

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Sensory Reinforcement of Eyblink Rate in a Decorticate Human

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An unusual case of hydranencephaly was reported. The child survived for 19 years and showed evidence on three occasions of an increase in eyblink rate with tactile reinforcement. Diagnosis was confirmed by an autopsy which revealed no preserved cortex in either hemisphere.

The relative importance of the cerebral cortex has been a recurring focus of attention in attempts to understand neurological

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mechanisms of learning. Although total decortication in some mammals does not abolish learned behavior, the question remains as to the function of the cerebral cortex when it is well-developed, as in the human.

Two disorders in embryological development permit the examination of learning

mechanisms in decorticate humans. With the most common disorder, anencephaly, the individual has a short life span due to a cranial vault defect, and investigations have been limited to descriptions of reflex behavior (Nielsen & Sedgwick, 1949). A rarer condition is hydranencephaly, in which there is an absence of a cortex in a normal cranium, with the cerebral hemispheres replaced by cystic sacs. Although death usually occurs in a matter of months, such persons have been reported to survive as long as 8 years (Kuhlenbeck, Székely, & Spuler, 1964).

Several years ago, an unusual case of hydranencephaly was brought to our attention and provided an occasion to attempt conditioning in a decorticate human. The primiparous white female remained in a vegetative state of decorticate rigidity under a total-care regimen, including force-feeding, until her death at age 19 from aspiration of food. Electroencephalographic (EEG) recordings obtained at ages 2, 9, and 19 showed flat tracings in all leads, with the exception at age 9 of transient 15 cps spindling, suggestive of diencephalic activity. Neuroanatomical examination following death revealed total devastation of the cerebral cortex bilaterally, with no preserved cortex or white matter in either hemisphere (McGarry, Note 1). Visible spontaneous behavior was limited to transient guttural vocalizations and head turning, which appeared to be associated with discomfort; rare and minimal clonic stretch responses; tongue movements; and a variable eyeblink rate of between 4 and 54 closures per minute.

Method and Results

Three attempts were made to condition the patient's eyeblink rate to tactile reinforcement. Half-hour baseline, reinforcement, and extinction periods were measured. During the reinforcement period, we provided continuous reinforcement following each eyeblink by touching the bottom of the patient's foot. When the child was first tested at the age of 14, the rate per minute of her eyeblinks during baseline increased during the reinforcement period and then dropped during extinction (means and standard deviations [*SDs*] = 21.7 [10.1], 35.2 [14.4],

and 22.9 [13.0], respectively). The same procedure was repeated twice when the patient was 19, using naive observers to eliminate possible experimenter bias effects. The prior differences between baseline (mean = 25.6, *SD* = 10.7) and reinforcement (mean = 30.1, *SD* = 9.5) were replicated, as well as between reinforcement and extinction (mean = 17.7, *SD* = 5.8). In a third session, the child fell asleep in the middle of the reinforcement period. Despite this, the half-hour baseline showed a large increase during the 13-minute reinforcement period (means and *SDs* = 26.5 [6.3] and 34.7 [8.3], respectively).

Because of the patient's death after the third session, the degree of control of the operant response normally achieved over multiple sessions in a conditioning paradigm was not obtained, and the meaning of the data from an operant conditioning standpoint is somewhat ambiguous, especially given the limited baselines and large variances of the measures. It is for situations such as this that randomization tests can be useful in evaluating the significance of results for single-subject designs which bar parametric tests (Edgington, 1975). Applied to the present data, a randomization test can be used to compare the differences between the means of two sets of measurements with all possible combinations of the values for the complete set of measurements assigned exhaustively to the two subset sample sizes. Because of the large number of computations involved in randomization tests, *approximate* randomization tests can be used to make equally valid probability statements (Edgington, 1969). In this procedure an obtained statistic is compared with the probability of equal or greater differences found in a finite sample of random assignments of the empirical data. Accordingly, each of the mean differences for the present data were compared with differences found in 100 distributions of the data randomly divided into appropriate sample sizes. All differences were in the predicted direction and occurred with a probability of less than .05.

Discussion

On three separate occasions, there was a significant increase in the patient's rate of

eyeblink as a result of tactile reinforcement, despite an abnormally high and variable baseline. However, the present results are subject to several limitations. Since the autopsy revealed "minimal residual structures containing the outlines of Ammon's horns" (McGarry, Note 1), the findings are not necessarily at variance with the later formulations of Penfield and his colleagues (e.g., Penfield & Mathieson, 1974), who emphasized the importance of medial temporal, especially hippocampal, structures in the learning process. But the functional state of these structures, given their atrophic state and the absence of EEG evidence of electrical activity, was questionable.

More serious limitations apply to the paradigm used in the present study, which permits alternate assumptions about the nature of the change which occurred. One is the limited baseline from which changes were inferred. A second applies to the possibility of change as a result of increased levels of arousal caused by tactile reinforcement. Although this interpretation has been ruled out in many studies of tactile reinforcement (Kish, 1966), the necessary support for the present data, such as residual elevations of the operant response or use of

the reinforcement to form discriminations, is lacking.

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Role-Taking Ability and the Interpersonal Tactics of Retarded Children

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The relationship between social role-taking ability and preferences for interpersonal control tactics was assessed in 50 mentally retarded children. Feffer's Role-Taking Task and two hypothetical interpersonal control episodes were used as experimental measures. Results were that role-taking proficiency was associated with the development of alter-directed tactics or tactics by which the subject appeared to take into account the needs, motivations, or expectations of others. Neither MA nor IQ were significant predictors of interpersonal tactic choice. Controls for IQ and MA did not alter the significance of the association between role-taking and general tactic preferences.

The association of social role-taking ability with interpersonal competencies among retarded individuals has been demonstrated

in two recent studies. Affleck (1975a) showed that role-taking is related to the interpersonal conflict resolution skills of retarded young adults. Affleck (1975b) revealed the significance of role-taking for the performance of dyads of retarded children in a cooperative two-person task.

The purpose of the present study was to

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