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ABSTRACT

Examined was the effectiveness of training four severely and profoundly retarded children (3-6 years old) to improve their level of functioning on a measure of object permanence and to demonstrate generalization to other areas of sensorimotor intelligence. Ss were given a pretest and posttest on the I. Uzgiris and J. Hunt instrument which consists of six parallel scales of intellectual development. Ss received individualized training on object permanence tasks for 45 minutes per day, 3 days per week for 6 months. Ss demonstrated large gains on the object permanence posttest measure, with smaller improvements in other areas of sensorimotor intelligence of four control Ss matched for age, etiology, and cognitive functioning level, only one S demonstrated improvement, and this was considered negligable. (CL)

Acceleration of Object Permanence with Severely and Profoundly Retarded Children

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The literature relating Piaget's theory to mildly retarded children is quite extensive (e.g., Droz, 1970; Gotts, 1970; Inhelder, 1966, 1968; Kahn, 1975b; Kahn & Reid, 1975; Stephens, et al., 1974; Woodward, 1961, 1962). The literature relating Piaget's theory to severely and profoundly retarded children, however, is quite limited. Nevertheless, the few studies which have been carried out using this theory with very low functioning retarded children do appear to support the contention that Piaget's theory can be applied to these children (Kahn, in press-a; Robinson, 1974; Wohlhueter & Sindberg, 1975; Woodward, 1959; Bricker & Bricker, Note 1). It appears from this research that severely and profoundly retarded children develop sensorimotor period thought in the same order as do nonretarded infants. Kahn's (in press-b) findings indicate that the Uzgiris and Hunt (1975) scales can be reliably and validly used with severely and profoundly retarded children. The six scales of the Uzgiris and Hunt instrument were found to be ordinal, when used with this population, and may be used with severely and profoundly retarded children to assess sensorimotor period functioning.

Piaget's theory, therefore, can help those working with young severely retarded children, and profoundly retarded individuals, to determine the cognitive level at which their clients are functioning. Based on this assessment, the appropriate training for an individual can be determined and implemented. Basing the program level for an individual on his level of cognitive functioning is a basic tenet of Piaget's theory. According to this theory (Piaget, 1964), development of certain

cognitive structures must precede learning. In other words, there are cognitive structures which are necessary, though not sufficient, to learn perceptual-motor skills, language skills, etc.

Many other researchers have shown that a severely or profoundly retarded child can be taught, through operant conditioning techniques, to respond appropriately to certain stimuli in certain situations. However, this is often done with no understanding of the stimulus (discriminated operant) or the response by the child. Without this understanding, which can only be present if the necessary cognitive structures are present, the possibility of generalization to other stimuli, situations, and responses is greatly reduced. The child will only respond as he was taught, and in the situation in which he was taught, with little prospect for continued development. This is demonstrated by the failure of the operant language training studies to show generalization by their subjects so that, the children generalize their learning to new situations, continue to increase their vocabulary, and improve their grammatical structure (Sailor, Guess & Baer, 1973).

It is, however, insufficient to say that the child doesn't have the necessary cognitive structures to learn, for instance, meaningful expressive language. We must be able to present an alternative approach. Kahn (1975a) has suggested that children functioning at too low a cognitive level to learn to use expressive language meaningfully, should receive a program of training designed to increase their cognitive level. Only when their cognitive functioning has been raised to a sufficient level should the language training program be implemented. This same approach would be appropriate for other skills such as the various self-care skills. Operant conditioning techniques would still be used but they would be used to teach skills for which the child has the prerequisite cognitive structures.

The present study was designed as an attempt to increase the rate of development of severely and profoundly retarded children functioning at the sensorimotor level. Object permanence was selected as the area of sensorimotor intelligence for which direct training procedures would be implemented. This type of sensorimotor intelligence was selected because it has received the most attention and is the most detailed of the Uzgiris and Hunt (1975) scales. However, I recognize that any acceleration in this area must be accompanied by gains in other areas of sensorimotor intelligence if the results are to be meaningful. It was hypothesized that severely and profoundly retarded children could be trained so as to show improvement in functioning on a measure of object permanence. It was further hypothesized that these children would also show improvement, though not as large, on measures of other types of sensorimotor intelligence for which there was no direct training.

Method

Subjects

The subjects in the present study were eight children living in a residential facility for severely and profoundly retarded children. None of the children in this study had ever demonstrated any expressive communication skills. These children were also all functioning well below the ceiling on each of the six scales of the Uzgiris and Hunt (1975) instrument. The subjects were matched for age, etiology, and scores on the Uzgiris and Hunt scales and then randomly assigned to either the experimental group or the control group.

The four subjects in the experimental group had chronological ages (CAs) ranging from 43 to 72 months with a mean CA of 57 months. Three of these children's etiologies were Down's Syndrome. The fourth child had brain damage, the suspected cause of which was encephalitis.

The four subjects in the control group had CAs ranging from 43 to 78 months with a mean CA of 56 months. Three of the these children's etiologies were also Down's Syndrome. The fourth child's etiology was designated "unknown brain damage". Accurate mental age and IQ data were not available for this sample.

Procedure

All of the subjects were individually given a pretest and a posttest using the Uzgiris and Hunt (1975) instrument. This instrument consists of six parallel scales of intellectual development. One of these scales, the Development of Imitation, is divided into two subscales, Gestural Imitation and Verbal Imitation, with no total score being derived. Therefore, I will refer to this instrument as having seven scales: Object Permanence, Means, Schemes, Causality, Verbal Imitation, and Spacial Relations.

The four control subjects received only the pretest, and six months later the posttest, with no special training in the interim. The four experimental subjects received the pretest, followed by individual training in an isolated room for 45 minutes a day, three days a week, for six months and then the posttest. The training was individualized for each child and consisted of a concentrated effort to have the child demonstrate gains in his performance in the area of Object Permanence. Object Permanence was selected as the area to be trained because the Uzgiris and Hunt instrument has more items for this scale than for any of the other six scales. Positive reinforcement (food and praise) was used to keep the child interested in the task. The steps followed in the training procedure were those of the Object Permanence scale of the Uzgiris and Hunt Instrument. This order was followed because the steps for this scale have been shown to be ordinal for a severely and profoundly retarded sample (Kahn, in press-b). The criterion for each step was considered achieved when the subject demonstrated success on the step, with no errors, for two consecutive sessions. Training then began on the next step

through successive approximations of that step. If repeated efforts on the next step were unsuccessful, overlearning of the preceding step was begun.

To further explain the training procedure used in this study, two concrete examples are given. In the first case, the child could locate an object (a doll) when it was partially covered but not when totally covered. We started with the doll half covered (legs and feet showing) and slowly, step by step, covered more of the doll with the child finding it at each successive step. Eventually, the doll was totally covered. At this point, the doll was placed under the cover so as to present a large lump. The child was able to find the doll and the lump was gradually made smaller until the child could find the doll totally covered and laying flat.

The second example presents a simpler procedure though the procedure took as long as the one previously presented. In this case, the child could find an object when covered by one screen. When the object was alternately hidden under one of two screens, however, he did not always go to the correct screen first. Since the child did search under the second screen when wrong at first, I felt that just letting him practice this task would eventually lead him to accomodate his cognitive structures and solve the problem correctly. This was based on Piaget's theory that children develop cognitively through interacting with the environment. As will be shown in the next section of this paper, both of these procedures were found to be successful. The entire training procedure developed for this study is delineated by Kahn (in press-a).

Results

All four of the experimental subjects achieved criterion for the highest item on the Object Permanence scale of the Uzgiris and Hunt (1975) instrument on the posttest. This represents gains from the pretest ranging from seven to 13 steps

with a mean gain of 11 steps. In addition, three of the experimental subjects demonstrated improvement on five of the other six Uzgiris and Hunt scales, the other experimental subject gaining on four of the scales. These gains range from one to five steps.

Only one of the control subjects showed any change in functioning on these scales from the pretest to the posttest. This subject gained two steps on the Object Permanence scale and one step on the Means scale. However, he also lost two steps on the Spacial Relations scale. The gains and losses demonstrated by each of the subjects, from pretest to posttest, on each of the scales are presented in Table 1.

Insert Table 1 about here

Discussion

The results of the present study indicate support for both of the hypotheses. The severely and profoundly retarded children, who received training, did show large improvements on the Object Permanence scale. The large improvement by these subjects, compared to the lack of change by the control subjects, indicates that the training was successful in this respect. The results also indicate that the experimental subjects improved on scales of sensorimotor intelligence for which there was no direct training while the control subjects showed no overall change, thereby demonstrating generalization. This latter finding of generalization is crucial to this study. Without it, this study could justifiably be criticized using the same arguments which I used earlier to criticize the indiscriminant use of operant conditioning procedures. That is, without this generalization, it could be argued that these children had merely learned a specific response, in a given situ-

ation, without any true understanding. However, as has been stated, this necessary demonstration of generalization is present.

These findings are of potentially great importance to those involved with training severely and profoundly retarded children. However, this statement must be qualified for two reasons. First, this study appears to have two limitations. The number of subjects used in this study is admittedly small. While it seems unlikely that the dramatic improvements shown by the experimental subjects are just specific to the present study, replications should be performed so as to totally nullify this argument. In addition, the use of a control group, rather than a placebo group, limits the generalization of these findings to other situations. The improvement could have been due to the specific training procedure utilized in this study or merely to the individual attention given the experimental subjects. However, the far greater inprovement shown by the experimental subjects in the area of Object Permanence, than in the other areas of sensorimotor intelligence, indicates that the training procedure did have some effect. Also, while the cause of the improvement may be in doubt, there was a good deal of improvement in a relatively short period of time. This finding by itself is significant.

The second factor, which could limit the importance of these findings, deals with the question of whether these findings are of any practical significance. The practical significance of these findings can at present only be hypothesized. More research is needed, to resolve the, as yet, many unanswered questions, before the full impact of this research can be known. It is necessary to determine if this sort of training leads to more efficient training in the various skill areas in which severely and profoundly retarded children are usually deficient (e.g., self-care skills, language skills, etc.). Kahn (1975a) has hypothesized just such a connection. He found a strong relationship between stage six sensorimotor period functioning and spontaneous expressive language development. Based on this finding

and the findings that operant language training programs are not always successful and don't demonstrate adequate generalization (Sailor, Guess & Baer, 1973), Kahn suggested that expressive language would be learned more readily and completely if the children were functioning at, at least, stage six rather than below stage six. He further suggested that children functioning below stage six should receive training to raise their level of cognitive functioning to stage six before the language training program was implemented.

The present study attempted to demonstrate that this sort of cognitive training is feasible. It is now necessary to determine if it does lead to more efficient learning of meaningful speech. In addition, future research is needed to pinpoint the precise areas and levels of sensorimotor intelligence which are prerequisite for each of the skills that we need to teach most severely and profoundly retarded children.

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Reference Notes

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Footnotes

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Table 1

Pretest to Posttest Gains and Losses on the Uzgiris and Hunt Scales

Subjects	Scales						
	Object Permanence	Means	Schemes	Causality	Verbal Imitation	Gestural Imitation	Spacial Relations
Experimental 1	+13	+2	+1	+3	0	+1	+5
Experimental 2	+12	+2	+1	+2	0	+1	0
Experimental 3	+ 7	+3	+2	+3	0	+1	+3
Experimental 4	+12	+2	+1	+3	0	+3	+4
Control 1	+ 2	+1	0	0	0	0	-2
Control 2	0	0	0	0	0	0	0
Control 3	0	0	0	0	0	0	0
Control 4	0	0	0	0	0	0	0