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AUTHOR Riall, Ann; Kelly, W. Jeffrey
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ABSTRACT

The study involving two profoundly retarded, multiply handicapped children (8 and 11 years old) was designed to demonstrate the effectiveness of the time delay/stimulus-transfer procedure and a progressive cue teaching strategy on the initial acquisition of verbal control over motor behaviors of Ss. The time delay strategy consisted of two components: the delivery of the verbal stimulus by the trainer and the completion of the motor response by the child, with or without the physical help of the trainer. The progressive cue strategy consisted of increased levels of trainer intervention until the child's behavior reached the criterion level. Data, recorded for each trial and probe, consisted of the sequential recording of trainer and child behaviors. The replication across Ss clearly demonstrated that motor responses of profoundly retarded children can be modified by the application of a systematic teaching strategy. Results of both of the children's graphs suggested that the progressive cue procedure was not efficient in comparison to the time-delay procedure, and that the Ss may not have benefitted from the demonstration. (SBH)

An Examination of Time Delay and Progressive Cue Strategies for Training Two Profoundly Handicapped Children Command Compliance.

Ann Riall and W. Jeffrey Kelly
George Peabody College for Teachers

Bringing motor responses under verbal control is an important goal for the teacher of the severely or profoundly retarded child (Striefel, Bryan, & Aikens, 1974). Not only does verbal control facilitate classroom management, but it expands the additional behavioral repertoire of the child. While some research has demonstrated the possibility of bringing the behavior of profoundly retarded children under verbal control (Striefel & Wetherby, 1973; Whitman, Zakaras, & Chardos, 1971) few studies examined the teaching strategies themselves. Two teaching strategy packages often used in developing verbal control over behavior are the time-delay/stimulus-transfer procedure (Touchette, 1971) and a progressive cue teaching strategy (Lent, 1968).

These strategies approach the problems of learning handicaps of retarded people from different perspectives. The time delay strategy emphasizes an errorless student performance circumventing the problem of verbal unresponsiveness or lack of imitative ability through reliance on an increasing time delay between verbal cue and physical assistance. In contrast, the progressive cue strategy centers around the provision of minimal assistance to the student, by increasing levels of cues from verbal, to demonstration, and to physical assistance, as necessary. While the probability of student errors is greater, the progressive cue strategy automatically fades teaching assistance and provides an opportunity for the child to develop a repertoire of imitative behavior (Lent, 1978). The purpose of the present study was to demonstrate the

effectiveness of the two teaching systems on the initial acquisition of verbal control over motor behaviors of profoundly handicapped children.

METHODS

Subjects

Subjects were two (2) profoundly retarded, multiply handicapped children enrolled in a public school classroom in Nashville, Tennessee.

The first subject, Billy was eight (8) years old, non-ambulatory and visually impaired. The second subject, Angela, was 11 years old, non-ambulatory, and exhibited athetoid movements.

Design

The study used a multi-element, multiple baseline design (Sidman, 1960) across behaviors taught, in which the stimulus conditions were the time-delay and the progressive cue teaching strategy packages. Four behaviors were selected and assigned randomly to the strategies.

Procedures

A daily session consisted of five trials for each behavior taught or probed. A trial consisted of the sequence of events beginning with the verbal cue and ending with the reinforcement of the child. A probe consisted of a verbal cue, five (5) second pause, and reinforcement delivery if the child responded correctly. To control for ordering effects on behavior training, all possible sequences of the four probe and training trials were randomly assigned to training sessions prior to intervention.

The time-delay strategy consisted of two components: the delivery of the verbal stimulus by the trainer; and the completion of the motor response by the child, with or without the physical help of the trainer. The trainer initially presented the verbal stimulus simultaneously with physical assistance, guiding the child's movement through the entire

movement cycle to the criterion level. The student was reinforced and the trial ended. The simultaneous presentation of the verbal cue with full physical help occurred for two sessions (10 trials). Beginning with the first trial of the third session, the trainer paused for one second between the verbal cue and the physical help. If the student responded at the criterion level, the child was reinforced. If the child responded short of criterion, the trainer, at the end of the delay, guided the child through the movement to the criterion level and reinforced the child. When the child responded correctly to the verbal cue for at least one trial per session for two consecutive sessions, the time-delay between the verbal cue and physical help was increased by one second. If the student required assistance for all trials of two consecutive sessions, the time-delay was reduced by one second.

The progressive cue strategy consisted of increased levels of trainer intervention until the child's behavior reached the criterion level. If the child emitted a correct response to the verbal cue, reinforcement was given and the trial ended. If, after five (5) seconds, the criterion level had not been reached, the trainer administered the next level of help, a demonstration and repetition of the cue. Following another five (5) second pause for correct child response, the third level of help, physical guidance through the correct behavior and simultaneous repetition of the verbal cue, was administered, if necessary. As in the time-delay strategy, the child performed the behavior correctly at every trial and received reinforcement.

Target Response Definitions

1. "Clap your hands" required the child to lift the hands from the

table and bring the palms together once.

2. "Touch your nose" required the child to bring one hand to the face and touch the nose with fingertips.
3. "Pick up the toy (or, spoon)": The behavior required was a grasping and lifting of an object by its handle.
4. "Give me the spoon" required the child, already grasping the spoon, to extend the arm and release the grasp.
5. "Kick the ball" required the child to extend the leg sufficiently to move a light, large beachball in front of them.
6. "Push the toy" required the child to grasp an object by its handle and move it across a table.
7. "Grab the ring" required a child to reach up and grasp a 3" plastic ring above the child's head.

Data Collection

Data, recorded for each trial and probe, consisted of the sequential recording of trainer and child behaviors.

Scorable teacher behaviors. A.) Verbal cue: (used for both teaching strategies) defined the beginning of a training trial or probe and consisted of the cue for the behavior in question. B.) Model (used only during the progressive cue strategy) was given subsequent to any response other than the correct student response, following the verbal cue. C.) Physical help (used for both strategies) was scored when the trainer guided the child through the correct response.

Scorable child behaviors. A.) Correct response: defined the end of each training trial and resulted in receipt of reinforcement. Scored whenever the child completed the desired behavior at the criterion level, regardless of the level of assistance received. B.) Incorrect response: any movement other than the correct response. C.) No response:

Scored when no discernable response occurred.

While within trial sequences of teaching levels and student responses could vary, only the sequence of the teacher's verbal cue followed by the child's criterion level response was considered correct for both teaching strategies.

RESULTS

Interobserver reliability was taken on the trainer's data by a secondary observer on more than 55% of the sessions and was calculated by dividing the number of agreements by the number of agreements plus disagreements regarding the sequence of events on each trial. The mean reliability for the data reported as the correct behavior sequence (trainer's cue followed by child's correct response) was over 99%. Range was 80%-100%. The mean reliability for the overall sequence of events during a trial was more than 97%. The range was 60%-100%.

The sequence of trainer-child behavior was observed for every trial. At the end of a session, those trials with the correct sequence (ie., verbal cue followed immediately by correct child response) were tabulated and plotted. Results displayed in figures 1 and 2 indicated that Angela and Billy demonstrated more correct behaviors on the task trained using the time-delay strategy.

Insert Figure 1 about here

Following a series of training sessions with little response to either strategy, Billy's consequent event was changed from edibles to a wind up music box. His performance of the correct behavior trained by the time-

delay task showed a steady and sustained improvement. Simultaneously, the task assigned to the progressive cue strategy showed a slight positive response following the consequent event change, although clearly not to the level of the task assigned to the time-delay procedure. Performance in response to the progressive cue strategy produced no correct responses until just prior to the end of training. Although Figure 1 shows only two correct sequences, examination of the entire behavior sequence show that fewer teacher cues were required, as Billy was responding more frequently to modeling.

The response to the probe items was zero throughout the first phase. Following phase change, a successful sequence was recorded in response to the time-delay strategy. The second task taught with the progressive cue did not result in any correct sequences following phase change.

Insert Figure 2 about here

Although more variable, Angela's graph illustrates a pattern not too dissimilar from Billy's. Angela's data show correct sequences beginning shortly after the initiation of the time-delay training. Although Angela's performance was erratic, correct sequences occurred throughout training. In contrast, the task trained by the progressive cue strategy produced no correct sequences.

Despite periodic successful sequences throughout the study without training, the two tasks assigned to the probe conditions were considered to have remained at baseline level. In order to address the question of interference, only one of the two probe items was trained at phase change. After the initiation of the phase change, one correct sequence occurred in response to the time-delay strategy. However, due to the

variability in baseline, this success must be viewed with extreme caution. No significant change appeared in the probe item.

DISCUSSION

Despite insufficient time to complete the within subject replication, the replication across subjects clearly demonstrates that motor responses of profoundly retarded children can be modified by the application of a systematic teaching strategy. Functional relationships were established between verbal cues and the corresponding motor responses. Since generalization to other motor behaviors did not occur, we suggest that the behavior changes were due to the intervention of the two teaching strategies.

The differences evident in these two common teaching strategies employed in the present study demonstrate that the children did not benefit equally from the teaching packages within the time parameters represented by this study. Functionally, the primary difference between the strategies is that the time-delay was primarily a fading from full physical assistance to verbal cue, while the progressive cue strategy consisted of graded teacher prompts, incorporating the use of demonstration as an instructional technique. Although Billy's graph of correct sequences indicates that the progressive cue strategy was beginning to be associated with some behavior change, the results of both of the children's graphs suggest that the progressive cue procedure was not efficient in comparison to the time-delay procedure, and that the subjects may not have benefitted from the demonstration.

That the children did not respond as well to a strategy incorporating demonstration is consistent with other studies (Baer, et.al., 1976; Nelson

& Cone, 1975) which suggest that imitation ability must be present for demonstration to be effectively utilized. Essentially, the question becomes one of the feasibility of imitation training. Therefore, the results of this study do not preclude attempts to teach imitation skills, for if a child can be taught to imitate, learning will be greatly facilitated. We do suggest, however, that a stimulus transfer/time-delay procedure can be more efficiently used to teach those skills needed for self care and survival than can a procedure which incorporates a demonstration component.

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FIGURE 1

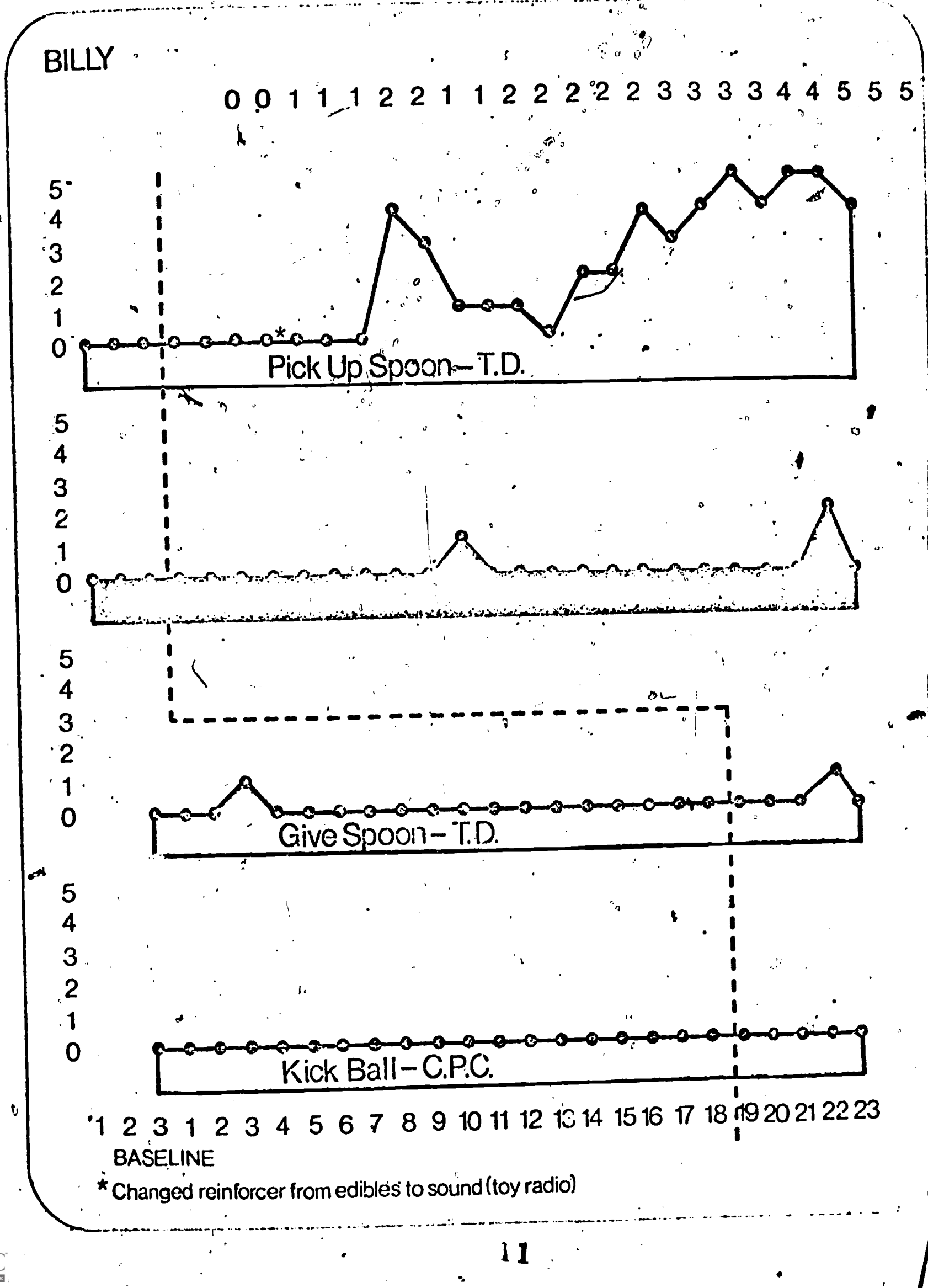
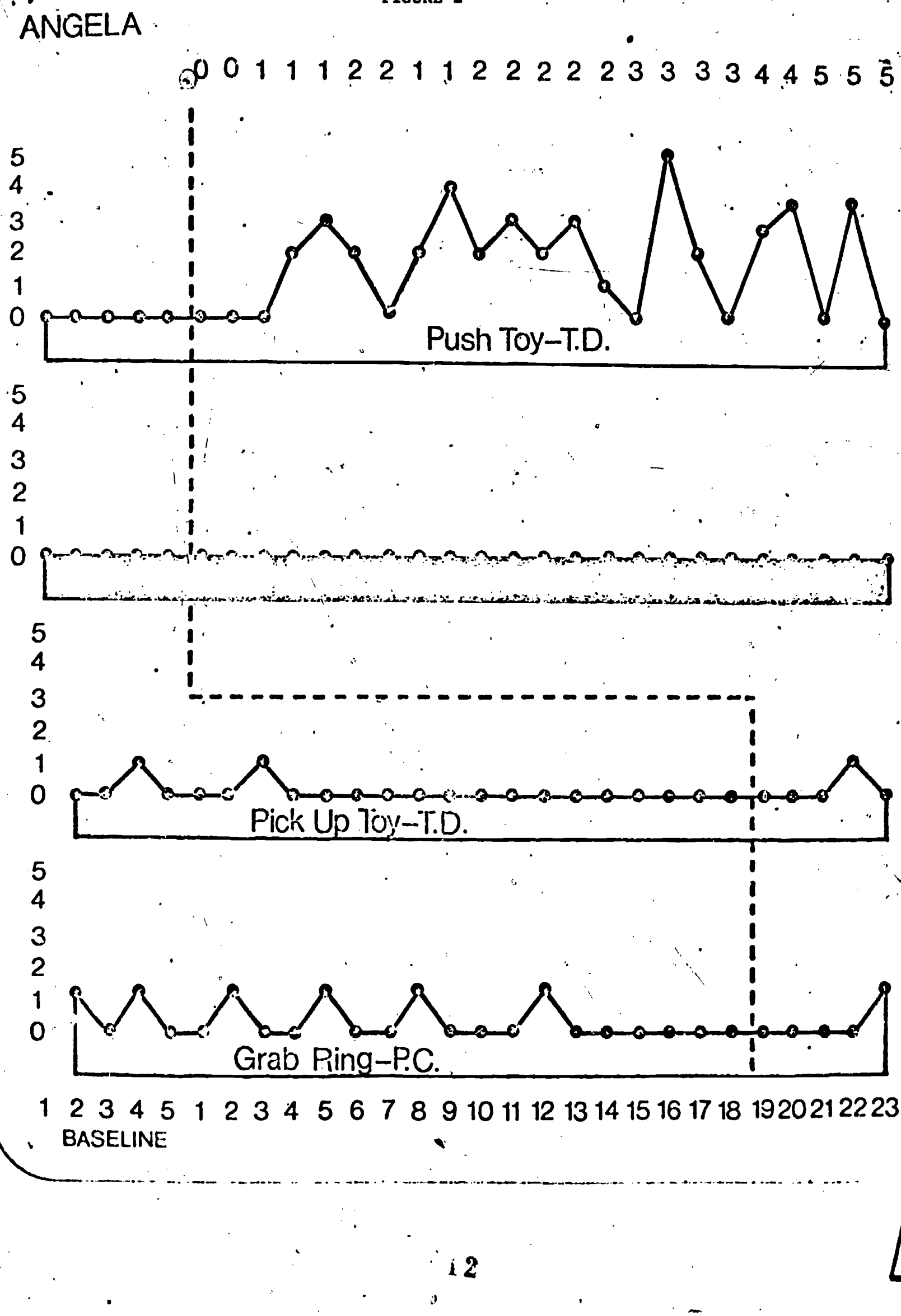

BILLY
0 0 1 1 1 2 2 1 1 2 2 2 2 2 3 3 3 3 4 4 5 5 5
5
4
3
2
1
0
*
Pick Up Spoon—T.D.
5
4
3
2
1
0
Give Spoon—T.D.
5
4
3
2
1
0
Kick Ball—C.P.C.
1 2 3 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
BASELINE
* Changed reinforcer from edibles to sound (toy radio)

FIGURE 2


ANGELA
0 0 1 1 1 2 2 1 1 2 2 2 2 2 3 3 3 3 4 4 5 5 5
5 4 3 2 1 0
Push Toy–T.D.
5 4 3 2 1 0
5 4 3 2 1 0
Pick Up Toy–T.D.
5 4 3 2 1 0
Grab Ring–P.C.
1 2 3 4 5 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
BASELINE