TRAINING AND MAINTAINING A RETARDED CHILD'S PROPER EATING¹

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The present study was designed to explore whether motivational procedures are needed to maintain a retardate's continued use of previously trained eating skills. A profoundly retarded child who ate food with her hands was trained by a manual guidance procedure to eat properly with a spoon, but the child still did not use the spoon after having learned to do so. When a motivational-maintenance procedure was applied, the child did begin to eat properly. When maintenance was discontinued, the child returned to eating with her hands. Proper eating returned when maintenance was applied again; when discontinued, the child returned to eating with her hands. These results demonstrate that continued motivational procedures are needed after training to maintain the retardate's continued use of proper eating skills.

Training profound retardates to eat properly is a major concern. Often, the profound retardate picks up food with his hands, spilling it on himself and his surroundings. Consequently, many descriptions of training programs for the mentally retarded have included statements about training proper eating. From the perspective of reinforcement procedures, the training of proper eating is almost unique in that no special search for a suitable reinforcer is necessary because the terminal component of the eating sequence is the ingestion of food. Similarly, a penalty for improper eating is necessarily available, namely, the interruption or postponement of the food delivery. The training of proper eating would seem, therefore, to be ideally suited to reinforcement procedures.

A variety of methods have been described for training the mentally retarded to perform proper eating skills. Of these methods, the most common is for a teacher to guide the child's hand manually through the eating se-

quence and to reduce the degree of guidance as the child improves. One method of reducing the guidance is for the teacher initially to hold the child's hand, and as the child progresses, to move the locus of the guidance from the hand to the forearm, elbow, and ultimately, the shoulder (Larsen and Bricker, unpublished; Patterson and Overbeck, 1968). A second method of reducing manual guidance is for the teacher to divide the eating sequence into steps and, as the child improves, to eliminate guidance of those steps at the end of the sequence (Berkowitz, Sherry, and Davis, 1971; Zeiler and Jervey, 1968; Spradlin, unpublished). In other reports, shaping of individual components without the use of manual guidance seems to have been used (Bensberg and Slominski, 1965; Whitney and Barnard, 1966). Still other reports have used some training procedure but have given insufficient information as to how this training was conducted (Barton, Guess, Garcia, and Baer, 1970; Bensberg, Colwell, and Cassell, 1965; Henriksen and Dougherty, 1967; Stolz and Wolf, 1969). Training programs have generally also included procedures for reducing grossly improper responses. Punishment by timeout from the food has been the usual procedure either by removing the food for a specified dura-

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tion of time (Spradlin, unpublished; Stolz and Wolf, 1969; Zeiler and Jervey, 1968; Whitney and Barnard, 1966; Bensberg and Slominski, 1965) or by removing the retardate from the table (Berkowitz, Sherry, and Davis, 1971). Physical restraint and interruption of improper responses (Spradlin, unpublished; Larsen and Bricker, unpublished) have also been used.

The question may be asked as to whether training would be sufficient without the need for a post-training maintenance procedure. For many other skills, the mentally retarded continue to use the skills trained without any additional motivation provided by the trainer. Presumably, such skills are intrinsically reinforcing (*e.g.*, riding a tricycle, swinging, bouncing a ball) or naturally provide sufficient reinforcement (*e.g.*, opening the refrigerator door, saying "I want a cookie", hugging parents). One would assume that proper eating skills might similarly provide sufficient reinforcement, the ingestion of food. This assumption may be one of the reasons that most reports concerned themselves with training the proper skills and ignored providing continued maintenance after training.

Two reports have described maintenance programs (Barton *et al.*, 1970; Henriksen and Doughty, 1967). Both reports relied greatly on punishing improper responses, with timeout from the food (Barton *et al.*, 1970) or verbal disapproval and restraint (Henriksen and Doughty, 1967). The development of these maintenance programs is based on an assumption that training alone will not establish proper eating without providing continued motivation for the use of proper skills after training. This assumption is apparently demonstrated valid by the maintenance articles (Barton *et al.*, 1970; Henriksen and Doughty, 1967), both mentioning that the retardates in their studies had previously learned proper responses, and yet were eating improperly. Unfortunately, neither study provides sufficient information as to the extent that the students were indeed capable of eating properly since neither study provided the necessary information concerning

the method of training, its results, and the specific skills trained. Conversely, one might ask what the effects of a motivating maintenance procedure would have been on the eating skills of retardates who had not previously learned proper eating skills. The present study was designed to test the assumption on which maintenance programs are based: continued motivation needs to be provided after training to insure the continued use of the skills trained, and to test this assumption in a manner allowing for an analysis previous studies could not provide.

METHOD

Subject

A 6-yr-old girl, enrolled in a day-care training program for profoundly retarded children served. She was tested for IQ by an independent agency and was listed "untestable". She did not speak, follow instructions, or perform any self-care skills. She had been trained to walk only one month before the study began. When food was placed before her, she reached into the food with either one or both hands, crushed the food in the palms of her hands with her fingers, and with her hand in an open position, brought the food to her mouth, invariably spilling food on herself and her immediate surroundings.

Response

A correct feeding response was defined as the child's taking food from the bowl with the spoon held right side up by the handle and bringing the food to her mouth without spilling. The feeding response was incorrect when food was moved in any other manner (*e.g.*, without the utensil, spilling from the spoon, with the spoon held upside down, *etc.*) An observer, whose only responsibility was to record self-feeding responses and to differentiate them as correct or incorrect, was present at every meal. An additional observer was present at random during one fourth of the meals and was positioned so that he could not view the other observer nor be viewed by him.

Procedure

A spoon was placed to the right of a bowl fixed to the top of a table. The bowl contained warm food, which was worked into the consistency of a lumpy paste. Five brief meals were conducted daily, five days per week. Each meal was terminated after 4 min or after the bowl was emptied, whichever occurred first. The teacher remained to the right of, and slightly behind, the seated child. The teacher kept the child's mouth out of contact with the bowl by manually returning the child to a correct eating posture when the child's face came within 6 in. of the bowl. During baseline, the teacher performed no additional procedures.

During training by manual guidance, the eating sequence was divided into six steps. The teacher provided guidance for the steps in the following manner:

- (1) The handle of the spoon was placed in the child's right hand, which was then held by the teacher's right hand.
- (2) Guiding the hand, the spoon was dipped into the food, and with food on the spoon, it was lifted to about 1 in. above the bowl.
- (3) The spoon was lifted to within 2 in. of the child's mouth.
- (4) The teacher placed her left hand on the child's chin and gently opened the child's mouth.
- (5) The spoon was gently guided into the child's mouth.
- (6) The child's hand was guided upward and outward resulting in the food being removed from the spoon by the child's upper teeth or lip.

When training by manual guidance was first introduced, the teacher guided the child through all six of the steps. Whenever the sequence was completed correctly on three successive assisted trials, the child's hand was guided through one less step on the next assisted trial. Whenever an assisted trial was not completed correctly, it was interrupted and another guided trial was begun, which included one additional step. Whenever a step was eliminated, added, eliminated,

and added on three consecutive trials, the child's hand was guided through a point between that step and the next lower step (*e.g.*, if step three was being added and eliminated, on the following trial the child's hand was guided to a point halfway between the bowl and her mouth.) To obtain a continuous measure of the level of independent eating, an unguided trial followed every trial completed correctly.

The motivating maintenance procedure consisted of interruption-extinction. When the child made an incorrect feeding response, the teacher stopped the child's hand before it reached her mouth and, if necessary, cleaned all food from the child's hand with a paper towel.

The sequence of the procedure was:

1. Baseline	6 meals
2. Interruption-Extinction	6 meals
3. Baseline	6 meals
4. Manual Guidance	9 meals
5. Manual Guidance and Interruption-Extinction	15 meals
6. Baseline	9 meals
7. Interruption-Extinction	9 meals
8. Baseline	6 meals

The initial use of interruption-extinction (Condition 2) provided an additional test of whether the child had not previously learned to eat properly, because all improper responses were interrupted and extinguished. A test of the validity of the use of this procedure as an indicator of past learning is provided by the return to this procedure (Condition 7) after training (Conditions 4 and 5). The successive use of baseline (Conditions 1, 3, 6, and 8) determined the permanence of the effects attributable to previous training and interruption-extinction conditions.

RESULTS

Independent observations were made on 17 of the 66 meals. The mean per cent agreement was 97 for correct self-feeding responses and 94 for incorrect responses.

Figure 1 shows the extent to which the child fed herself correctly during the various procedures. When the trainer did not intervene in the feeding process (meals 1 through 6), not a single feeding response was performed correctly. When the trainer interrupted and extinguished each of the incorrect responses (meals 7 through 12) the child still did not feed herself correctly on any trial. The return to baseline on meals 13 to 18 showed the same complete

absence of correct feeding. When the child was trained to eat correctly by manual guidance during meals 19 to 27, correct eating emerged and continued on guided trials. On the unguided trials, however, no correct eating occurred. When interruption-extinction was applied to unguided trials, on meals 28 through 42, correct eating emerged and reached a near perfect level after nine meals. The child then continued to eat correctly for as long as interruption-extinc-

Fig. 1. The percentage of feeding responses completed correctly by a profoundly retarded 6-yr-old child. Five brief meals were given within a 6-hr period each day. During the "Interruption-Extinction" procedure, the teacher prevented the child from eating by removing food from the child's hand during an incorrect response. During the Manual Guidance procedure, the teacher assisted the child on guided trials by manually guiding the proper hand movement. Neither Interruption-Extinction nor Manual Guidance were used during Baseline.

tion remained in effect. When interruption-extinction was discontinued on unguided trials and no trials were guided (meals 43 to 51) proper eating returned to a near zero level. When interruption-extinction was reintroduced, on meals 52 to 60, proper eating returned shortly to the near perfect level. The return to baseline from meals 61 to 66 resulted in a decreased frequency of correct feeding, albeit, only after baseline was continued past three meals.

It would appear from Figure 1 that the initial period of interruption-extinction had no effect. Examination of the absolute number of feeding responses made by the child showed that this procedure decreased the number of feeding attempts. The child had a mean of 24 feeding responses during the baseline meals before and after interruption-extinction. In contrast, the mean number of feeding responses per meal during the initial extinction-interruption procedure was only four. (Indeed, on meal 12 no feeding attempts were made, either proper or improper; the data point for that day on Figure 1 was arbitrarily set at zero.)

Not shown in Figure 1 is the extent to which manual guidance was effective in training the child to eat properly. After seven meals of manual guidance over a period of one and one half days the child had advanced to Step 1, which required only that the trainer place the spoon in the child's hand. On the last two meals of this second day of training (meals 26 to 27), the child fed herself correctly on every trial after the spoon was placed in her hand.

Visual observation of the child revealed that during the baseline periods (meals 1 to 6 and 13 to 18), the child ate the food exclusively with her hands, spilling it on her clothing, the table, and the floor. No attempt was made to use the spoon. The same behavior characterized the child during the initial interruption-extinction period (meals 7 to 12) except that the child virtually stopped attempting to eat. During training (meals 19 to 27), as stated previously, the child quickly learned to eat correctly on the guided trials, rarely even spilling any food while

bringing the spoon from the bowl to her mouth. On the unguided trials during this period, however, the child reverted to a pattern of dipping her hands directly into the food, rarely using the spoon during the unguided trials. The behavior of the child changed greatly during the succeeding period when interruption-extinction was applied to the unguided trials (meals 28 through 42). On the second meal during this period, the child began to use the spoon on unguided trials and soon was using the spoon during every feeding attempt. Failure to reach 100% correct was completely attributable to the occasional spilling of food from the spoon while the spoon was being raised from the bowl. When interruption-extinction was discontinued (meals 43 to 51) the child again reverted to dipping her hands into the food. When the interruption-extinction procedure was introduced on meals 52 to 58, these hand-dipping responses disappeared entirely after the fourth meal. A residual effect was seen during the first three meals of the final baseline period on meals 61 to 66, during which the child continued to eat with the spoon and only rarely allowed any food to spill from it. On the following three meals during the same baseline period, the child progressively reverted back to eating without the utensil.

DISCUSSION

The present study demonstrated that training proper eating skills may not be sufficient to insure the continued use of the proper skills after training. During the final seven meals of training, the child ate properly on almost every trial, guided or not, thereby demonstrating that the child had learned to eat properly. When training was discontinued and baseline conditions reintroduced, the child immediately returned to a complete absence of the proper eating skills she had learned. Training proper eating, therefore, is not sufficient to insure the continued use of proper eating after training.

That training may be insufficient leads to questioning whether it is even necessary. Prior

maintenance studies demonstrated improved eating by providing motivation to decrease improper responses (Barton *et al.*, 1970; Henriksen and Doughty, 1967) and to increase proper responses (Henriksen and Doughty, 1967). Thus, improved eating was demonstrated without training. These studies reported that the retardates had previously been trained, implying that without prior training, maintenance procedures would have been ineffective. The present study similarly demonstrated improved eating when maintenance was applied after training, but in addition, demonstrated no improvement when maintenance was applied before training. It therefore appears probable that, although training may be insufficient, it well may be necessary.

The present study demonstrated the validity of the implications and conclusions of previous maintenance programs: (1) training alone is not sufficient to insure proper eating; (2) maintenance without prior training is ineffective; (3) the retardate must first be trained to eat properly and later provided with continuous motivational procedures to maintain the proper eating skills trained. Either training without maintenance or maintenance without training are insufficient to insure proper eating by the mentally retarded. Rarely does maintenance appear necessary with normal children, probably because family members naturally provide maintenance to the children while they eat together in the home. In most settings with the mentally retarded, however, meals are so impersonal that maintenance procedures are required. Without maintenance, the children may never use the proper skills they have learned.

REFERENCES

- Barton, E. S., Guess, D., Garcia, E., and Baer, D. M. Improvement of retardates' mealtime behaviors by timeout procedures using multiple baseline techniques. *Journal of Applied Behavior Analysis*, 1970, 3, 77-84.
- Bensberg, G. J., Colwell, C. N., and Cassel, R. H. Teaching the profoundly retarded self-help activities by behavior shaping techniques. *American Journal of Mental Deficiency*, 1965, 69, 674-679.
- Bensberg, G. J. and Slominski, Anita. Helping the retarded learn self-care. In G. J. Bensberg (Ed.), *Teaching the mentally retarded*. Atlanta, Georgia: Southern Regional Education Board, 1965.
- Berkowitz, S., Sherry, P. J., and Davis, B. A. Teaching self-feeding skills to profound retardates using reinforcement and fading procedures. *Behavior Therapy*, 1971, 2, 62-67.
- Henriksen, K. and Doughty, R. Decelerating undesired mealtime behavior in a group of profoundly retarded boys. *American Journal of Mental Deficiency*, 1967, 72, 40-44.
- Larsen, L. A. and Bricker, W. A. *Mental retardation: what can we do?* Unpublished mimeographed manual for teachers of the severely retarded.
- Patterson, E. G. and Overbeck, D. B. *Behavior shaping*. Austin, Texas: The Department of Inservice Training, Austin State School, 1968.
- Spradlin, J. E. *The Premack hypothesis and self-feeding by profoundly retarded children: a case report*. (Working paper No. 79) Parsons, Kansas: Parsons Research Center, 1964. (Mimeo.)
- Stolz, S. B. and Wolf, M. M. Visually discriminated behavior in a "blind" adolescent retardate. *Journal of Applied Behavior Analysis*, 1969, 2, 65-77.
- Whitney, L. R. and Barnard, K. E. Implications of operant theory for nursing care of the retarded child. *Mental Retardation*, 1966, 4, 26-29.
- Zeiler, M. D. and Jervey, S. S. Development of behavior: self-feeding. *Journal of Consulting and Clinical Psychology*, 1968, 32, 164-168.

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