Operant eyelid conditioning of severely retarded children

J. D. KEEHN

LETHBRIDGE JUNIOR COLLEGE, ALBERTA

Abstract

While each of 4 children between 10 and 15 years old with MAS from 3 to 4 years played with simple construction materials across a table from him, E recorded their eyeblinks on a cumulative recorder activated by a hidden switch. In operant and extinction sessions Ss received candy independently of blinking; in conditioning sessions candy was contingent upon blinking. Three Ss blinked faster in conditioning sessions.

Problem

The Law of Reinforcement states that a response increases in probability if it is immediately followed by a reinforcing state of affairs. No limits have been set on the species membership or on the intellectual capacity of the behaving organism, and in principle it is not necessary for the response to produce the reinforcer or for S to be aware of the contingency (Skinner, 1948, 1956, 1963). The role of awareness may be assessed by misleading Ss who might otherwise be expected to comprehend the experimental contingencies, or by using Ss unlikely to understand what the experiment is about. With the first method Keehn et al (1965) found evidence of operant eyelid conditioning in college students who believed they were being rewarded for lever pressing. In the present study the second method was utilized by attempting operant conditioning of eyeblinking with severely defective children.

Method

Four inmates of the same cottage in an institution for the mentally retarded served as Ss. They were: Lilly¹, 12-1/2 years old, IQ 36; Don, 10-1/2 years old, IQ 30; Jane, 14 years old, IQ 31; Sue, 15 years old, IQ 23. Sue was mongoloid, the others familial. Each S was brought from the cottage to the psychologist's office, seated at a table and offered toys to

play with. Regular daily routines soon developed; Lilly made patterns out of blocks and then strung beads, Don made block towers and then assembled a simple puzzle, Jane made block arrangements and played with a nest of hollow cubes, and Sue counted beads (randomly!) as she threaded and removed them from a string.

The E sat across the table from S. In two preliminary sessions E and S played together and E occasionally gave S an M and M candy. These sessions lasted 30 to 40 min. and served for E and S to become acquainted and for S to establish a play pattern. In the first two experimental sessions E recorded Ss eyeblinks by pressing a hidden switch every time S blinked. This activated a cumulative recorder located several rooms away out of earshot. These operant (baseline) sessions lasted between 15 and 20 min., in which time each S was given 25 candies at random. In Session 3 all Ss were reinforced on schedule VR2 for eyeblinking, and this schedule was maintained for Jane through Session 15. The other Ss were reinforced on VR3 or VR4 on Sessions 4 through 11. This was the final session for Lilly who was taken home for the summer. Session 12 was an extinction session for Don and Sue, in which 25 and 30 candies, respectively, were given at random. For these 2 Ss Sessions 13 and 15 were re-conditioning (VR3), and Sessions 14 and 16 again extinction with random reinforcement. Conditioning sessions typically lasted about 15 min. with Ss receiving from 25 to 30 reinforcements per session.

Results

Three of the 4 Ss more than doubled their blink rates by Session 6, the fourth conditioning session. Cumulative records of each S on Sessions 2 (baseline) and 6 are shown in Fig. 1. The blink rates on Sessions 2, 6 and 10, respectively, were: Lilly 2.6, 8.2 and

Fig. 1. Cumulative eyeblink records of the 4 Ss on Session 2 (baseline, lower records) and Session 6 (VR reinforcement schedule, upper records).

8.0; Don 2.5, 6.4 and 5.3; Jane 3.6, 4.4 and 4.0; Sue 2.0, 5.2 and 9.3 blinks per min. Jane never did blink much above her operant level, but Lilly, Don and Sue all maintained rates more than twice their operant levels when eyeblinking was reinforced on schedules up to VR4.

When Don and Sue were given random reinforcements on Session 12 their blink rates fell to 3.5 and 4.6 blinks per min., respectively. Don's rate rose to 6.1 blinks per min. when blinks were reinforced on schedule VR3 on Session 13, but Sue's rate remained the same as on Session 12. During extinction on Session 14 Don maintained his blink rate of 6.1 but Sue produced a typical negatively accelerated extinction curve averaging 4.8 and 1.0 blinks per min. over the first and last 5 min., respectively, of the 14 min. session. Neither S adjusted to the alternating extinction and conditioning procedures in Sessions 12 through 16, and their blinking behavior was not brought under control again in 3 more conditioning sessions; both Ss returned to baseline performance.

Discussion

The spontaneous blink rates of the Ss were lower than those casually observed in normal children, but no conclusions about a relationship between IQ and voluntary blinking can be drawn from the present data (cf. Cromwell, Palk & Fosbee, 1961). However it does appear that blink rates of some retarded children can be appreciably changed by appropriate arrangement of reinforcement contingencies. When M and M candies were made contingent upon eyeblinking, blink rates rose, and when the candies were given at random, blink rates fell. Blink rates were not so high as to produce candies as fast as the Ss "requested" them. In view of this and their severe retardation it is unlikely that the Ss became aware of the experimental contingencies.

Some control over the Ss behavior without their awareness appears to have been shown, but when conditioning and extinction sessions alternated performance deteriorated instead of improving (cf. Bullock & Smith, 1953). Loss of control over retarded children's behavior over a long series of experimental sessions has been reported by Barrett & Lindsley (1962), and the Brelands (1961) have reported the same phenomenon with some animals. It is not unlikely that there are organismic factors that make complete environmental control difficult or impossible, although in the present study the abrupt procedural change to alternating conditioning and extinction sessions could have been responsible for the Ss' failure to adapt.

References

- Barrett, B. H., & Lindsley, O. R. Deficits in acquisition of operant discrimination and differentiation shown by institutionalized retarded children. *Amer. J. ment. Defic.*, 1962, 67, 424-436.
- Breland, K., & Breland, M. The misbehavior of organisms. *Amer. Psychologist*, 1961, 16, 681-684.
- Bullock, D. H., & Smith, W. C. An effect of repeated conditioning-extinction upon operant strength. *J. exp. Psychol.*, 1953, 46, 349-352.
- Cromwell, R. L., Palk, B. E., & Fosbee, J. G. Studies in activity level. V. The relationship among eyelid conditioning, intelligence, activity level, and age. *Amer. J. ment. Defic.*, 1961, 65, 744-748.
- Keehn, J. D., Lloyd, K. E., Hibbs, M., & Johnson, D. Operant eyeblink conditioning without awareness: A preliminary report. *Psychon. Sci.*, 1965, 2, 537-538.
- Skinner, B. F. Superstition in the pigeon. *J. exp. Psychol.*, 1948, 38, 168-172.
- Skinner, B. F. A case history in scientific method. *Amer. Psychologist*, 1956, 11, 221-233.
- Skinner, B. F. Operant behavior. *Amer. Psychologist*, 1963, 18, 503-515.

Note

1. Patient identifications are pseudonyms. The study was conducted at Sonoma State Hospital. I wish to thank the hospital Superintendent and the staff of the Psychology Department for providing help and facilities.