JOURNAL OF THE EXPERIMENTAL ANALYSIS OF BEHAVIOR 1979, 31, 159-160 NUMBER 1 (JANUARY)

A PELLET FEEDER FOR THE BIRDS

W. J. MILLARD[1]

UNIVERSITY OF MASSACHUSETTS
AND
SMITH COLLEGE

An alternative means of delivering food to pigeons in operant conditioning research is described. The feeder allows greater control of the amount of food delivered and reduces the amount of time necessary for the pigeon to collect the food. It is possible to extend the length of experimental sessions due to the reduction of food intake. Data obtained using the pellet feeder indicated that the control of responding is comparable to that observed with the standard grain-magazine feeder.

Key words: discrimination, reinforcement, pellet feeder, pigeons

In the typical experiment using pigeons as subjects, a food reinforcer is defined as timed access to grain in the standard magazine (Ferster and Skinner, 1957). In contrast to the standard grain magazine, the pellet feeder described here, similar to one used by Richardson and his colleagues (*e.g.,* Richardson and Loughead, 1974), more precisely controls the amount of food (*i.e.,* reinforcement magnitude) and reduces the time required for the pigeon to collect the food. Also, the pigeon's view of the experimental environment is not obstructed while consuming the food.

The feeder is used with food pellets (pigeon formula, 45 mg, P. J. Noyes Co.) delivered by a standard pellet dispenser (BRS/LVE Model PDC-002). Figure 1 is a diagram of the feeder in position. An aluminum tube (1.91 cm O.D., 0.16 cm thick wall) passes from the dispenser, through a hole in the cubicle ceiling, to an attached connector (3 cm by 3 cm by 5 cm high) and pellet trough of machined aluminum. The trough (4 cm long by 2 cm wide by 0.5 cm deep) is recessed and angled to "hold" the pellet. A deflection plate of sheet aluminum above the opening to the trough guides the pellet. The stabilizing plate (12 cm long by 5 cm wide by 0.75 cm thick) holds the tube at a right angle to the cubicle ceiling and against the intelligence panel. The set screw in the plate allows vertical adjustment of the tube, and thus changes the distance between the response disc and pellet trough. Placement or removal of the feeder requires less than 10 sec. When the feeder is removed, the hole in the ceiling is filled with a rubber stopper.

In the past 3 yr, 12 pigeons have been studied with this feeder. The preliminary training in one experiment provides illustrative data. Three naive White Carneaux pigeons, maintained at 85% of their free-feeding weights, were trained to eat pellets dispensed singly, and then trained to peck the illuminated disc for intermittent reinforcement. The birds were then exposed to a multiple schedule in which disc pecks were intermittently followed by food (VI 90-sec) in one component, and 15-sec periods in which no pecks occurred were intermittently followed by food in the second component (*tand* VI 60-sec DRO 15-sec). Hue stimuli projected behind the disc were differentially correlated with the two components. A session involved a random sequence of 30 2-min periods of each component. Response rates during the last five of 25 sessions were judged stable by visual inspection. Discrimination indices, the ratios of responses in the VI component to the total responses, were greater than 0.98 for all birds in these five sessions. Responses per minute in the VI component, averaged over these last five sessions, were 129, 101, and 66. A sample cumulative record of the bird with the *lowest* response rate in the VI component is shown in Figure 2. Such rates are comparable to those obtained in a similar procedure reported by Reynolds (1961) with

[1]I gratefully asknowledge W. Kirk Richardson, who suggested the application of the pellet feeder to this research, and John W. Donahoe for his consul and support. Reprints may be obtained from W. J. Millard, Department of Psychology, Tobin Hall, University of Massachusetts, Amherst, Massachusetts 01002.

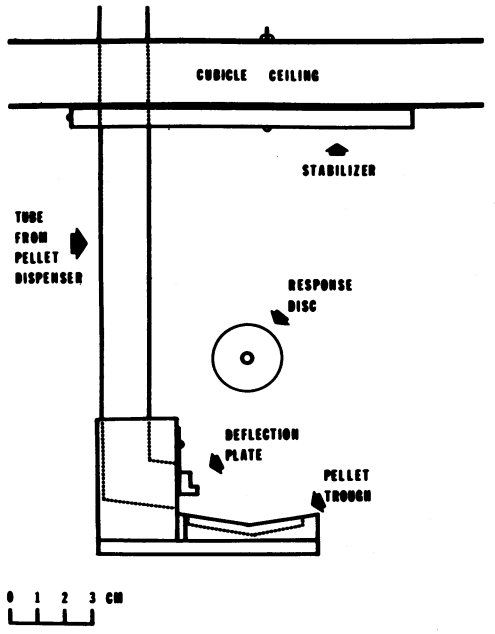

Fig. 1. Diagram of the pellet feeder (placement is shown for left side of the intelligence panel).

3-sec periods of grain access. Remote video observations confirmed that the time from the reinforced peck to the next peck following the consumption of the pellet was consistently less than 1.0 sec, and often much less.

An initial difficulty was interference due to accumulation of pellet dust at the end of the tube inside the connector. This was corrected by blowing the dust out of the tube and trough with a rubber hose at the end of each session.

The session length in this procedure was 120 min. During asymptotic performance, each bird received about 60 pellets or 2.7 g of food per session. In order to maintain their weights, each bird received at least 13 g of food ("Checkers", Ralston Purina Co.) in the post-session feedings. Assuming approximately equal composition of the pellets and the food, it would be possible to extend the session length to over 10 hr, using the same schedule parameters, while maintaining the body weights.

REFERENCES

Ferster, C. B. and Skinner, B. F. *Schedules of reinforcement.* New York: Appleton-Century-Crofts, 1957.

Reynolds, G. S. Behavioral contrast. *Journal of the Experimental Analysis of Behavior,* 1961, 4, 57-71.

Richardson, W. K. and Loughead, T. E. The effect of physical restraint on behavior under the differential-reinforcement-of-low-rate schedule. *Journal of the Experimental Analysis of Behavior,* 1974, 21, 455-461.

Received 7 June 1978.
(Final acceptance 15 August 1978.)

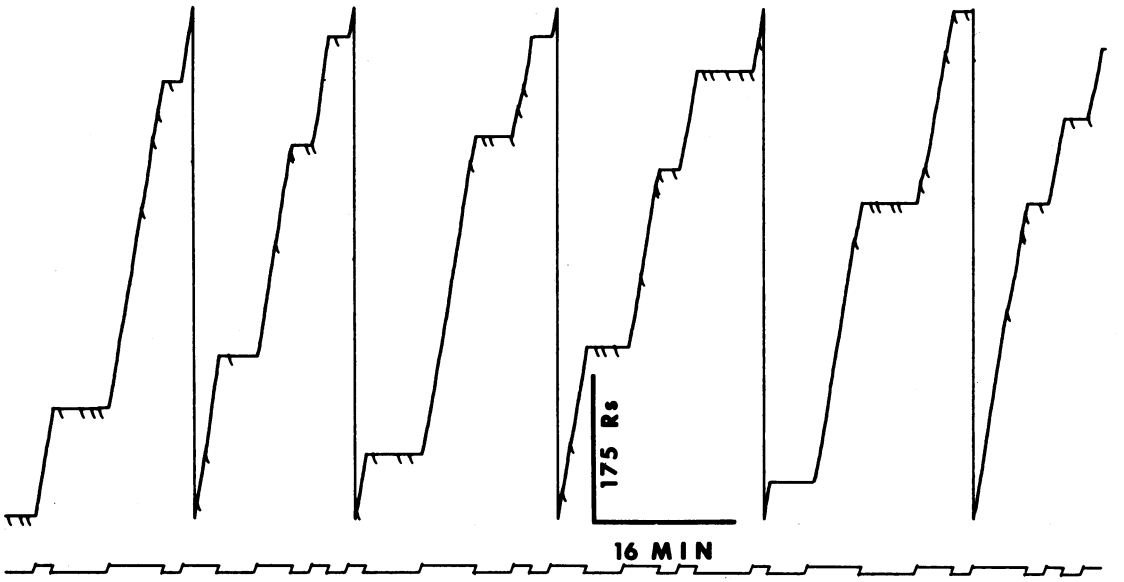

Fig. 2. A full-session (120 min) cumulative record for the pigeon with the lowest response rate in the VI component (see text). Downward deflection of the event marker indicates the *tand VI* 60-sec DRO 15-sec.