

# Schedule-induced aggression against a slide-image target\*

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Pigeons were trained to keypeck on a multiple schedule of reinforcement consisting of three 20-sec fixed interval components followed by one 200-sec fixed-interval component. In one phase of the study, a rear-projected slide image of a pigeon was present, while in another phase, a taxidermically prepared pigeon was present. Although more schedule-induced aggression occurred against the stuffed model than against the slide, the topography and temporal locus of attack against either target were comparable.

Several studies have shown that aggression against live or inanimate targets can be induced by the transition from frequent food reinforcement to extinction (Azrin, Hutchinson, & Hake, 1966; Davis & Donenfeld, 1967; Thompson & Bloom, 1966) and by various intermittent food schedules, including fixed-ratio (Cherek & Pickens, 1970; Cole & Litchfeld, 1969; Cole & Parker, 1971; Flory, 1969b; Gentry, 1968; Gentry & Schaeffer, 1969; Hutchinson, Azrin, & Hunt, 1968; Knutson, 1970), fixed-interval (Cherek & Heistad, 1971; Cherek, Thompson, & Heistad, 1973; Richards & Rilling, 1972), variable-interval (Dove & Rashotte, 1971), and fixed time schedules (Cherek et al., 1973; Flory, 1969a). In studies with pigeon Ss, the use of either live or stuffed targets has several disadvantages, including (1) serious injury or damage to the target, (2) uncontrolled counteraggression and/or spontaneous movement of live targets, (3) variability in the size and posture of live targets, (4) the relatively low percentage of Ss that will attack a stuffed model, and (5) the expense of procuring live or preparing stuffed targets.

Recent demonstrations of schedule-induced aggression against a mirror (Cohen & Looney, 1973) and against a color photograph (Looney & Cohen, 1973) suggest that pigeons might also attack other two-dimensional objects, such as a rear-projected slide image. The slide's characteristics and availability could be easily controlled, and its use would eliminate the disadvantages of live or stuffed targets. The present study compared the amount of schedule-induced aggression exhibited against a two-dimensional slide target with that exhibited against a stuffed target.

## METHOD

### Subjects

Four experimentally naive male White Carneaux pigeons, maintained at 80% free-feeding weight, were used. Ss were approximately 5 years old and were housed in separate cages in a constantly illuminated room.

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### Apparatus

One end of a pigeon chamber, similar to that described by Azrin et al (1966), contained a food magazine located below a standard pigeon key that could be transilluminated with red or green light. The other end of the chamber housed either of two interchangeable target objects. One target was a taxidermically prepared White Carneaux pigeon, the head and throat areas of which were covered with a white synthetic fur hood. A force of 50-55 g applied to the model's head closed a microswitch. The other target was a rear-projected color slide of a White Carneaux pigeon in a standing position. The head of the pigeon was rotated approximately 45 deg, thus exposing the throat and eye regions. The 35-mm slide was projected by a Sawyer 500R projector onto a 12.1 x 17.8 cm rear projection screen. A microswitch mounted on the back of the screen closed when a force of 50-55 g was applied to the head area of the rear-projected pigeon. For either target, only those switch closures separated by at least 0.2 sec were recorded as discrete attacks. This contingency decreased the occurrence of switch closures due to the bounce of the stuffed target. Standard electromechanical apparatus arranged experimental events.

### Procedure

To determine the operant level of attack prior to any schedule training, each S was exposed to a pretraining baseline condition, during which the slide target was initially available and during which the response key was inoperative and dark. When attack rate stabilized over five 1.5-h sessions with little or no systematic variability, the slide target was removed and the stuffed model introduced. Following stability of attack rate against the stuffed target, the slide target was reintroduced to determine whether prior exposure to the stuffed model would facilitate attack against the slide target. A second presentation of the stuffed model constituted the last phase of the pretraining baseline condition.

With neither target present in the chamber, Ss were magazine trained and then trained to keypeck on a multiple schedule, consisting of three 20-sec fixed-interval (FI) schedule components correlated with a red key, followed by one 200-sec FI schedule component correlated with a blue key. Exposure to the multiple schedule continued until the rate and index of curvature (Fry, Kelleher, & Cook, 1960) of keypecking each showed stability over five sessions. The slide target was then presented until rate of attack against it was stable. In the last condition of the study, the stuffed target was available during the ongoing multiple FI 20-sec FI 200-sec schedule. Each session consisted of 45 FI 20-sec components and 15 FI 200-sec components, for a total of 60 reinforcements.

## RESULTS

Figure 1 shows session attack rates of Pigeons AC8 and AC9. Figure 1 shows session attack rates of Pigeons AC8 and AC9. The data from the other two Ss are not presented because these Ss never attacked either target throughout the entire study. As Fig. 1 shows, Ss AC8 and AC9 exhibited relatively little operant-level attack against either target. The initial high attack rates of Bird AC8 against the stuffed target during the second and fourth phases of the baseline condition dropped to zero over sessions. On the first session of exposure to the multiple FI 20-sec/FI 200-sec schedule, Pigeons AC8 and AC9 emitted 7 and 44 attacks, respectively, against the slide target. For both Ss, all attacks occurred during the



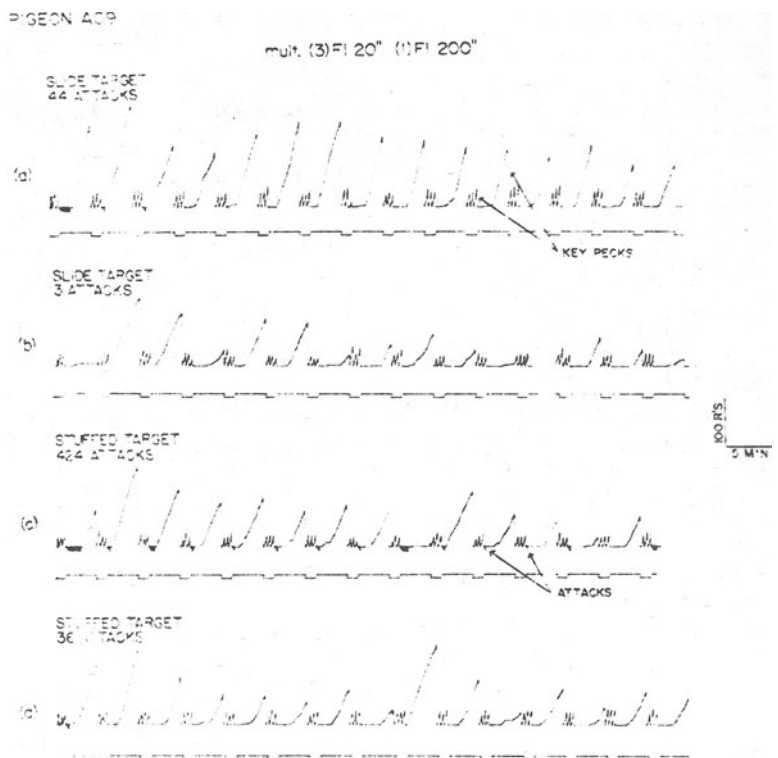


Fig. 2. Sample cumulative records of Pigeon AC9. Records (a) and (b) show, respectively, the first and last session of the multiple-schedule/slide-target condition, whereas Records (c) and (d) show, respectively, the first and last sessions of the multiple-schedule/stuffed-target condition.

Flory, 1969a, b), mirror-image targets (Cohen & Looney, 1973), and pictorial targets (Looney & Cohen, 1973).

### DISCUSSION

The results of the present study tentatively suggest that a rear-projected image of a conspecific is a relatively ineffective target for the study of schedule-induced aggression in pigeons. The two Ss that did attack either target showed a considerably lower rate of responding against the slide image than against the stuffed model. In a preliminary study similar to the present one, Rashotte, Katz, & Griffin (1973) reported that only two of their eight pigeons exhibited substantial extinction- or schedule-induced aggression against a rear-projected image of a pigeon. Although these two Ss had a previous history of pecking a key and a stuffed pigeon to obtain food, their screen contacts showed the same topography and postreinforcement occurrence as the attack behavior of Pigeons AC8 and AC9 in the present study. In general, both studies indicate that pigeons show little or no schedule-induced aggression against a two-dimensional slide-image target.

The observations of schedule-induced attack against a mirror (Cohen & Looney, 1973) and against a color photograph (Looney & Cohen, 1973) suggest that neither the hard surface nor the two-dimensionality of the slide target was responsible for the low levels of attack on it. It is possible that less attack occurred against the slide target than against the stuffed pigeon, because the feedback movement or bounce following blows on the stuffed model was absent following contacts on the glass screen. The observation (Looney & Cohen, 1973) that pigeons will attack a stationary color photograph of a conspecific suggests, however, that feedback movement of the target is not necessary for schedule-induced aggression to occur against it. It is also possible that the size of the projected image target may be a critical determinant of the amount of schedule-induced attack against it. That is, a projected image may not be perceived as

lifelike unless its size on the contact screen is essentially equal to that of a live or stuffed target pigeon. Other factors, such as the orientation, brightness, and color of the projected image, may also be critical to its being an effective target of schedule-induced aggression.

Upon initial exposure to either target object, the rates of attack for Pigeons AC8 and AC9 were maximal. Over sessions, however, target contacts progressively decreased to low or zero levels for both Ss. Using pigeon Ss and fixed-ratio (FR) food schedules, Cherek & Pickens (1970) reported a similar gradual decrease in attack against a live target following each increase of the FR response requirement. The results of these two studies suggest that schedule-induced aggression against live or inanimate targets may be a relatively unstable behavior which varies inversely with amount of exposure to experimental conditions.

In summary, the present study was conducted to investigate whether a rear-projected slide image would serve as an adequate target of schedule-induced attack. Although the results indicate that a slide target was not as effective as a stuffed model, further research with additional food schedules is necessary before definite conclusions can be reached.

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