Classical conditioning of reflexive fighting¹

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This study demonstrated that reflexive fighting could be classically conditioned to a 80-db buzzer, using both simultaneous and delayed conditioning paradigms.

Fighting responses are consistently elicited by the delivery of electrical foot shock to pairs of rats (Ulrich & Azrin, 1962). Since this behavior occurs in the absence of prior conditioning, shock elicited fighting has been defined as an unconditioned reflex (Ulrich & Azrin, 1962). If fighting is a UCR, then it should be amenable to classical conditioning procedures. The present study attempted to condition fighting responses to a buzzer using simultaneous and delayed conditioning processes.

Subjects and Apparatus

The Ss were 10 male and two female experimentally-naïve Sprague-Dawley rats about 120 days old. Each of the six pairs of Ss were matched for weight and sex.

The apparatus consisted of a Grason-Stadler E3125B test chamber and a E1064GS shock source. The door of the test chamber was left open to permit an unobstructed view of the Ss. Two buzzers, 45 db, 60 cps, and 80 db, 4000 cps (modulated by a 60-cps tone), respectively, were mounted on the wall of the test chamber. The conditioning paradigms were programed by electromechanical apparatus. Fighting responses and shock and buzzer presentations were recorded by counters and a four-pen polygraph.

Procedure and Results

Azrin et al (1964) have reported that 2 ma shocks of 0.5 sec. duration, presented at a frequency of 20 shocks per min., are the optimal UCS parameters for eliciting fighting in paired animals. These shock parameters were used in the present study.

Fighting responses were defined and recorded in the manner suggested by Ulrich & Azrin (1962). Two Es independently depressed switches to record striking movements that occurred with each shock presentation, or in the case of test trials, with each buzzer presentation. Greater than 95% agreement was obtained between the two Es in recording fighting responses.

Simultaneous conditioning

Each pair of rats was first placed in the chamber and given random, unpaired presentations of the CS (40-db buzzer) and the UCS (shock) to test for sensitization. Fighting was elicited by the UCS, but not by the CS.

In the simultaneous conditioning procedure, the CS and the UCS were presented and terminated simultaneously. Pair 1 was presented with 400 UCS-CS pairings during the first daily session and 300 pairings each day, for two more sessions, for a total of 1000 UCS-CS pairings. Pairs 2 and 3 were given 900 UCS-CS pairings, 300

per day, over the same period. On the fourth day, after having presented each pair with an additional 100 UCS-CS pairings, 25 test trials of the CS only were given. These test trials elicited a standing posture, but no fighting responses.

The three pairs were then presented with an additional 600 UCS-CS pairings, 300 per day, for two more sessions. During the third session, the animals were first given 210 UCS-CS pairings followed by a CS only test trial. Ten additional UCS-CS pairings and another test trial were then presented. This sequence of 10 UCS-CS pairings, followed by a test trial, was repeated nine times for each pair of Ss. No fighting responses were observed, although the standing posture described above was elicited again.

At this time, the 45-db buzzer was replaced by the 80-db buzzer. Each of the three pairs was retested for sensitization by presenting random, unpaired UCS-CS presentations. Once again, fighting was elicited only by the UCS.

Pair 1 was then presented with 130 UCS-CS pairings followed by a test trial. Ten additional UCS-CS pairings were then given and another test trial presented. This sequence of 10 UCS-CS pairings, followed by one test trial, was repeated seven times during the session. Five fighting responses were observed during the eight CS only test trials. Pairs 2 and 3 were each presented with 110 UCS-CS pairings followed by a test trial. Ten additional UCS-CS pairings were given and another test trial presented. This sequence of 10 UCS-CS pairings, followed by a test trial, was repeated nine times during the session. Fighting responses were elicited by the CS only with both pairs. All Ss were then tested for

Fig. 1. The percentage of fighting responses that were elicited by the CS only during all four test sessions for the four pairs of Ss used in the simultaneous conditioning procedure.

Fig. 2. The percentage of fighting responses that were elicited by the CS only during all four test sessions for the two pairs of Ss used in the delayed conditioning procedure.

three more sessions in the manner described for Pairs 2 and 3. The percentage of fighting responses elicited by the CS only for the three pairs during all four test sessions is shown in Fig. 1.

To determine the reliability of the above results, Pair 4 was given 1500 UCS-CS pairings over a five-day period. During the sixth session, testing took place exactly as described above for Pairs 2 and 3. Three fighting responses were observed during the 10 presentations of the CS only in the first test session. This same testing procedure was carried out for three additional sessions. The percentage of fighting responses elicited by the CS alone during all four test sessions is also shown in Fig. 1.

Delayed conditioning

Pairs 5 and 6 were then tested for sensitization in the manner described above for the Ss employed in simultaneous conditioning. Fighting responses were elicited by the UCS, but not by the CS.

In the delayed conditioning procedure, the 80-db buzzer (CS) came on 0.5 sec. before the UCS was delivered and terminated simultaneously with the UCS onset. Each pair of Ss was presented with a different number of UCS-CS pairings before testing occurred. After 110 pairings of the CS and UCS, Pair 5 was given one test trial of the CS only. The pair was then given 10 additional UCS-CS pairings followed by another test trial. This sequence of 10 UCS-CS pairings, followed

by a test trial, was repeated nine times. Five fighting responses were observed during these 10 presentations of the CS only. An identical procedure was carried out for three more sessions. The percentage of responses elicited by the CS only during these four test sessions for Pair 5 is shown in Fig. 2.

Pair 6 was presented with 10 UCS-CS pairings followed by a test trial presentation of the CS only. This sequence of 10 UCS-CS pairings followed by a test trial was repeated 10 times. No fighting responses were elicited by the CS only. The same procedure was repeated the following session. Again, no fighting responses were elicited by the CS only. During the third session, Pair 6 was treated in a manner similar to that described for Pair 5, i.e., after 110 pairings of the CS and UCS, one test trial was given, etc. One fighting response was elicited during the 10 test trial presentations of the CS only. An identical procedure was carried out for three additional sessions. The percentage of fighting responses that occurred in the presence of the CS only during all four test sessions for Pair 6 is also shown in Fig. 2.

Discussion

From the results of this study, two factors emerge as potential determinants of the acquisition of conditioned reflexive fighting. The first concerns the intensity of the CS. Whereas no conditioned fighting responses were obtained using the 40-db buzzer as a CS, conditioned fighting responses were elicited when the 80-db buzzer was used as the CS. Secondly, the delayed conditioning paradigm was found to be a more efficient procedure for eliciting conditioned fighting responses than was the simultaneous conditioning paradigm. This latter finding agrees with previous studies which have compared the relative effectiveness of delayed and simultaneous classical conditioning procedures for a variety of conditioned responses (Kimble, 1961).

References

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Note

1. Supported in part by Public Health Service Research Grants MH 08795 and MH 08775 from the National Institute of Mental Health, Robert W. Schaeffer principle investigator.