Response cost and confirming behavior¹

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Abstract

Some operant behavior does not have immediately obvious consequences. If S can make another response which makes these consequences apparent, he will frequently do so. We here show that the incidence of such confirming responses is an inverse function of the amount of work required to execute them.

Problem

Operant behavior does not always lead to consequences that are immediately apparent to the behaving organism. For example, a reinforcement may be delayed, or its amplitude may be too small to be detectable easily. Or, the consequences of a response may not be discernible unless it is followed by another response of a different class. With respect to the last instance, we have demonstrated elsewhere that operant responses which make overt the covert consequences of preceding responses behave like other operants, increasing in frequency if reinforced, extinguishing if not (Laties & Weiss, 1960). We shall refer to this type of response as a *confirming response*. It should be noted that such confirming responses are variants of the observing response. The latter has been defined by Wycoff (1952) as any response which results in exposure to the discriminative stimuli involved in the learning of a discrimination. A confirming response is simply an observing response that exposes an organism to discriminative stimuli that have resulted from the organism's own behavior.

This note reports some observations on how the effort required to make a confirming response affects the frequency of emission of such responses. Weiner (1962) has recently shown how dramatically the "cost" of an observing response can influence its frequency of emission: when responses cost his human subjects some of the points they were trying to earn, there was a drastic decrease in response rate. The present experiments show that the same kind of effect occurs with confirming behavior.

Method

Six male medical students and one physician's wife were Ss. They were paid approximately \$ 3.75 per hour for their time, with the payments not contingent upon their performance. S, seated in a dark room, pressed a telegraph key which flashed a light on the face of a voltmeter. The light flash made it possible for him to see whether or not the pointer on the dial was deflected; he had been instructed to reset such deflections (signals) "as quickly as possible" by pressing a second telegraph key. The deflections were programmed to appear on a 1-min. fixed interval schedule. Holland (1958) has shown that the detection of these signals rein-

forces the light-flashing responses which make their detection possible.

The details of our procedure have been given before (Laties & Weiss, 1960), but the following points deserve mention. The S had to exert a force of 1675 gm in order to depress the light-flashing key. This much force was required to insure rapid adaptation to the schedule (Azrin, 1958; cf. Mower & Jones, 1943). The light flash lasted 0.13 sec. Each time S detected a deflected meter pointer (it moved slightly more than halfway across the dial), he reset it to zero by pressing a second telegraph key (the "reset" key). Ss were not told how frequently deflections on the meter would occur. They were given practice until their interreinforcement response distributions showed typical effects of exposure to the fixed interval schedule; namely, an acceleration in response rate towards the end of the interval. This practice, given in individual sessions that were 40 fixed intervals long, varied for different Ss from 80 min. to 320 min., with a mean of 211 min. The return of the pointer after a response on the reset key was noiseless, and if S wanted to see whether it had in fact returned to zero, he had two courses open to him. He could wait until he began to respond on the light-flashing key in search of the next signal or he could flash the light immediately. A response that illuminated the dial less than 6 sec. after reset is called here a *confirming response* and is what we have previously labelled a *postreset observing response* (Laties & Weiss, 1960). The 6 sec. criterion was arbitrary; inspection of the cumulative records showed that lengthening it would not alter any conclusions significantly. In the experiment reported below we investigated frequency of confirming responses as a function of the number of responses on the light-flashing key required to flash light on the meter face.

Either 1, 4, 8, or 16 presses on the light-flashing key were required to produce a flash of light with only one ratio in force during an experimental session. Ss were informed only that, upon occasion, not every press would put on the light. They had all had one of the higher ratios in effect during at least one 40-interval session during training. Each of seven Ss was given one 40-interval exposure on FI 60 sec. to each of the four ratios in unsystematic order.

Results and Discussion

The effect of ratio variation is summarized in Fig. 1. The number of intervals during each 40-interval session that were followed by at least one confirming response has been plotted against the size of the fixed ratio. With few exceptions, as the ratio increased, the number of

Fig. 1. Effect on confirming responses of varying the ratio contingency on the light flashing key. The means are connected.

needle resets followed by confirming responses decreased. S6, who rarely made confirming responses, showed only an inconsequential effect of ratio size.

In order to evaluate the reliability of the effect, we performed an analysis of variance on these data. The F for variance attributable to ratios was significant, with $p < 0.01$.

This phenomenon can be most easily interpreted as a reflection of the physical effort involved, with responses involving the most physical effort—16 depressions of the telegraph key—being the most negatively reinforcing, and therefore, the least likely to be emitted (cf. e.g., Solomon, 1948).

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Note

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