The use of sexually arousing slides as unconditioned stimuli for the GSR in a discrimination paradigm

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Traditional studies of classical conditioning have relied heavily on the use of noxious stimuli. This study employed pin-up slides as non-noxious UCSs in a discrimination paradigm. Significant differential reactivity to critical and noncritical stimuli was found for both CSs and UCSs. Differential novelty and meaningfulness as well as failure to find differences during the UCS interval on test trials raised the question of whether the obtained differences in reactivity were due to orienting or "conditioned" responses.

Traditionally, for the GSR, experiments employing the classical conditioning paradigm have tended to rely on the pairing of a neutral conditioned stimulus (CS) with a noxious unconditioned stimulus (UCS). However, since the galvanic skin response (GSR) is a manifestation of autonomic nervous system (ANS) activity, it should follow that any stimulus, whether noxious or not, which can arouse or activate the ANS should produce a GSR. It should also follow that any previously neutral stimulus which has been paired with this UCS should acquire the capacity to elicit the GSR as a conditioned response (CR).

While it has been shown that sexually arousing pictures can elicit the GSR (Sines, 1957), such stimuli have rarely been used systematically as UCSs. Lovibond (1963) has reported differential conditioning in Ss to positive and negative UCSs and Furedy (1966) has reported that cool air can serve as an effective positive reinforcement for the GSR. The purpose of the present study was to investigate the feasibility of employing slides of pin-up pictures as non-noxious UCSs in a discrimination paradigm. A series of slides of semi-nudes were paired with one CS, while a constant low illumination field was paired with the other CS. Non-sexual pictures were not used as UCSs in order to maximize the possibility for differential reactions.

METHOD

Experimental Design and Subjects

Since the critical measure was the S's differential reactivity to the two CSs, a single group of Ss was used with each S serving as his own control. The Ss were 28 male students drawn from an introductory psychology course at Syracuse University who participated in the experiment as a partial fulfillment of a course requirement. Four Ss were eliminated because of equipment failure or failure to complete the experiment, leaving 24 Ss in the final sample.

Apparatus

The GSR was measured by a Grass Model 5 Polygraph with electrodes attached to the volar surfaces of the index and middle fingers of S's right hand. The electrodes were coated with Cambridge electrode jelly and secured with commercial finger bandages.

Two 15 W lights, one red and one yellow, were located on either side of a 40-in. projection screen, 12 ft in front of the S and at eye level when S was seated. The lights were controlled by two silent switches on E's control panel which activated a Hunter Interval Timer set for 3 sec. At the end of the 3 sec

period, the light was automatically turned off and a Kodak Carousel projector was simultaneously activated. Since there was approximately a ½ sec delay between activation of the projector and the appearance of the picture on the screen, the effective CS-UCS interval was 3.5 sec, the CS terminating ½ sec before the onset of the UCS. The UCS remained on for a total of 8 sec, as pilot data indicated that shorter durations frequently failed to produce GSRs.

Procedure

For half of the Ss the left (red) light was the CS for the critical UCS and the right (yellow) light was the CS for the neutral UCS. The pairing was reversed for the remaining Ss. The 44 conditioning trials were randomly divided into 22 critical trials and 22 neutral trials. On the critical trials, each presentation of the critical CS was followed by a different slide of a nude or semi-nude female taken from men's magazines. On the neutral trials, a blank, translucent slide which presented a homogeneously illuminated field on the screen served as the neutral UCS. Sixteen test trials were randomly interspersed among the 44 conditioning trials. On eight of these trials (11, 21, 28, 31, 44, 48, 52, and 60) the critical CS was followed by a blank, opaque slide which left the screen dark. On the other eight test trials (14, 19, 27, 33, 38, 45, 54, and 59), the opaque slide followed the neutral CS. The Ss were instructed to relax and pay attention to the stimuli which would be presented on the screen. No mention was made of the lights, nor of their function.

RESULTS

The data for the analysis consisted of the GSRs to the various stimuli on the conditioning and test trials. The GSR was measured in conductance from onset to peak, converted according to the following formula: $\text{Log}_{10}[(C \times 100) + 1]$. The analysis was based on reactivity to each conditioned stimulus for 30 trials, reactivity to each UCS on the 22 trials on which UCS was presented, and reactivity during corresponding intervals on each set of eight test trials where no UCS was presented. Responses were counted if they occurred within the interval from 2 sec after stimulus onset until 2 sec after stimulus offset, for the conditioned stimuli, the unconditioned stimuli, and the corresponding intervals in the absence of the UCS during the test trials.

Fig. 1. Conductance changes during CS interval.

Fig. 2. Conductance changes during UCS intervals.

Figure 1 presents the magnitude of the reactions to the critical and noncritical CSs as a function of trials. In an analysis of variance, both main effects and the interaction were significant (Type of CS, $F = 19.83$, $df = 1/23$, $p < .001$; Trials, $F = 4.97$, $df = 29/667$, $p < .001$; Stimuli by trials, $F = 2.73$, $df = 29/667$, $p < .01$). Greater overall reactivity occurred to the critical than to the noncritical stimuli (.835 vs .584) and, as suggested both by Fig. 1 and by the interaction, there was a sharper decrease in reactivity over trials to the noncritical than to the critical stimuli.

The left hand portion of Fig. 2 presents the reactivity to the critical and noncritical slides on reinforced trials. In addition to a significant overall trials effect ($F = 5.32$, $df = 21/483$, $p < .001$), reactions to the critical slides were significantly higher than to the noncritical slides (.883 vs .612, $F = 23.11$, $df = 1/23$, $p < .001$). The interaction was not significant. The right hand portion of Fig. 2 presents the reactions on test trials during the UCS interval but in the absence of the UCSs. In an analysis of variance of these data, the only significant effect was due to the type of CS, greater reactions occurring following the critical than the noncritical stimuli (.396 vs .289, $F = 4.91$, $df = 1/23$, $p < .04$). Although the main effect of trials and the interaction only approached significance

(p 's $< .08$), Fig. 2 suggests that the major source of this difference is on the first test trial.

DISCUSSION

The results clearly indicate that sexually arousing pictures can serve to maintain GSR reactivity in a classical conditioning paradigm. As "unconditioned stimuli," not only do the critical and non-critical stimuli differ in the degree of reactivity generated, but also in the degree of reactivity produced to the conditioned stimuli which signal the onset of the slides. These results are entirely consistent with those of Lovibond (1963).

It is of interest to consider the nature of the "conditioned" reactions. With the 3.5 sec CS-UCS interval used in this study, the reactions to the CS might be considered orienting rather than anticipatory reactions (Stewart et al, 1961), and that unconditioned orienting reactions to the lights were being maintained by sexually meaningful stimuli. Although it could be argued that on the test trials reactions in the absence of the UCS might reflect conditioned responses, the greater stimulus disparity between conditioning and test trials for critical as opposed to non-critical stimuli would result in correspondingly greater novelty and thus larger orienting reactions on critical test trials. The small differences between critical and non-critical trials during UCS absence after the first test trials, support the interpretation that the GSRs reflected orienting reactions to the absence of the UCS rather than conditioned reactions. Better control of the differential novelty and meaningfulness of the critical and non-critical UCSs and of the differential disparity between UCS and UCS absence on the test trials would appear to be necessary in order to provide a clear interpretation of both the anticipatory reactions on the conditioning trials and the UCS-absent reactions on the test trials.

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