AN APPARATUS FOR THE AUTOMATIC PRESENTATION OF COLOR AND FORM¹

KEITH G. SCOTT

UNIVERSITY OF CONNECTICUT

To study transfer effects in learning (e.g. House and Zeaman, 1963) it is often necessary to have available a large number of stimulus

¹This work was supported by Research Grant M-1099 from the National Institute of Mental Health, USPHS. The author wishes to thank Dr. David Zeaman and the staff of the University of Connecticut Shop for help and advice. Mr. Frank Turrisi assisted with the wiring of control equipment.

combinations of two dimensions, such as color and form. Typically, stimuli have been drawn on cards and presented in a Wisconsin General Test Apparatus. The present apparatus was designed to provide the advantages of the more controlled operant situation. It features separate control of colors and forms so these may be automatically presented in any combination. Currently used with retarded

Fig. 1. Photograph of one display unit dismounted and lying face downward to reveal the switch and positioning mechanisms. On this right-hand member of the pair, the display cell is mounted to the left of the motor.

children it should need little modification for use with lower organisms.

Figure 1 is a photograph of the mechanism of one display unit. Figure 2 is a schematic diagram.

A motor, Slo-Syn SS250, cost \$65.00, drives a pegged shaft and a grooved positioning cam with a spring loaded wheel running on it. The pegs engage with microswitches (Unimax, type 2HBW-1) as shown in the insert in Fig. 2. On the end of the shaft is a filter wheel with seven Wratten filters, in 35mm Airequipt slide mounts, clipped to its outer edge. One filter is always positioned exactly between the plexiglas response key and the display cell.

Fig. 2. Schematic diagram of a display unit showing position of the components. The insert shows the method of engagement of the microswitches with the pegged shaft.

The Slo-Syn SS50 motors, shown in Fig. 1, started unreliably until the flexible coupling was installed. The manufacturers, the Superior Electric Company, Bristol, Connecticut, advise that with the larger type SS250 motor a direct drive could be used, obviating the need for fine adjustment. All Slo-Syn motors have a start-stop time of 25 msec and run at 72 rpm giving a maximum change time between filters of about .75 sec.

The circuit used to operate the motors is shown in Fig. 3. Only one select switch may be closed at a time. It energizes the motor through one microswitch which is opened by a peg when the filter is correctly positioned. For manual stimulus selection, interlocking

Fig. 3. Wiring diagram for a motor. Specifications of R and C depend on the motor type used and are specified by the manufacturer.

pushbutton switches, one bank for color and one bank for form, are used. Automatic selection is achieved with a punched tape programmer (Scott, 1964).

With a standard in-line display 36 stimuli, combining six colors and six forms, are available. Such stimuli appear as white illuminated figures on a colored circular ground. The present display provides 84 stimuli, combining 12 forms and seven colors. The stimuli appear as solid colored figures on a black background and their saturation and brightness may be changed by inserting appropriate combinations of colored and neutral density filters.

The 12 form stimuli on the display cells were made to special order for use with children. The preparation costs of the special stimuli for the type 1820 projectors with 15/16 in. diameter stimuli were \$80.00. The unit cost from Industrial Electronic Engineers, North Hollywood, California, is \$21.50.

The units are made in a pair with the display cells mounted on opposite sides so the response keys can be brought close together in a two-choice situation. Reinforcement is delivered by a Davis M and M dispenser. The display is mounted in a sound-deadened cubicle with the control equipment in an adjoining room. Pilot studies over a summer show the equipment to be completely reliable.

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