Letters

Stimulus Generalization of a Positive Conditioned Reinforcer

The question raised by Thomas and Williams [*Science* **141**, 172 (12 July 1963)] as to whether stimuli generalize in a similar manner for different behavioral effects—in this case reinforcement and discriminative control—is important to our understanding of the bases of these effects. Unfortunately, however, the method leaves some room for doubt whether the two behavioral effects were measured independently.

Thomas and Williams trained pigeons to peck a key on a variable-interval schedule of food reinforcement preceded by a brief key-color stimulus and then measured effects of variations in the stimulus during extinction under the same schedule without the food. They took response rate during the stimulus presentations as a measure of "discriminative function" and amount of responding between stimulus presentations as measure of "reinforcement." For these to be considered measures of completely different functions of the stimulus requires the assumptions that discriminative effects do not outlast the physical presence of the stimulus and that reinforcement-produced increments in response rates do not generalize from a situation with an unlighted response key to one with an illuminated key. Neither assumption seems justified.

As Bugelski [*The Psychology of Learning* (Holt, New York, 1956)] has long argued, extinction resistance, as used by Thomas and Williams, does not provide a valid measure of conditioned reinforcement, since the "reinforcing" stimulus has had ample opportunity during training to become part of a response "chain" in which the "reinforced" response is maintained by a purely discriminative function. That the key-color stimulus always followed a response in Thomas and Williams's experiment means it could have had its effect through reinforcement, but does not rule out the possibility that its effect was a forward-acting cue function. It is particularly important to avoid any possible contamination of the measure of one function with effects of another if one wishes to demonstrate that both functions obey the same law. Since Thomas and Williams have failed to do so, their otherwise interesting data do not support their titular conclusion that they have demonstrated "stimulus generalization of a positive conditioned reinforcer." They may have only demonstrated stimulus generalization of a discriminative stimulus in two different ways.

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In our paper, responses to a blank key which produced aperiodic 2-second exposures of a green light were considered evidence for the reinforcing function of that light, whereas responses during the presentation of light were viewed as evidence of discriminative function.

Pigeons trained to peck at a blank, unilluminated key show virtually no tendency to respond to the same key when it is illuminated with the green stimulus (R. E. Miller, "The development of stimulus control in operant conditioning," thesis, Kent State Univ., 1962). Laudauer's first point is more difficult to handle. We agree that a discriminative effect (Bugelski would prefer to call it an "eliciting effect") may outlast the physical presence of the stimulus and must therefore agree that our results are theoretically interpretable in terms of Bugelski's "elicitation hypothesis." We feel, however, that such an interpretation, though logically possible, lacks sufficient empirical support to warrant a rejection of the interpretation that we have offered.

In an important review of positive conditioned reinforcement, Kelleher and Gollub pointed out that the "elicitation hypothesis," the "facilitation hypothesis," and the "discrimination hypothesis" have been offered as alternatives to the concept of conditioned reinforcement but concluded that none of these interpretations has the explanatory power of the concept they would replace [*J. Exptl. Analysis Behavior* **5**, 543 (1962)]. With regard to the "elicitation hypothesis" they argue: "When animals have been trained on FI or DRL schedules of reinforcement, for example, the magazine click is characteristically followed by a zero response rate. . . . Obviously, the click does not elicit responding on these schedules. . . . Nevertheless, responding occurred more frequently in the extinction records when responses produced the click. . . . The empirical data contradict the 'elicitation' hypothesis."

It would be impracticable if not impossible to build into each experiment on conditioned reinforcement controls sufficient to preclude all alternative interpretations of data. We feel that the interpretation of our data in terms of conditioned reinforcement is the most parsimonious. If comparable results are obtained with current experiments, our past findings will be supported. If not, a reinterpretation of our findings will indeed be indicated at that time. More definite conclusions must await the accumulation of additional evidence.

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Librarians and Technical Literature

The recent Special Libraries Association meeting in Denver focused attention within the professional library fraternity on the need for closer collaboration between scientists and engineers and professional librarians. It was encouraging to note the constructive response of those present to the challenges offered by the report of the President's Science Advisory Committee, "Science, Information, and Government."

More evidence of the need for greater rapport between some college and university librarians and scientists and engineers is found in the relegation of scientific and engineering periodicals to separate reading rooms, apart from the bulk of the library accessions. The ready explanation for this can perhaps be found in the liberal arts training of most university librarians. However, when such broadly based journals as *Scientific Ameri-*