

level of performance by the third block of extinction trials. The running times of both groups approach the maximum allowable time on the third block. There was a significant Groups x Trials interaction ($p < .05$); in addition, Group C ran significantly faster than Group O on the first block of extinction trials ($p < .005$). Thus the effects of reinforcement were evident during a large portion of the extinction period.

Group P runs significantly faster during extinction than either Group C ($t(53) = 2.73$; $p < .01$) or Group O ($t(55) = 4.44$; $p < .001$). The comparison of Groups P and C agrees with findings from the earlier studies (McCain et al, 1962, and McCain, 1965a), the PRE can be achieved following a very limited number of acquisition trials. Further, the difference between Groups P and C indicates that the differences obtained between partial and consistent reinforcement groups, where only a very limited number of acquisition trials are used, do not depend on prior exploration of the test apparatus.

Studies in this series raise serious questions regarding those assumptions made in the frustration hypothesis which have led both Amsel (1958) and Spence

(1960) to conclude that the PRE would not occur after a very small number of training trials.

There is some question as to the possible effects of satiation in the present study. This problem has been examined in two studies which are in preparation as part of a paper covering several studies.

References

- AMSEL, A. The role of frustrative nonreward in noncontinuous reward situations. *Psychol. Bull.*, 1958, 55, 102-119.
- MCCAIN, G. Partial reinforcement with a small number of trials: Performance in extinction. *Psychon. Sci.*, 1965a, 131-132.
- MCCAIN, G. Partial reinforcement with a small number of trials: Modified extinction procedures. *Psychon. Sci.*, 1965b, 133-134.
- MCCAIN, G., LOVE, NANCEY, & GRUER, W. Extinction as a function of a small number of partially reinforced trials. *Psychol. Rep.*, 1962, 11, 451-454.
- MCCAIN, G., REED, CLY, & MCCORMACK, L. Extinction after a small number of partial reinforcement trials. *Psychol. Rep.*, 1963, 13, 300.
- SPENCE, K. W. *Behavior theory and learning*. Englewood Cliffs, N.J.: Prentice-Hall, 1960.
- WINER, B. J. *Statistical principles in experimental design*. New York: McGraw-Hill, 1962.

Note

1. This study was supported by NIMH Grant MH-06981. Thanks are due to John Taylor Williams who ran the Ss.

Comment

Thompson (*Psychon. Sci.*, 1965, 109-110) reports further evidence supporting his previous conclusion (*J. exp. Anal. Behav.*, 1964, 7, 1-8) that increased fixed-ratio response requirements, on a bar reinforced by food or water, are associated with increasing response rates on a second (time-out) bar which temporarily removes both the S^D and the reinforcement. In his efforts to reconcile this finding (dubbed the "FR-TO effect") with failures to demonstrate it by Zimmerman & Ferster (*J. exp. Anal. Behav.*, 1964, 7, 13-19), Thompson conspicuously avoids any mention of the many inextricably confounded variables in his 1964 (and presumably also his 1965) experiment, despite the fact that I had pointed to one of these confoundings as providing a likely alternative explanation for his results during his Master's oral examination almost two years ago. This alternative interpretation clearly needs to be made explicit, inasmuch as it apparently has escaped previous editorial reviewers (as well as readers), probably because of Thompson's failure to describe adequately his extensive 1964 pretraining procedure which produced the confounding.

In point of fact, one of the few conditions held constant for all of Thompson's (1964) animals was their extensive pretraining under conditions identical to the conventional operations for attaching positive secondary-reinforcing

properties to his "time-out" stimulus. As a consequence, he begins by establishing a stimulus as a positive secondary reinforcer, and subsequently claims to be demonstrating "escape" behavior when the animal indicates a preference for that same stimulus over another associated with water (or food) reinforcement under a high fixed-ratio requirement!!

Admittedly, Thompson's (1965) cursory description of his birds' previous service in "an experiment involving different colored key-lights and variable-interval schedules of reinforcement," so that "little preliminary training was necessary since the birds were not experimentally naive," suggests that in his 1965 report he had not followed his 1964 pretraining procedure. However, if his unspecified 1965 pretraining conditions had eliminated the secondary-reinforcement establishing operations for the TO stimulus, this most certainly should have been mentioned in view of its obvious bearing upon the appropriate interpretation to be attached to his FR-TO effect. In either case, these unspecified and seemingly haphazard changes in procedure render Thompson's characterization of his "replication" as "systematic" highly questionable even as compared with the type of procedure for which Sidman had originally adopted this label.

William F. Battig
University of Maryland

(See page 258 for reply by D. M. Thompson)