RESPONSE STRENGTH OF AN OPERANT UNDER STIMULUS CONTROL WITH SATIATED SUBJECTS

W. W. WENRICH¹

VETERANS ADMINISTRATION, ST. PAUL, MINN.

A series of three studies, beginning with the experiment central to my doctoral dissertation (Wenrich, 1962)² led me to the following statement: It would appear that an operant response conditioned by a secondary reinforcing stimulus will be emitted even though subjects are satiated when the operant response is under stimulus control, but not otherwise. Below is a summary of these three researches.

The results of past experiments regarding the effectiveness of secondary reinforcement with satiated subjects have suggested that such effects as do obtain are, at best, relatively weak and transitory. The first of the experiments to be reported in this note re-examined the question of the efficacy of secondary reinforcement with satiated subjects. Two aspects of this study, in particular, distinguish it from the more classical studies in this domain. One, considerable care was taken to increase the probability that the stimulus to be used as a secondary reinforcer (buzzer)³ was first established as a discriminative stimulus that occasioned the availability of primary reinforcement. Two, the operant reinforced by the buzzer was under stimulus (S^D) control.

The general procedure for the original experiment was this: The subject was placed in a modified Skinner box containing a light, a bar, and a buzzer. When the buzzer sounded, a cup of dry ground Purina chow was made available for 10 sec. The subject was then placed in a cage in another room to await the next trial. Each subject was given 10 such

trials over a period of three days. On the following three days each subject was provided with a total of 25 more buzzer-food pairings; however, on these three days food was not presented each time the buzzer sounded. The buzzer was a necessary, but not a sufficient condition for the availability of food.

For the next stage of the experiment, the area of the apparatus in which food had been presented was sealed off. In this stage the subjects learned to press a bar which was succeeded by the buzzer. The buzzer was the sole stimulus in the conditioning of the bar-pressing response. A third stage involved arranging a light as an S^D : S^D (light) $\rightarrow$ R (bar press) $\rightarrow$ S^r (buzzer). For a second group of subjects the S^D was no light: S^D (no light) $\rightarrow$ R (bar press) $\rightarrow$ S^r (buzzer).

When the three-term contingency became effective, the subjects were given free access to water and dry ground Purina chow for 45 min and were tested immediately thereafter. Each subject was placed in the apparatus for a total of 20, 1 min intervals (10 intervals during the first day of testing, and 10 during the second), during each of which the S^D and S^A were alternated every 20 sec. If during the first interval the S^D was presented at the beginning of the interval, then, on the second interval, the S^A would be presented first.

Responding under the S^D was surprisingly dependable and consistent. Below is a summary of the data. Seven subjects were used in this experiment. Table 1 presents an analysis of each subject's performance on the two test days by the Sign Test. A plus, minus, or zero was assigned to each consecutive S^D - S^A . For example, S-5 was tested in 20 test intervals, and within these intervals there are 30 consecutive S^D - S^A pairs. In 19 of these pairs the S^D responses were in greater frequency than the S^A responses, so each of these pairs was assigned a plus. Three pairs were assigned a minus, since the S^A responses exceeded the S^D

¹For reprints write W. W. Wenrich, Department of Psychology, Wisconsin State College, River Falls, Wisconsin.

²The Tact Relation: An Experiment in Verbal Behavior is in press with the Journal of General Psychology and will appear in the spring of 1964.

³Preparatory to this experiment, a study was conducted to determine whether or not the buzzer itself was a primary reinforcer. Results indicated that bar pressing followed by the buzzer did not exceed operant level responding.

responses. The probability of this difference (three minuses and 19 plusses) occurring by chance is less than .001.

Table 1

Sign Tests on Data Obtained when Subjects were Tested Immediately after being Given Free Access to Food and Water for 45 min.

<i>S^D</i>	<i>Subject</i>	<i>No. of Plusses</i>	<i>No. of Minuses</i>	<i>Total Plusses and Minuses</i>	<i>Probability Value</i>
Light	1	9	2	11	.033
No light	2	9	1	10	.011
No light	3	9	1	10	.011
Light	4	10	7	17	.315
Light	5	19	3	22	<.001
No light	6	15	0	15	<.001
No light	7	22	1	23	<.001

In the second experiment of the series, four subjects were required to learn to press a bar when each press was followed by a buzzer which had previously functioned as a discriminative stimulus for food (as in the first experiment). The operant in this experiment was not brought under the control of an *S^D*. When the rats were tested under satiation, the results were compatible with those in the literature dealing with drive and secondary

reinforcing efficacy: the rats did not respond above operant level.

At this point it was felt that the differences between the results of the first and second experiments, as well as between the first experiment and the earlier work of other investigators, may, at least in part, have been a function of the fact that in the one case the operant was under the control of an *S^D*, while in all other studies the operant was free.

The last of the experiments in the series was a replication of the original study, and the results supported those of the initial experiment. The subjects (four rats) responded dependably in the presence of the *S^D* even though they were satiated. In repetition, it would appear that an operant response conditioned by a secondary reinforcing stimulus will be emitted even though subjects are satiated when the operant response is under stimulus control, but not otherwise.

REFERENCES

Wenrich, W. W. The tact relation: An experiment in verbal behavior. Unpublished doctoral dissertation, Univ. of Minnesota Library, 1962.

Received May 16, 1962