Does reduction of cognitive dissonance reinforce an instrumental response?*

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The reinforcing effects of delay of both positive reinforcement, (positive information feedback) and negative reinforcement (dissonance reducing information feedback) upon the speed of an instrumental response were investigated. Although no dissonance reduction effect occurred, significant acquisition, delay of positive reinforcement, and Delay of Positive Reinforcement by Acquisition interactions were found.

Several studies have indicated that cognitive dissonance has a nonspecific energizing effect upon human performance similar to generalized drive (D) in Hull-Spence theory (Cottrell & Wack, 1967; Waterman & Katkin, 1967; Waterman, 1969). Another property of noxious drive is that its reduction, following an instrumental response, serves to reinforce that response. If cognitive dissonance has the functional properties of drive, reduction of it following an instrumental response should serve to reinforce that response. In an attempt to further relate cognitive dissonance theory to Hull-Spence theory, the present experiment was intended to be analogous to instrumental escape conditioning with cognitive dissonance as the noxious drive and reduction of cognitive dissonance as the reinforcement. In escape conditioning the speed of an instrumental response is (1) a decreasing function of the delay of reinforcement, (2) an increasing function of the number of reinforced trials, and (3) an inverse function of the delay of reinforcement and trials combined (e.g., Fowler & Trapold, 1962). It therefore follows in the present experiment that the speed of an instrumental response should be (1) a decreasing function of the delay of dissonance reduction, (2) an increasing function of the number of trials on which dissonance is reduced, and (3) an inverse function of the delay of dissonance reduction and trials combined.

SUBJECTS AND DESIGN

One hundred forty-four undergraduate Ss were assigned randomly to the levels of a 2 by 3 by 3 design. There were two levels of dissonance: a negative reinforcement dissonance group and a positive

*Completed in partial fulfillment of the requirements of the degree of Master of Science at the University of Oklahoma by the first author. Thanks are due the major professor, Dr. Robert F. Weiss, and the members of the committee, Dr. N. Jack Kanak and Dr. Lauren Wispe.

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reinforcement no-dissonance control group. There were three levels of delay of reinforcement: 0, 3, and 8 sec. There were three acquisition trials varied within Ss.

APPARATUS

The apparatus was devised to measure S's response latency (speed = 100/latency). It was represented to Ss as an automated answering panel wired to an electronic tabulator. When the "ready to tally" signal, the CS, appeared on the tabulator, S pressed the "tally" button on the answering panel, the instrumental response. The CS started a Standard Electric timer (S-1A), and the instrumental response stopped this latency timer and began a delay timer. Four lettered buttons, a "guess" button, and an "erase" button, also wired to the tabulator, were on the answering panel to add to the deceptive function of the apparatus.

PROCEDURE

The dissonance manipulation was based on Aronson & Carlsmith's (1962) hypothesis that cognitive dissonance is induced when S's self-relevant performance expectancy is inconsistent with his actual performance. Aronson (1969) has noted that inconsistency between self-concept cognitions and actual behavior is a boundary condition within which dissonance theory applies.

NEGATIVE REINFORCEMENT

To account for the negative reinforcing effects of reduction of cognitive dissonance upon the speed of an instrumental response, it was necessary to create a rationale within which cognitive dissonance could be manipulated and Ss could receive feedback information. Upon entering the laboratory, Ss were informed that they would take some verbal abilities and performance tests. The uses of the answering panel and electronic tabulator were explained, and they were each given a shaping trial at pushing the tally button, following the CS. Ss took three pairs of tests in a counterbalanced order. Before taking

each test, S read the instructions; E obtained S's self-relevant performance expectancy by asking, "How well do you expect to do on this test in terms of percentile points as compared to other Psychology 1 students?"

Dissonance was induced by telling S he had received an inconsistent performance score, 17%-21% points below his expectancy following the first test of each pair. Following the second test of each pair, dissonance was reduced by telling S he had received a good score, 4%-8% points above his expectancy. Scores were assigned randomly according to S's pretest expectancy. The second test was a multiple-choice test, and S answered each question by pushing one of four buttons lettered A, B, C, or D, corresponding to his choice. S could also push the "guess" button to guess or the "erase" button to change his answer. After completing the entire test, E signaled S "ready to tally," and S pressed the tally button to calculate his score in percentile ranks. Contingent upon the buttonpress, E told S his score at 0, 3, or 8 sec delay.

In order to insure that no consistent pattern of bad-score/good-score alternation would be recognized by Ss, a pair of good-score tests was inserted between the second and third trials; this pair of tests was "hand scored" and thus did not involve a training trial on the apparatus.

POSITIVE REINFORCEMENT

In order to separate the reinforcing effects of dissonance reduction from the reinforcing effects of good scores, a no-dissonance control condition was devised. Ss took only the second test of each pair. Ss received only good scores, matched to dissonance Ss, 4%-8% points above their expectancy, contingent upon the instrumental response at 0, 3, or 8 sec delay. Otherwise, the same procedure was followed as outlined above.

Fig. 1. Acquisition curves of response speed at three levels of delay of reinforcement.

RESULTS

A two-way analysis of the variance on the speed data on Trial 3 tested for effects due to dissonance, delay of reinforcement, and their interaction. There was no dissonance effect or interaction between dissonance and delay of reinforcement. No evidence of dissonance induction was found, since dissonance drive induction did not manifest itself as superiority of dissonance over control groups regardless of delay. Only the delay of reinforcement effect was significant ($F = 4.28$, $df = 2/138$, $p < .025$). Tukey's test on the means of each level of delay showed that the 0-sec delay group responded significantly faster than both the 3- and 8-sec groups, but there was no difference between the 3- and 8-sec delay groups.

A three-way analysis of the variance tested for acquisition and higher-order interactions effects. The acquisition effect was highly significant ($F = 34.44$, $df = 2/276$, $p < .001$), and the Delay of Reinforcement by Trials interaction was also significant ($F = 3.52$, $df = 4/276$, $p < .01$). No other effects were significant. The acquisition curves appear in Fig. 1.

DISCUSSION

The results indicated that negative reinforcement due to reduction of cognitive dissonance added nothing to positive reinforcement due to good scores. Therefore, only the good scores presented following the instrumental response actually served to reinforce that response. A trials effect, delay of reinforcement effect, and a Delay by Trials interaction effect due to positive reinforcement were obtained. Delay of positive reinforcement combined multiplicatively with the number of reinforced trials to determine the speed of responding.

Other research has investigated the effects of performance expectancy upon performance (Cottrell, 1967; Zajonc & Brickman, 1969). Zajonc and Brickman showed that although Ss' reaction times were energized by dissonant feedback information, mere estimation of expected performance led to acquisition. Mere estimation of expected performance cannot account for either the delay of reinforcement effect or the Delay by Trials interaction effect obtained here.

Cottrell found that expectancy-performance dissonance reduction was limited to judgmental processes. Ss did not adjust their performance (reaction time) to reduce dissonance but did reject inconsistent information about their performance by changing their estimates of their task proficiency.

Most importantly, the purpose of this experiment was to relate cognitive

dissonance theory to Hull-Spence theory. It seems likely that the failure to obtain delay of dissonance-reinforcement effects lies in the inaccuracy of dissonance theory, since the more conventional good-score positive reinforcements functioned as in conditioning theory, and some studies have failed to replicate the Aronson and Carlsmith effect (e.g., Brock, Edelman, Edwards, & Shuck, 1965; Lowin & Epstein, 1965).

REFERENCES

- ARONSON, E. The theory of cognitive dissonance: A current perspective. In L. Berkowitz (Ed.), *Advances in experimental social psychology*. Vol. 4. New York: Academic Press, 1969. Pp. 2-34.
- ARONSON, E., & CARLSMITH, J. M. Performance expectancy as a determinant of actual performance. *Journal of Abnormal & Social Psychology*, 1962, 65, 178-182.
- BROCK, T. C., EDELMAN, S. K., EDWARDS, D. C., & SHUCK, J. R. Seven studies of performance expectancy as a determinant of actual performance. *Journal of Experimental Social Psychology*, 1965, 1, 295-310.
- COTTRELL, N. B. The effects of dissonance between expected and obtained performance upon task proficiency and self-estimates of task proficiency. *Journal of Social Psychology*, 1967, 72, 275-284.
- COTTRELL, N. B., & WACK, D. L. Energizing effects of cognitive dissonance upon dominant and subordinate responses. *Journal of Personality & Social Psychology*, 1967, 6, 132-138.
- FOWLER, H., & TRAPOLD, M. A. Escape performance as a function of delay of reinforcement. *Journal of Experimental Psychology*, 1962, 63, 464-467.
- LOWIN, A., & EPSTEIN, G. F. Does expectancy determine performance? *Journal of Experimental Social Psychology*, 1965, 1, 248-255.
- WATERMAN, C. K. The facilitating and interfering effects of cognitive dissonance on simple and complex paired associates tasks. *Journal of Experimental Social Psychology*, 1969, 5, 31-42.
- WATERMAN, C. K., & KATKIN, E. Energizing (dynamogenic) effects of cognitive dissonance on task performance. *Journal of Personality & Social Psychology*, 1967, 6, 126-131.
- ZAJONC, R. B., & BRICKMAN, P. Expectancy and feedback as independent factors in task performance. *Journal of Personality & Social Psychology*, 1969, 11, 148-156.

Impression change and favorableness of first impressions: A study of population and of commitment effects*

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The present study replicated and extended Briscoe, Woodyard, & Shaw's (1967) study of impression formation. The replication yielded overall recency effects and did not find that initially unfavorable first impressions were more resistant to change. This failure to replicate was not due to initial differences in impressions and was attributed to hypothesized population differences. The extension, on commitment, indicated that commitment was greatest for Ss who made covert initial ratings and least for those who made public initial ratings. The commitment effects were related to Kiesler's (1968) commitment theory.

Briscoe, Woodyard, & Shaw (1967) presented college Ss with two prescaled descriptions, one favorable (F) and one unfavorable (U). They found the UF order of descriptions

more resistant to change than the FU order. Furthermore, the interpolated mode (S evaluates after each description) and FU order favored a recency effect, the final mode (S evaluates after reading both descriptions) and UF order favored a primacy effect, and both other combinations produced neutral final evaluations. The results were in accord with earlier studies (e.g., Anderson & Barrios, 1961).

*Thanks to John Dibler, Sunnyland Boy Scout Council Executive, and David Dickson and George Keuel, District Executives, whose assistance and cooperation made this study possible. Thanks, too, to the Scoutmasters and boys of Camp Flying Eagle, Sarasota, Florida, 1968 camp season.