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This Week's Citation Classic

Crespi L P. Quantitative variation of incentive and performance in the white rat.
Amer. J. Psychol. 55:467-517, 1942.
[Princeton University, Princeton, NJ]

The study addressed first the influence of different amounts of incentive upon level of performance and distribution of effort within performance (speed gradients). Explored secondly were the effects of shifts of incentive amounts. A theory of emotional drive was elaborated to account for observed 'depression' and 'elation' effects. [The Social Sciences Citation Index® (SSCI®) indicates that this paper has been cited over 175 times since 1966.]

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"It's a pleasure to comment on the genesis of the present study, if only to correct a misapprehension on the part of M.E. Bitterman[1] that it was a repetition of an earlier study by M.H. Elliott.[2] In fact, the present inquiry was independently conceived along quite different lines. The Elliott study was concerned with qualitative change of reward. My study was concerned with the effect upon performance of quantitative variation in the amount of the same reward. The Elliott study said nothing about amount of reward and introduced the possible confounding effects of unknown changes in appetitive drive. The present study held drive constant to study the influence of carefully calculated gradations of the same incentive.

"The inspiration for the present study was an earlier inquiry into gambling behavior among white rats.[3] This was conceived of as a comparative approach, without cultural overlays, to a possible philogenetic propensity to gamble or not to gamble on the attainment of rewards. In this connection, some of my fellow graduate students at Princeton accused me of promoting rodent roulette or vice in mice.

"This study involved the choice between a constant-goal of a certain amount of food and a gamble-goal of a lesser or greater amount. The preliminary indications were inconclusive and were not further pursued because I became interested in the more general question of the influence of quantitative variation of incentive on performance. I was struck by the fact that hundreds of animal experiments had been done without specifying the magnitude of a factor of possible considerable influence.

"This interest motivated the present study, which indicated at the outset that amount of incentive was indeed a major influence in performance and could readily explain some apparent conflicts in the animal literature as to the true shape of the speed of locomotion gradient in a runway.

"But more interesting were the results of shifts in incentive amounts after rats had established a level of performance for a given magnitude. Those shifted downward ran more slowly than rats started at the lower level; rats shifted upward ran faster than those started at the upper level. I dubbed these effects 'depression' and 'elation' and elaborated a hypothesis of emotional drive to account for them —a theory to which O.H. Mowrer has subscribed.[4]

"The psychological fraternity rechristened these phenomena, as described in my thesis and subsequently elaborated,[5] the 'Crespi effect' and subjected them to no little attention because they posed a major challenge to Thorndikean laws of effect and to Clark Hull's comprehensive theory of animal behavior.

"In consequence, among others, one of Hull's students, Kenneth Spence, had a group of graduate assistants explore every possibility of explaining away these apparent departures from Hull's conceptions. He was led, to my mind uncon-vincingly, to argue that the elation effect was an artifact of training procedure rather than a true response to a shift in incentive.

"In any event, the Crespi effect has continued to draw attention and has been applied so far afield as in the design of a dietary regimen for overweight adults. Later experiments have been reported in The Psychology of Animal Learning."[6]

1. Bitterman M E. Thorndike and the problem of animal intelligence. Amer. Psychol. 24:444-53, 1969.
2. Elliott M H. The effect of change of reward on the maze performance of rats. (Brown W, Tolman E C & Jones H E, eds.) University of California publications in psychology. Berkeley, CA: University of California Press, 1932. Vol. IV. p. 19-30.
3. Crespi L P. Gambling behavior: a comparative approach. I. Constant-goal vs. gamble-goal in the albino rat. Paper delivered at the eleventh annual meeting of the Eastern Psychological Association. 5-6 April 1940, Atlantic City, NJ.
4. Mowrer O H. Learning theory and behavior. New York: Wiley, 1960. p. 261-3. [Citation Classic. Current Contents/Social & Behavioral Sciences 12(5):16, 4 February 1980.)
5. Crespi L P. Amount of reinforcement and level of performance. Psychol. Rev. 51:341-57, 1944.
6. Mackintosh N J. The psychology of animal learning. London: Academic Press, 1974. 730 p.