

This Week's Citation Classic

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Amsel A. The role of frustrative nonreward in noncontinuous reward situations. *Psychol. Bull.* 55: 102-19, 1958.

This paper presents a conceptualization of the role of frustrative factors in the invigoration of behavior, the development of learned persistence, and the formation of discriminations. The theory describes how goal-incentive mechanisms, defined by Pavlovian conditioning and the hypothetical feedback stimuli from such conditioning, mediate approach and avoidance responding. Some sample data are presented to show the correspondence of the theory to phenomena that occur when a rat learns under a schedule of intermittent reinforcement. [The *Science Citation Index*® (SCI®) and the *Social Sciences Citation Index*™ (SSCI™) indicate that this paper was cited 550 times in the period 1961-1977.]

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"This paper was the second in a series of theoretical articles defining and developing the concept of frustration in learning theory. An earlier paper had been rejected in 1951 by the major theoretical journal in our field, because the editor felt there was 'no point patching up Hull's theory.' I had proposed that adding a 'frustration-inhibition' factor to Hull's two-factor theory of inhibition would bring it more into line with its Pavlovian antecedents and with Kenneth W. Spence's influential theory of discrimination learning. Because such a factor would depend on classical conditioning of frustration, it seemed to me necessary first to identify the requisite Pavlovian unconditioned response of frustration to the unconditioned stimulus of nonreinforcement. This led to a large number of experiments in our laboratory and elsewhere—the first with Jacqueline Roussel in 1952—to establish an indicant of primary

unconditioned frustration, the so-called frustration effect (FE). In the 1958 *Bulletin* article, I returned to an examination of the presumed mechanisms of conditioned frustration.

"An outline of the theory introduced in this paper, and developed in subsequent ones, jumped out at me in a laboratory at Newcomb College, Tulane University as I watched rats running an alley for food under a schedule of intermittent reinforcement. In such schedules, studied earlier by L. C. Humphreys and B. F. Skinner, reward is given or withheld quasi-randomly for the same response. I observed that on this (as compared with a consistent-reward) schedule subjects appear at first to approach vigorously even though reward is given only on half the trials, and nonrewards appear to have little effect. In a second stage they react emotionally when reward is withheld; and in a third stage emotional, conflict-like behavior occurs in anticipation of the goal. The conflict disappears in a fourth stage, and the animal returns to vigorous and consistent approach. The nub of the theory is that overcoming the emotional conflict of the third stage and getting to the fourth depends on a counterconditioning mechanism which makes animals more resistant to extinction — persistent.

"This early version of the theory provided an integration of the frustration effect, the partial reinforcement effect, and the appearance and disappearance of emotional effects of frustration in discrimination learning. My guess is that this paper has been cited so frequently because the explanatory scope of the theory has been expanded since its publication. Going from less to more molar examples, the theory has been addressed to some suggested neurophysiological and pharmacological correlates of frustration and persistence; to other behavioral phenomena, such as simultaneous positive and successive negative contrast, Pavlovian induction, the formation of behavioral rituals, and the emission of ultrasonic calls in extinction by infant rats; and to psychopathic persistence, aggression, and regression."