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Signal Reliability in Pavlovian Conditioning

There are two classes of models that explain the effects of partial reinforcement on the acquisition of conditioned responding. According to trial-based models, the rate of acquisition is determined by the proportion of reinforced to nonreinforced trials. Time-based models claim that acquisition is based on a comparison of the rate of reinforcement during the CS to the rate of reinforcement in the background or intertrial interval (ITI). Experiments testing these models have used differing forms of the partial reinforcement schedule. Some have used a varied trial order and variable ITI values. Other studies have used a fixed trial order and fixed ITI durations. The former set of studies found no effects of partial reinforcement on the number of CS-US pairings needed for acquisition, while the latter study reported a difference between continuous and partial reinforcement. This experiment sought to determine whether procedural differences might account for the different results. Rats were trained on a Pavlovian appetitive conditioning paradigm with trial order either fixed or variable and ITI either fixed or variable. There were no significant differences in acquisition between groups. Therefore, procedural differences between previous experiments do not account for the different results. However, there was a significant difference in responding during trials following reinforcement; subjects on variable trial order schedule demonstrated consistent responding from trial to trial, while subjects on fixed trial order demonstrated suppressed responding following a reinforcer. As neither class of models predicts that subjects on fixed trial order will maintain the same rate of responding as subjects on variable trial order while responding differentially to different trials, the results imply a more complex mapping of learning to performance than has previously been suggested.