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A QUANTITATIVE ANALYSIS OF THE RELATIONSHIP BETWEEN RESPONSE RATE AND REINFORCEMENT RATE

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Traditional reinforcement theories have predicted a positive monotonic relationship between response rate and reinforcement rate. That is, response rates should rise as a function of increased reinforcement rate. More recently, several theories based on economic and regulatory models have predicted bitonic functions. That is, response rates should first rise, and then fall, as a function of increased reinforcement rates. Several studies have found the predicted bitonic relationship. Unfortunately, many of these studies purporting to demonstrate bitonicity can be criticized because of various confounding variables. For example, in studies which vary reinforcement rate, a decreased rate of response at high reinforcement rates may be an artifact of satiation or of a shorter time available to respond. The present study attempts to replicate and extend the earlier studies by demonstrating bitonicity while controlling for confounding variables, in particular for satiation effects. Subjects were 10 rats: Each was exposed to a Variable Interval (VI) 15s and a VI30s schedule. Half of the subjects ran a 10-minute session, and half responded on a 30-minute session. We expect an inverse relationship between response rate and reinforcement rate in the 30-minute sessions, but a direct relationship during the 10-minute sessions.