A test of Rescorla and Wagner’s prediction of nonlinear effects in contingency learning

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Abstract

According to most theories, in a simple contingency learning situation, excitatory learning occurs when the probability of the unconditioned stimulus in the presence of the conditioned stimulus ($p_1$) is higher than the probability of the unconditioned stimulus in the absence of the conditioned stimulus ($p_2$). In Rescorla and Wagner’s model this prediction varies depending on the parameters used. The following experiments evaluate if the difference between $p_1$ and $p_2$ required to produce excitatory conditioning is the same independently of the specific value of $p_1$ or if this difference varies proportionally to $p_1$’s value. To do so, an appetitive procedure of Pavlovian conditioning with rats was used. Four experiments compared different levels of contingency (low, high and medium) and found that the difference between $p_1$ and $p_2$ required to produce excitatory conditioning enhances when the value of $p_1$ is higher. The possibility of analyzing contingency learning as a discrimination between $p_1$ and $p_2$ is also discussed.

Keywords: contingency learning, associative learning, excitatory conditioning, psychophysics, discrimination, Rescorla and Wagner’s model.