World Academy of Science, Engineering and Technology
International Journal of Cognitive and Language Sciences
Vol:13, No:09, 2019

# Effect of Dimensional Reinforcement Probability on Discrimination of Visual Compound Stimuli by Pigeons

**Authors :** O. V. Vyazovska

**Abstract :** Behavioral efficiency is one of the main principles to be successful in nature. Accuracy of visual discrimination is determined by the attention, learning experience, and memory. In the experimental condition, pigeons' responses to visual stimuli presented on the screen of the monitor are behaviorally manifested by pecking or not pecking the stimulus, by the number of pecking, reaction time, etc. The higher the probability of rewarding is, the more likely pigeons will respond to the stimulus. We trained 8 pigeons (Columba livia) on a stagewise go/no-go visual discrimination task.16 visual stimuli were created from all possible combinations of four binary dimensions: brightness (dark/bright), size (large/small), line orientation (vertical/horizontal), and shape (circle/square). In the first stage, we presented S+ and 4 S-stimuli: the first that differed in all 4-dimensional values from S+, the second with brightness dimension sharing with S+, the third sharing brightness and orientation with S+, the fourth sharing brightness, orientation and size. Then all 16 stimuli were added. Pigeons rejected correctly 6-8 of 11 new added S-stimuli at the beginning of the second stage. The results revealed that pigeons' behavior at the beginning of the second stage was controlled by probabilities of rewarding for 4 dimensions learned in the first stage. More or fewer mistakes with dimension discrimination at the beginning of the second stage depended on the number S- stimuli sharing the dimension with S+ in the first stage. A significant inverse correlation between the number of S- stimuli sharing dimension values with S+ in the first stage and the dimensional learning rate at the beginning of the second stage was found. Pigeons were more confident in discrimination of shape and size dimensions. They made mistakes at the beginning of the second stage, which were not associated with these dimensions. Thus, the received results help elucidate the principles of dimensional stimulus control during learning compound multidimensional visual stimuli.

**Keywords :** visual go/no go discrimination, selective attention, dimensional stimulus control, pigeon
**Conference Title :** ICABVC 2019 : International Conference on Attentional Blink and Visual Cognition
**Conference Location :** Paris, France
**Conference Dates :** September 19-20, 2019