

MENTAL ZOOMING IN PIGEONS

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Invariance processes such as mental rotation (1) and mental zooming (2) may furnish humans with isomorphic representations of objects. Pigeons are also capable of mental rotation and their performance in some instances is better than that of humans (3). We investigated the mental zooming abilities of pigeons in an attempt to compare them with those of humans.

In an oddity-from-sample conditioning procedure a shape was presented on the middle key of a Skinner box. Response to the sample produced a matching and an odd comparison shape on two side keys. Responses to the odd shape were rewarded and responses to the matching shape were punished. The time between the onset of the comparison stimuli and the final response was the decision time. After the subjects had learned the basic task non-reinforced test trials were intercalated among training trials. Training trials always involved identically sized (10 mm) shapes but during test trials sample and comparison shapes were pairings of four different sizes (5, 10, 15 and 20 mm).

The generalization of the oddity detection to patterns of different size was not an easy task for the pigeons. The percent correct responses decreased steeply and the decision times increased as the relative size difference between sample and comparison shapes increased. Perhaps pigeons are inhibited from pecking discriminatively at stimuli which are distinctly larger than grains. This is supported by the fact that even when there was no size difference between sample and comparisons the accuracy decreased and the decision times tended to increase with the largest sizes.

The shape recognition performance of pigeons was thus markedly affected by relative size difference and not affected by absolute sizes except when the largest stimuli were involved. Leaving aside the latter point, humans appear to perform similarly. Size invariance information processing may thus be analogous in both species.

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3. V.D. Hollard and J.D. Delius (1982). *Science* 218: 804-806.