

# Studying invariant visual object recognition in rats

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Traditionally, higher level visual processing tasks such as object recognition, which occur in the inferior temporal lobes of the brain, have been studied in humans and monkeys. The use of rats to study vision has been limited, as most scientists believe that rats are anatomically different from humans and monkeys, lacking the ability to perform and comprehend higher level visual tasks. In order to prove that rats are indeed capable of higher level visual processing, a behavioral study involving invariant visual object recognition was employed. Invariant visual object recognition is a complex process in which the brain can effortlessly and consistently recognize hundreds of thousands of objects that have each undergone transformations such as rotation, occlusion, and lighting changes. In this study, Long-Evans rats were trained to recognize two different three-dimensional target objects. The rats learned to associate each of the two target objects with a specific contact sensor. This association was achieved through operant conditioning in which the rats were on a reward/punishment system, receiving juice for correct responses or unpleasant noise and flashing for incorrect responses. As the experiment progressed, the rats were subjected to numerous experimental trials in which the target objects had been varied in numerous ways such as changes in position, rotation, size, and lighting. If the rats prove to be capable of these invariant visual object recognition tasks, they can become a new, powerful experimental model for studying how the brain recognizes visual objects.



Figure 1. Two different three dimensional objects were rotated from  $-60^\circ$  to  $60^\circ$  in  $30^\circ$  increments.

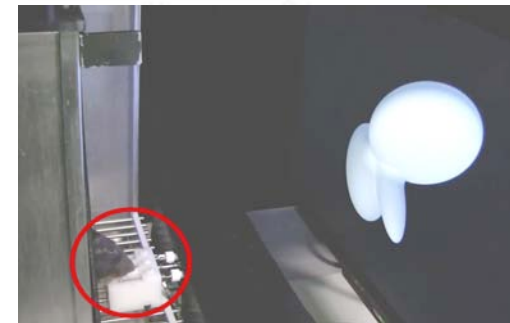


Figure 2. The above photograph shows the rat making a selection for an object that has been rotated about the y-axis.

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