Study validates monkey model of visual perception

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A new study from *The Journal of Neuroscience* shows that humans and rhesus monkeys have very similar abilities in recognizing objects "at a glance," validating the use of this animal model in the study of human visual perception. In the study, published August 26, humans and monkeys not only demonstrated similar ease in recognizing objects in varied positions and landscapes, but both species also tended to make the same errors.

For the study, researchers from MIT compared the performance of two rhesus macaque monkeys and 638 adult human subjects on a large set of object recognition tasks. First, the researchers generated images of 3-D objects and trained the monkeys to identify the objects. Images were presented for less than a second and then the monkeys selected the

correct object from two choices. In the object recognition tasks, humans and monkeys were presented with an object for less than a second on a variety of backgrounds and in various positions and orientations. They then had to identify the object from two choices.

The researchers found that:

- Humans' and monkeys' performance across a large number of object recognition tasks was highly correlated, suggesting that they have similar abilities to recognize objects.
- Humans and monkeys made the same types of mistakes, such as confusing tanks with trucks and elephants with rhinoceroses, even though these objects possess no semantic meaning for monkeys.
- Each monkey's pattern of mistakes was statistically indistinguishable from individual humans. Thus, it would be impossible to tell whether a particular set of responses on these object recognition tasks originated from a monkey or human.

The results suggest that rhesus monkeys and humans share similar neural representations of shapes and that these underlie the visual perception of objects, the researchers said.

"The study shows that monkeys are similar to humans, not only in their ability to recognize objects, but also in their patterns of errors," said Nikolaus Kriegeskorte, a neuroscientist at the University of Cambridge who studies visual object recognition and was not involved in the study. "This is consistent with the similarity of the brain representations of objects between the two species, which had been demonstrated previously."

As far as visual processing is concerned, "the study provides important evidence that the monkey brain can serve as a model for the human

brain," Kriegeskorte added.

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