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Sensitivity to geometric shape regularity in humans and baboons: A putative signature of human singularity

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Abstract

Among primates, humans are special in their ability to create and manipulate highly elaborate structures of language, mathematics or music. We show that this sensitivity is present in a much simpler domain: the visual perception of geometric shapes. We asked human subjects to detect an intruder shape among six quadrilaterals. Although the intruder was defined by an identical amount of displacement of a single vertex, the results revealed a geometric regularity effect: detection was considerably easier with most regular shapes. This effect was replicated in several tasks and in both uneducated adults and preschoolers. Baboons, however, showed no such geometric regularity effect even after extensive training. Baboon behavior was captured by convolutional neural networks (CNNs) but a symbolic model was needed to fit human behavior. Our results indicate that the human propensity for symbolic abstraction permeates even elementary shape perception and they suggest a new putative signature of human singularity.