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Why are letters and other human visual signs shaped the way that they are?

Caltech researchers argue that the shape signature for human visual signs was selected for ease of reading, at the expense of writing

In a new study forthcoming in the May 2006 issue of *The American Naturalist*, Mark A. Changizi and his coauthors, Qiang Zhang, Hao Ye, and Shinsuke Shimojo, from the California Institute of Technology explore the hypothesis that human visual signs have been cross-culturally selected to reflect common contours in natural scenes that humans have evolved to be good at seeing.

"[We] analyzed one hundred writing systems, Chinese characters, and non-linguistic visual signs, and found that these very different types of human visual signs possess a similar shape structure," explain the researchers.

Comparing human visual signs to natural scenes, the researchers demonstrate a high correlation between the most common contour combinations found in nature and the most common contours found in letters and symbols across cultures. For example, contours resembling an "L" or "X" are more common in both human visual signs and natural scenes than anything resembling an asterisk (*).

The researchers also examined motor and visual skills and the shapes that are easiest to see and form. They make a strong case that the shape signature for human visual signs is primarily selected for reading, at the expense of writing.

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Founded in 1867, *The American Naturalist* is one of the world's most renowned, peer-reviewed publications in ecology, evolution, and population and integrative biology research. AN emphasizes sophisticated methodologies and innovative theoretical syntheses--all in an effort to advance the knowledge of organic evolution and other broad biological principles.

Mark A. Changizi, Qiong Zhang, Hao Ye, and Shinsuke Shimojo "The structures of letters and symbols throughout human history are selected to match those found in objects in natural scenes," *The American Naturalist* 167:5.

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02 Apr 2006

Visual Signs Attuned To Reading Rather Than Writing



Mark A. Changizi and coauthors, Qiang Zhang, Hao Ye, and Shinsuke Shimojo, from the California Institute of Technology have hypothesized that human visual signs are "cross-culturally selected to reflect common contours in natural scenes" that the eye has already mapped.

"[We] analyzed one hundred writing systems, Chinese characters, and non-linguistic visual signs, and found that these very different types of human visual signs possess a similar shape structure," the authors say in a study to be published in the May 2006 issue of *The American Naturalist*. The researchers say that they compared human visual signs to natural scenes and found a significant correlation between the contours combinations in nature and the contour combinations in letters. They cite the example of contours "L" or "X" as being common in human visual signs and natural scenes. They also analyzed the motor and visual skills that related to the shapes and forms that are easier to see and conclude that shape signature for human visual signs is attuned to reading at "the expense of writing." Mark A. Changizi, Qiong Zhang, Hao Ye, and Shinsuke Shimojo "The structures of

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scenes," The American Naturalist 167:5. Contact:
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