

The brain 'joins the dots' when drawing a cartoon face from memory

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In a study by Miall, Gowen and Tchalenko published by Elsevier, in the March issue of *Cortex*, a brain scanner was used to record the brain's activity in each stage of the process of drawing faces. The researchers found that the captured visual information is stored as a series of locations or action plans to reach those locations. It is as if the brain remembers key locations and then "joins the dots" with a straight or curved line to achieve the desired image on the page.

Participants who had no particular expertise as artists were studied using an [MRI scanner](#) to measure levels of oxygen in the [brain](#). They viewed black and white cartoons of faces and were asked to reproduce them using pencil and paper.

The results show that looking at the cartoons activated visual processing areas of the brain, that are known to be responsive to faces, especially if the cartoon was displayed at the same time as they produced the [drawing](#). But when the subjects had to wait before drawing, there was no maintained activity in these areas. This suggests that the memory of the [cartoon face](#) is transformed into a different, non-visual form. Instead, there was increased activity in parietal [cortex](#) and frontal areas consistent with the encoding and retention of the spatial information as an action plan, representing a series of targets for ocular fixation or as spatial targets for the drawing action.

In other experiments, the scientists have also precisely measured where people look as they perform these tasks. They conclude that facial

information is captured during a sequence of eye movements towards certain features of the cartoons, and the information is stored as spatial locations for subsequent eye and hand actions. The drawing process then recreates these spatial features as the eye and hand are guided by the retained action plans. Finally their work shows that brain imaging, in combination with eye and hand tracking, can dissect complex visually guided tasks into separate functional stages.

This work is an important step towards a full understanding of how sensory information is used to guide actions. The implications are that the brain translates sensory information into action plans as soon possible, rather than maintaining and later copying from a mental image.

More information: The article is "Drawing cartoon faces - a functional imaging study of the cognitive neuroscience of drawing" by Emma Gowen, R. Chris Miall and John Tchalenko published in Cortex, Volume 45, Issue 3 (March 2009) <http://www.elsevier.com/locate/cortex>

Source: Elsevier

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