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Press Release

Do not disturb! How the brain filters out distractions

Tübingen neuroscientists: brain uses varying strategies to prevent the notepad of working memory from being wiped clean

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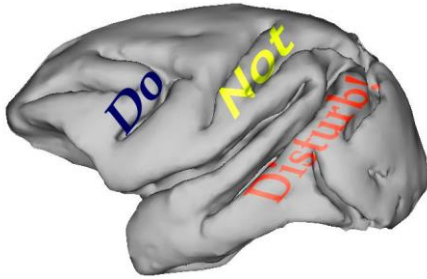
You know the feeling? You are trying to dial a phone number from memory... you have to concentrate.... then someone starts shouting out other numbers nearby. In a situation like that, your brain must ignore the distraction as best it can so as not to lose vital information from its working memory. A new paper published in *Neuron* by a team of neurobiologists led by Professor Andreas Nieder at the University of Tübingen gives insight into just how the brain manages this problem.

The researchers put rhesus monkey in a similar situation. The monkeys had to remember the number of dots in an image and reproduce the knowledge a moment later. While they were taking in the information, a distraction was introduced, showing a different number of dots. And even though the monkeys were mostly able to ignore the distraction, their concentration was disturbed and their memory performance suffered.

Measurements of the electrical activity of nerve cells in two key areas of the brain showed a surprising result: nerve cells in the prefrontal cortex signaled the distraction while it was being presented, but immediately restored the remembered information (the number of dots) once the distraction was switched off. In contrast, nerve cells in the parietal cortex were unimpressed by the distraction and reliably transmitted the information about the correct number of dots.

These findings provide important clues about the strategies and division of labor among different parts of the brain when it comes to using the working memory. "Different parts of the brain appear to use different strategies to filter out distractions," says Dr. Simon Jacob, who carried out research in Tübingen before switching to the Psychiatric Clinic at the Charité hospitals in Berlin. "Nerve cells in the parietal cortex simply suppress the distraction, while nerve cells in the prefrontal cortex allow themselves to be momentarily distracted – only to return immediately to the truly important memory content."

The researchers were surprised by the two brain areas' difference in sensitivity to distraction. "We had assumed that the prefrontal cortex is able to filter out all kinds of distractions, while the parietal cortex was considered more vulnerable to disturbances," says Professor Nieder. "We will have to rethink that. The memory-storage tasks and the strategies of each brain area are distributed differently from what we expected."



Nerve cells in two brain areas important to working memory use different strategies to filter out distractions.
Image: LS Tierphysiologie

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