

Scientists able to read people's minds

By Steve Connor, Science Editor Friday, 13 March 2009

¹ Having the ability to read someone's mind with a 'thought machine' has come a step closer after scientists showed that they could guess a person's memory simply by looking at the electrical activity of their brain.

² Scientists have found that spatial memories can be 'read' by a brain scanner so that it is possible to predict automatically where someone imagines themselves to be (the exact location in a maze, for instance) without actually asking them.

³ 'It's also a small step toward the idea of mind reading, because just by looking at neural activity, we are able to say what someone is thinking,' said Demis Hassabis of University College London.

⁴ It may one day be possible to do the same with other types of memories and thoughts, although the possibility of using a mindreading machine to solve crimes or to fight terrorism is still a distant *prospect*, Dr Hassabis said.

⁵ 'It's at least 10 years, probably more, from getting anywhere near that kind of technology, where you could literally read someone's

thoughts in a single short session when they don't want you to,' he said. 'We might be about 10 years away from doing that, so it might be useful to start having those ethical discussions in the near future in preparation for that – but we're still a long way from doing anything practical,' Dr Hassabis said.

⁶ The study was led by UCL's Professor Eleanor Maguire who had already shown that a small area of the brain behind a region called the hippocampus is enlarged in male taxi drivers who had done 'The Knowledge' – memorising the maze of London streets. Professor Maguire trained a different set of male volunteers to navigate themselves through a virtual maze on a computer while their brains were being scanned by a functional MRI machine. 'We know that the hippocampus *underpins* our ability to navigate, to form and recollect memories and how to imagine the future. But how the activity across millions of hippocampal neurons supports the functions is a fundamental question in neuroscience,' Professor Maguire said.

⁷ The scientists found that certain nerve cells in the brain's

hippocampus, called 'place cells', became stimulated in definite patterns of activity that the researchers could analyse to guess where in the maze each man imagined himself to be.

'to read someone's mind . . . how far are we away from the reality . . . ?'

⁸ 'Remarkably, using this technique we found that we could accurately predict the position of an individual within this virtual environment *solely* from the pattern of activity within their hippocampus,' she said.

⁹ In contrast, previous research on animals suggested that there were no particular patterns of activity within the nerve cells of the hippocampus that could be used to predict spatial memory. 'Our technique, which looks at the picture over many thousands of neurons, shows this cannot be the whole story,' Professor Maguire said. 'If we're able to predict spatial memories from brain activity, ➡'

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➡ this means there must be a structure to how it is coded in the neurons.'

¹⁰ The study, published in the journal *Current Biology* and funded by the Wellcome Trust, the world's biggest medical research charity, could help scientists to understand the fundamental memory problems behind some neurological diseases. 'Understanding how we as humans record our memories is critical to helping us learn how information is processed in the hippocampus and how our memories are *eroded* by diseases such as Alzheimer's,' Dr Hassabis said.

The future: Ethical questions

¹¹ Being able to read someone's mind has been *the stuff* of science

fiction, but how far are we away from the reality of visualising the secret thoughts of people without them knowing?

¹² The latest research is strictly limited to a certain set of nerve cells in the brain – specifically the hippocampus region – that are known to be involved in memorising spatial awareness and navigation.

¹³ Professor Eleanor Maguire of University College London, who led the study, said that the finding opens up the possibility of understanding how other kinds of memories are encoded in the brain, although we are still a long way from seeing inside someone's head. 'We can *rest easy* in terms of mind-reading. While technically in this study we were able to predict someone's spatial memory

from their brain activity, there was nothing intrusive about what we did,' Professor Maguire said.

¹⁴ 'It's not that we can put somebody in a brain scanner and suddenly read their thoughts. It's quite an involved process that's at a very early stage.'

¹⁵ But in science you can never say never, and the technique could be adapted for other kinds of memory *infiltration*. 'It's probably quite far away from having social, ethical and probably *forensic* implications,' Professor Maguire said. ■