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## Juggling 'can boost brain power'

**Learning to juggle can cause changes in the brain, scientists have found.**

Using brain scans, the researchers showed that in 12 people who had learnt to juggle, certain brain areas had grown.

But three months later, during which time people stopped juggling, the brain had gone back to its normal size.

Writing in *Nature*, the researchers from the University of Regensburg, Germany, say their findings challenge the view that experiences do not affect the brain.

### Grey matter

The team studied 24 people who had no juggling ability.

They were scanned using voxel-based morphometry, a technique which measures concentrations of brain tissue.

Half were then asked to teach themselves to juggle for at least 60 seconds using the traditional three-ball cascade routine, and given three months to practise.

All 24 were then scanned again. There was no change in the brains of the non-juggling group.

But brain scans of those who had learnt to juggle showed two areas had increased in size.

Jugglers had more grey matter - which consists largely of the nerve cells - in the mid-temporal area and the left posterior intraparietal sulcus, which both process visual motion information.

But after a further three months, in the people who had



The skills we learn may shape the structure of our brains

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stopped juggling, the increase in grey matter had reduced.

The scientists, led by Dr Arne May, said the changes could have been caused by an increase in cell production or by changes in the connections between cells.

Dr May told Reuters news agency: "I believe the challenge we face is... to be able to adapt and modulate this knowledge into disease management."

### Everyday impact

Dr Vanessa Sluming, a senior lecturer in medical imaging at the University of Liverpool, UK, has previously studied musicians and found they retain more brain cells than non-players.

She told BBC News Online the juggling research was interesting because it had been carried out amongst adults learning a new skill, rather than looking at people who had learnt a skill as a child.

"However, they have only shown a temporary increase. It would be interesting to know at what point this acquired grey matter can be retained.

"Does it mean you need to continuously practise the acquired skill to retain it, or at some point have you done enough to retain it?

"It shows that what we do in everyday life might have an impact not just on how our brains function but on the structure at a macroscopic level."

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