

From the BBC News Website

Monday, 17 June, 2002, 10:20 GMT 11:20
UK

Musicians have 'more grey matter'

By Helen Briggs

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Professional musicians have more grey matter in a part of the brain involved in processing music, scientists have found.

The discovery could explain why musical virtuosos tend to be born not made.

But it is unlikely to resolve the long-running debate about what makes a potential Mozart.

Repeated flexing of the brain by practising a musical instrument could account for the extra grey matter in the auditory cortex.

The latest twist in the search for a scientific basis of musical ability was made by a team at the University of Heidelberg in Germany.

Neurologists played tones of varying frequencies to professional musicians, amateur musicians and non-musicians, and then recorded their brain responses.

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Nature and nurture

The part of the brain they were looking at is a region called Heschl's gyrus.

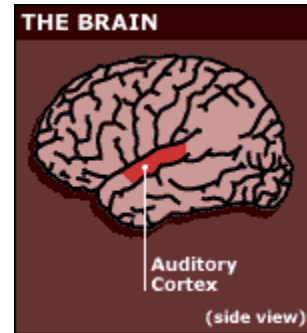
This structure - buried within the auditory cortex - is the region of the brain that responds to sound.

The researchers found that professional musicians showed greater responses to the tones than non-musicians. Amateurs were somewhere in between.

They then used brain imaging techniques to measure the size of Heschl's gyrus and found it was larger in professional musicians.

They had 130% more grey matter in the part of the brain that makes sense of music compared with people who were not musical.

According to research leader Dr Peter Schneider, how much we have of this type of brain cell is fixed from birth. So there must be a strong inheritable component.



He told BBC News Online: "There must be a great influence of genetics to account for the great volume of grey matter in the professional musicians."

But, as always, genes are not the whole story. Growing up in a musical family also played a role, allowing children to develop a "good ear" for music, said Dr Schneider.

He thinks listening to music and singing is a big influence in early childhood.

Scientists believe that musical aptitude, or an individual's potential for musical ability, is no longer plastic after the age of nine.

So what makes a great musician?

"It could be a genetic influence only or it could be an influence of the musical environment in early childhood," Dr Schneider said.

'More responsive'

The research, published in the journal Nature Neuroscience, is unlikely to settle the debate.

According to Dr Bob Carlyon, of the Medical Research Council Cognition and Brain Sciences Unit in Cambridge, UK, there are several interpretations.

"The problem with these types of studies is that you never really know if the Heschl's gyrus has become larger and more responsive because of continued practice or whether people become musicians because they have large and responsive Heschl's gyri," he told BBC News Online.

Whatever the implications, the study provides new insight into how the brain responds to music.

Brain scans show that our brain uses a wide distribution of areas when we listen to music.

Rhythm and pitch tend to be processed in the left-hand side of the human brain, while timbre and melody is dealt with on the right.

