

BECOMING A PIANIST: AN FMRI STUDY OF MUSICAL LITERACY ACQUISITION

Lauren Stewart

Institute of Cognitive Neuroscience, London, UK

Background

When a child or adult starts to play the keyboard, a significant part of the initial musical training is devoted to learning to read musical notation. Musical pieces which, at first sight, appear meaningless in their written form, will eventually be translated into a recognisable melody. Just as written language becomes meaningful and even compelling to read, so does musical notation. But how does this happen? And what brain regions are recruited for this process in the aspiring pianist?

Aims

To measure functional brain changes before and after the acquisition of music reading skill from scratch using an implicit and an explicit music reading task.

Method

Musically naïve subjects performed both tasks before and after they had been taught to read music and play keyboard to grade 1 (Associated Board, UK). fMRI results were analyzed separately, for the pre-training and post-training sessions using Statistical Parametric Mapping Software.

Results

Subjects showed learning-related changes in activation in bilateral superior parietal cortex and left supramarginal gyrus for the explicit and implicit music reading tasks, respectively. A common learning-related activation change was seen across both tasks in superior parietal cortex.

Conclusion

In music reading, the information which is relevant for performance is contained in the position of the note on the staff and musical performance relies on the use of this positional information to guide selection of the appropriate keypress. Hence the activation of bilateral superior parietal (within the dorsal stream) in the explicit music reading task is entirely consistent with the idea that music reading involves a sensorimotor translation in which the spatial characteristics of musical notation are used to guide selection of the appropriate keypress. The supramarginal gyrus activation seen in the implicit music reading task is consistent with this area's suggested role in "motor intention". During the course of training, subjects learned to make specific keypresses in response to particular musical notes. The visual appearance of musical notes, post-training, may be automatically and unconsciously interpreted as an instruction to act. The study serves to illustrate the power of culture, and specifically music, to shape brain function.