How learning Braille changes brain structure over time

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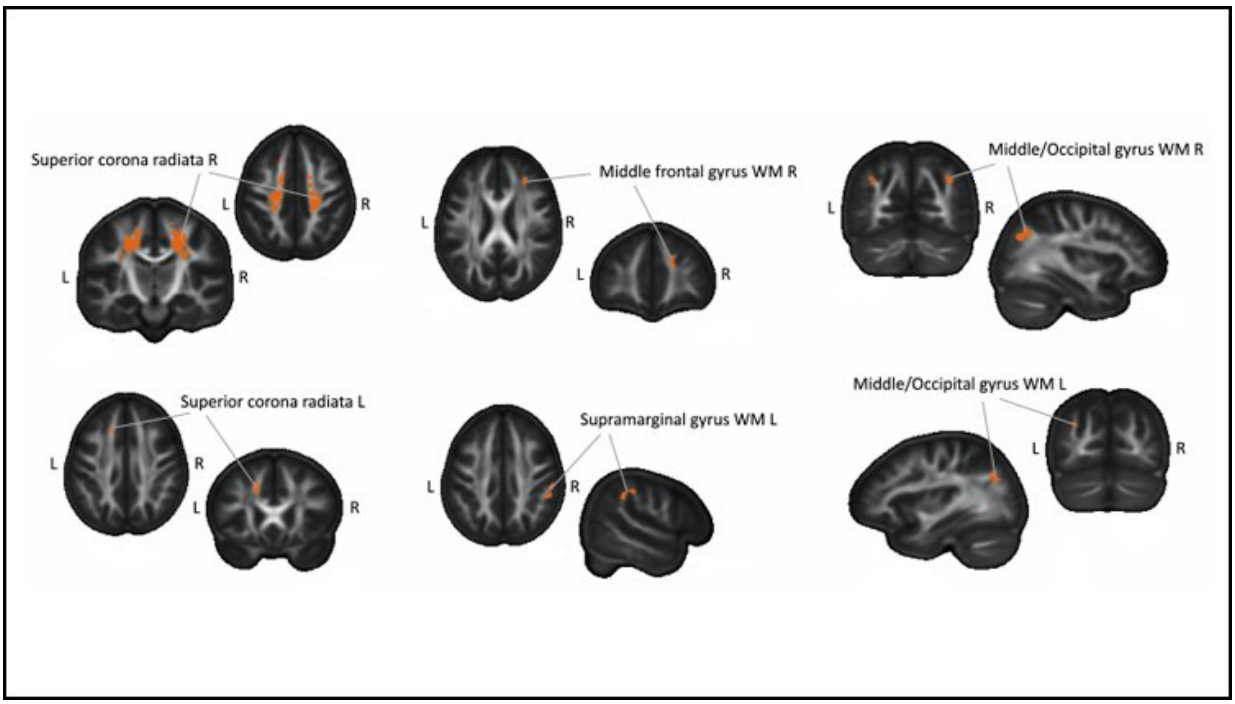

Changes in motor, visual, and language-related white matter areas over time. Credit: Molendowska and Matuszewski et al., JNeurosci 2021

Learning changes the brain, but when learning Braille different brain regions strengthen their connections at varied rates and time frames. A new study published in *JNeurosci* highlights the dynamic nature of learning-induced brain plasticity.

Learning new skills alters the brain's white matter, the nerve fibers connecting brain regions. When people learn to read tactile Braille, their somatosensory and visual cortices reorganize to accommodate the new demands. Prior studies only examined white matter before and after training, so the exact time course of the changes was not known.

Molendowska and Matuszewski et al. used diffusion MRI to measure changes in the white matter strength of sighted adults as they learned Braille over the course of eight months. They took measurements at five time points: before the training, three times during, and once after. White matter in somatosensory areas strengthened steadily over the course of the training. But white matter in the visual cortex did not reorganize until halfway through the training, the point where the Braille words start to take on semantic meaning. White matter in both regions went back to the pre-training level two and a half months after the training ended.

These results demonstrate white matter reorganizes itself across regions and different timeframes to meet the brain's needs.

More information: Temporal Dynamics of Brain White Matter Plasticity in Sighted Subjects During Tactile Braille Learning—a Longitudinal Diffusion Tensor Imaging Study, *JNeurosci* (2021). DOI: 10.1523/JNEUROSCI.2242-20.2021

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