Massive cortical reorganization in sighted Braille readers.

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Created 9/15/2016
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Abstract:

The brain is capable of large-scale reorganization in blindness or after massive injury. Such reorganization crosses the division into separate sensory cortices (visual, somatosensory...). As its result, the visual cortex of the blind becomes active during tactile Braille reading. Although the possibility of such reorganization in the normal, adult brain has been raised, definitive evidence has been lacking. Here, we demonstrate such extensive reorganization in normal, sighted adults who learned Braille while their brain activity was investigated with fMRI and transcranial magnetic stimulation (TMS). Subjects showed enhanced activity for tactile reading in the visual cortex, including the visual word form area (VWFA) that was modulated by their Braille reading speed and strengthened resting-state connectivity between visual and somatosensory cortices. Moreover, TMS disruption of VWFA activity decreased their tactile reading accuracy. Our results indicate that large-scale reorganization is a viable mechanism recruited when learning complex skills.

Journal:
eLife

Volume:
5

Pagination:
e10762

Date Published:
2016

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