Increased functional connectivity between language and visually deprived areas in late and partial blindness.

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Abstract:

In the congenitally blind, language processing involves visual areas. In the case of normal visual development however, it remains unclear whether later visual loss induces interactions between the language and visual areas. This study compared the resting-state functional connectivity (FC) of retinotopic and language areas in two unique groups of late visually deprived subjects: (1) blind individuals suffering from retinitis pigmentosa (RP), (2) RP subjects without a visual periphery but with preserved central "tunnel vision", both of whom were contrasted with sighted controls. The results showed increased FC between Broca’s area and the visually deprived areas in the peripheral V1 for individuals with tunnel vision, and both the peripheral and central V1 for blind individuals. These findings suggest that FC can develop in the adult brain between the visual and language systems in the completely and partially blind. These changes start in the deprived areas and increase in size (involving both foveal and peripheral V1) and strength (from negative to positive FC) as the disease and sensory deprivation progress. These observations support the claim that functional connectivity between remote systems that perform completely different tasks can change in the adult brain in cases of total and even partial visual deprivation.

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