



How does reading expertise influence letter representations in the brain?

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Abstract

Familiar languages are known to activate Visual Word Form Area (VWFA) – a region formed with reading expertise. However, does reading modulate the visual representation of the known language is unanswered. In this study, using two Indian language: Telugu and Malayalam – these languages have different scripts but same phonetic – we studied how representation alters with reading. We enrolled two groups of participants who were fluent in either one of the language but not both. From a series of behaviour and fMRI experiments, we found that 1) Learning to read does not alter the letter representation in the visual cortex. However, the pair-wise dissimilarities are larger for the known stimuli and it is achieved by reduced part-part interactions. 2) The neural correlates of reduced part-part interactions is observed in LOC. 3) Apart from VWFA, learning to read modulates the activity in other visual areas as well i.e. while hV4 activates strongly for the known language, Lateral Occipital Cortex (LOC) activates strongly for the unknown language. In conclusion, reading has a wide spread effect over the entire visual cortex but the letter representations do not change, although the parts of a unit become more independent.