V1 activation in congenitally blind humans is associated with episodic retrieval

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Abstract:

Recently we showed that the occipital cortex of congenitally blind humans is activated during verbal-memory tasks. Activation was found in regions corresponding to the retinotopic visual areas of sighted humans, including the calcarine sulcus (V1). No such occipital activation was found in sighted humans. One year later, the same blind subjects participated in a second fMRI scan, to study the contribution of semantic elements and episodic memory to the occipital activation. The subjects performed an episodic-memory task, requiring recognition of words that were originally presented in the first scan. We demonstrate here that the magnitude of V1 activation during the recognition task is correlated with memory performance, assessed during the scan. Across the blind, the better-remembered set of words elicited greater V1 activation than words from the poorly-remembered set, although the semantic components and the behavioral task were similar in the two sets. This indicates that on top of semantic processing (suggested previously), V1 activation in the blind is probably associated with long-term episodic memory. Indeed, within the blind, those who showed better recognition-memory performance had greater V1 activation compared with the poorer performers. We conclude that the posterior occipital cortex (including V1) of the congenitally blind is likely to be involved in episodic retrieval.

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