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A shared representation of order between encoding and recognition in visual short-term memory

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Abstract

Many complex tasks require people to bind individual events into a sequence that can be held in short term memory (STM). For this purpose information about the order of the individual events in the sequence needs to be maintained in an active and accessible form in STM over a period of few seconds. Here we investigated how the temporal order information is shared between the presentation and response phases of an STM task. We trained a classification algorithm on the fMRI activity patterns from the presentation phase of the STM task to predict the order of the items during the subsequent recognition phase. While voxels in a number of brain regions represented positional information during either presentation and recognition phases, only voxels in the lateral prefrontal cortex (PFC) and the anterior temporal lobe (ATL) represented position consistently across task phases. A shared positional code in the ATL might reflect verbal recoding of visual sequences to facilitate the maintenance of order information over several seconds.

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1 Introduction

One of the most important features of human short term memory (STM) is the ability to bind individual events into a sequence. A host of complex behaviours including language processing, vocabulary acquisition, and chunk formation are thought to rely on sequence

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