

Effects of detail and temporal distance of past and future events on the engagement of a common neural network

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Behavioral, lesion and neuroimaging evidence show striking commonalities between remembering past events and imagining future events. In a recent event-related fMRI study, we instructed participants to construct a past or future event in response to a cue. Once an event was in mind, participants made a button press, then generated details (elaboration) and rated them. We found that the elaboration of past and future events recruited a common neural network. However, regions within this network may respond differentially to event characteristics, such as temporal distance and the amount of detail generated, depending on whether the event is in the past or future. To investigate this further, we conducted parametric modulation analyses, with temporal distance and detail as covariates. The analysis of temporal distance (independent of detail) revealed that for past events, right parahippocampus exhibited increasing activity with decreasing temporal distance. In contrast, numerous regions exhibited increasing activity with increasing temporal distance of future events, including bilateral hippocampus, which may reflect increasing novelty and/or more intensive relational processing when recombining disparate details. Temporal poles also showed increasing activity, suggesting more remote future events rely on more conceptual information. The analysis of detail (independent of temporal distance) showed increasing detail in past events modulated activity in right precuneus. Increasing detail in future events also modulated precuneus, as well as right frontal and left temporal pole. Notably, bilateral hippocampus responded most strongly to increasing detail, again highlighting the involvement of this structure in relational processing during elaboration of future events.