False Memory and the Frontal Lobes

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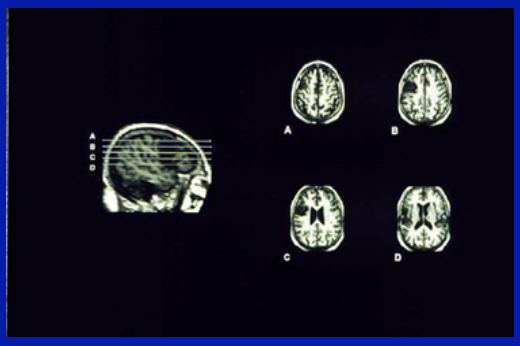


False Memory and the Frontal Lobes

- Lesion studies have implicated defective retrieval focusing and monitoring processes in elevated false recognition observed after various types of damage to prefrontal cortex (e.g., Rapcsak et al., 1999; Schacter et al., 1996; Ward et al., 1999)
- However, encoding deficits have also been implicated (Curran et al., 1997; Parkin et al., 1999)

False Memory and the Frontal Lobes

- Present talk will examine two fMRI studies indicating that level of PFC activity during encoding can be associated with either greater or lesser susceptibility to memory distortion:
- *Illusory truth effect*: A form of misattribution in which presentation of both true and false statements increases perceived truth value.
- *False recognition of visual objects*: False alarms to new objects that are perceptually/conceptually similar to previously studied objects

Illusory truth

Tendency to believe previously encountered information to be true:

- People judge the truth of old statements > novel statements.
- When statements are initially presented as true or false, people more frequently correctly judge true statements to be true than false statements to be false.
  - i.e., people tend to judge false statements incorrectly as "true."

Recollection v. familiarity

Cognitive theories indicate that the illusory truth effect emerges when item familiarity is misattributed to truth (e.g., Begg *et al.*, 1992)

- Presentation of a statement increases its *familiarity*
- At test, participants misattribute this sense of familiarity to the truth of an item
- However, familiarity may be opposed by *recollection*, i.e., detailed, contextually-rich memory of the initial encounter with the statement
- When an item is initially presented as false, participants need to recollect aspects of the study episode in order to counteract a familiarity-based truth judgment

Recollection and the brain

- Activations in inferior frontal gyrus (IFG) and medial temporal lobes (MTL) have been associated with successful encoding
- These studies have generally restricted analyses to items that are accompanied by *recollection*: recalled items (Strange et al., 2002), high confidence hits (e.g., Wagner et al., 1998); 'remember' responses (e.g., Henson et al., 1999; Brewer et al., 1998)
- According to cognitive account of illusory truth effect, if greater IFG and MTL activity during encoding is associated with greater subsequent recollection, such activity should also be associated with decreased susceptibility to the illusory truth effect

Mitchell, Dodson, & Schacter (submitted)

The motivation

Examine brain activity during encoding in light of the familiarity v. recollection account of the illusory truth effect

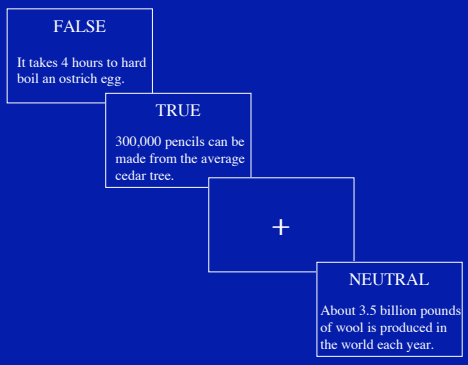
The design

Using event-related fMRI, identify encoding activations associated with successful suppression of illusory truth

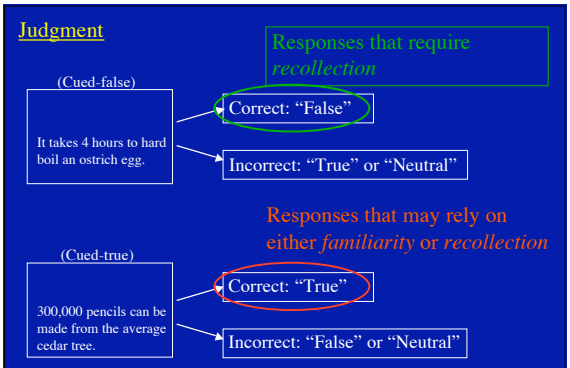
The prediction

Activated regions should overlap with those previously theorized to subserve encoding processes that support subsequent recollection (IFG and MTL)

Encoding

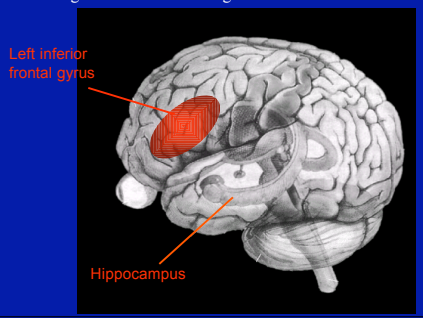


Judgment



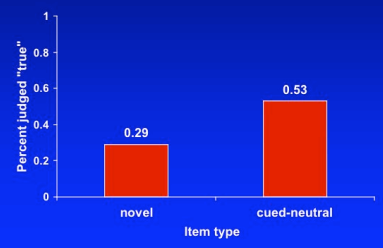
Imaging predictions

If suppressing the illusory truth effect requires recollection, then cued-false/judged-false items should be associated with activations in areas subserving recollective encoding



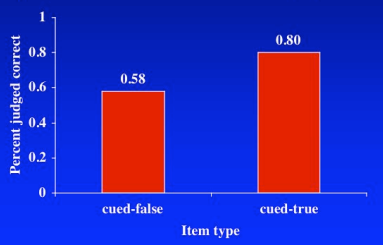
Behavioral results

Proportion of novel and cued-neutral items judged true

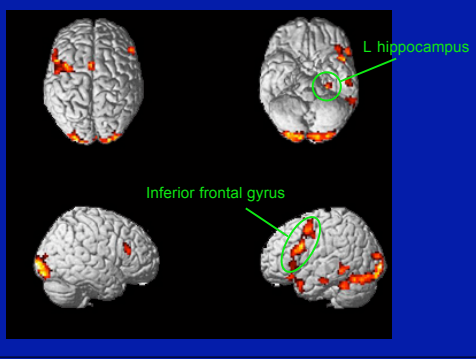


Behavioral results

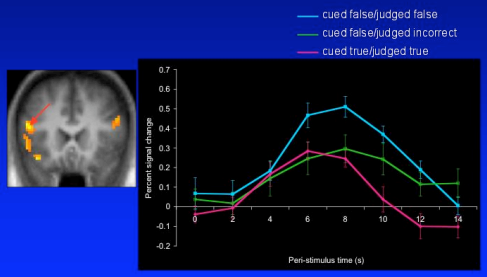
Proportion of cued-false & cued-true items judged correctly



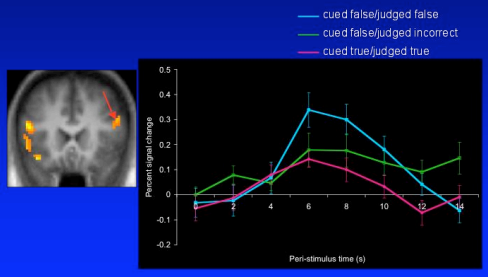
Encoding > fixation



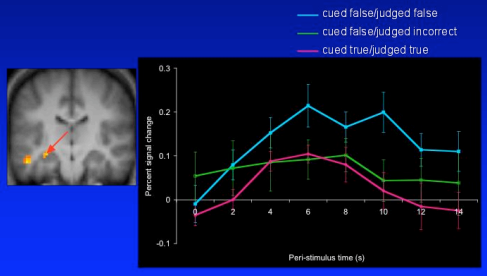
Left inferior frontal gyrus



Right inferior frontal gyrus



Left hippocampus



Collaborators

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