

## Imaging Familiarity: Predictions and Observations

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## Overview

### I. Familiarity and Priming

- Behavioral and Neuropsychological Data
- Neuroimaging Data

### II. Familiarity and Recollection

- fMRI Encoding Correlates
- fMRI Retrieval Correlates
- Independence or Redundancy?

## Familiarity and Priming?

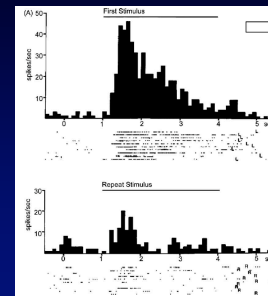
### F and Perceptual Priming

- Behaviorally dissociable:  
LoP, study-test perceptual similarity (e.g., Wagner et al., 1998a)
- Neurally dissociable:  
patient E.P. (e.g., Hamann & Squire, 1997)  
patient M.S. (e.g., Gabrieli et al., 1995; Wagner et al., 1998b)

### F and Conceptual Priming?

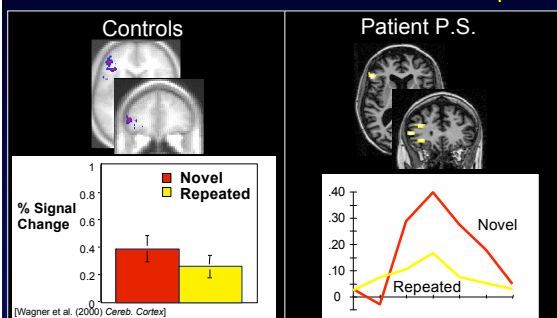
- Behavioral data: no dissociative evidence
- Neurobiological data:  
patient M.S. — conceptual priming and F intact  
patient X.X. — conceptual priming impaired & F intact?

## Repetition Suppression & Item Familiarity



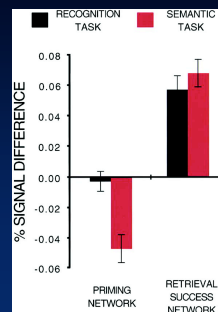
[Brown & Xiang (1998), *Progress in Neurobiology*]

## Imaging Conceptual Priming: BOLD Decreases in Left PFC and Lat. Temporal



[Wagner et al. (2000) *Cereb. Cortex*]

## Familiarity and Conceptual Priming: Overlap in Retrieval Responses?



Old – New Contrasts

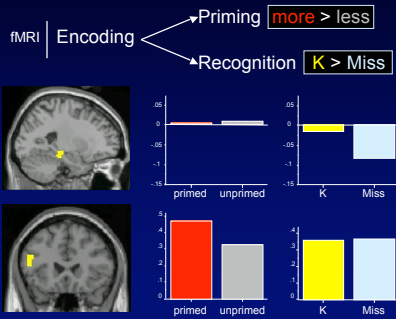
- Distinct networks at test
- Priming network: no old–new difference at recognition

Old – New at recognition did not distinguish btwn R & F

Single dissociation

[Donaldson et al. (2001), *Neuron*]

## Familiarity and Conceptual Priming: Overlapping or Distinct Encoding Correlates?

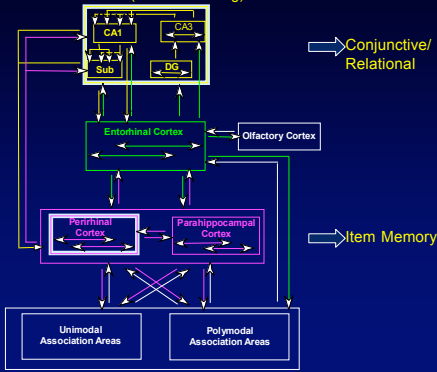


[Gonsalves & Wagner (in progress)]

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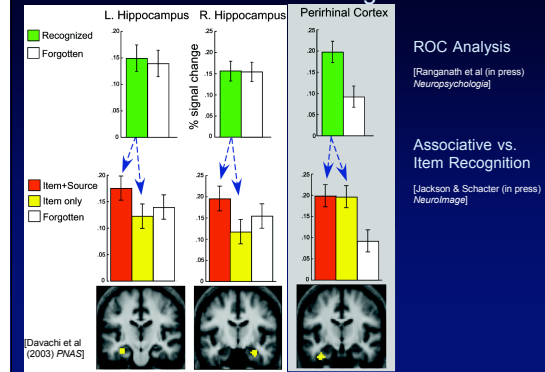
## MTL: Similar or Distinct Mechanisms? (one trial learning)



Conjunctive/Relational

Item Memory

## Dissociable MTL Encoding Activations



ROC Analysis

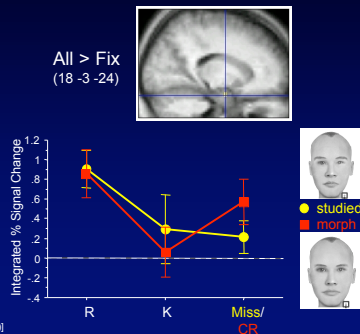
[Ranganath et al (in press) *Neuropsychologia*]

Associative vs. Item Recognition

[Jackson & Schacter (in press) *NeuroImage*]

[Davachi et al (2003) *PNAS*]

## Hippocampal Encoding Activation: Predicts Remembering, but not Knowing

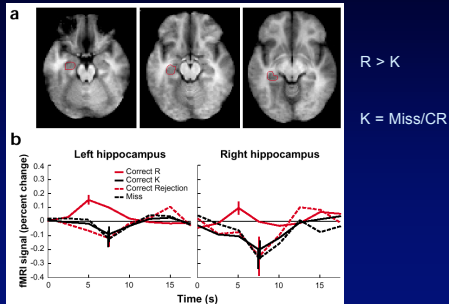


[Gonsalves et al. (in prep)]

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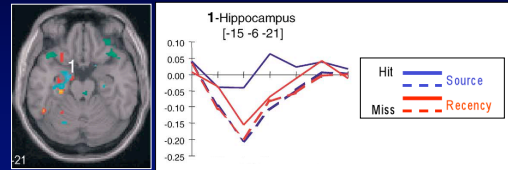
### Hippocampal Retrieval Activation: Insensitive to Familiarity?



[Eldridge et al. (2000) *Nature Neurosci*]

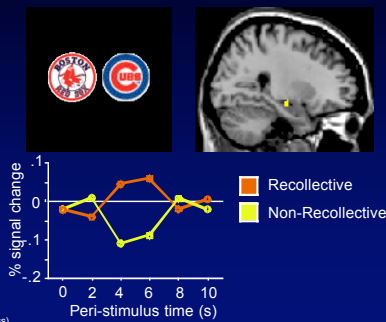
### Hippocampus Retrieval Activation: Source Recollection, Not Relative Recency

Source > Recency  
Source Hit > Miss



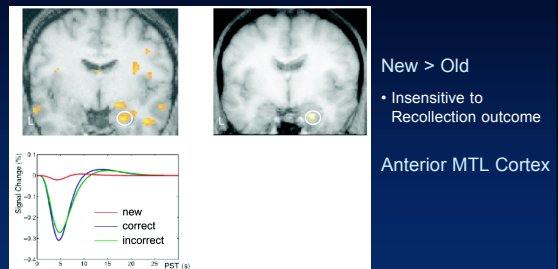
[Dobbins et al. (2003) *Neuropsychologia*]

### Hippocampal Retrieval Activation: Visual Associative Recognition



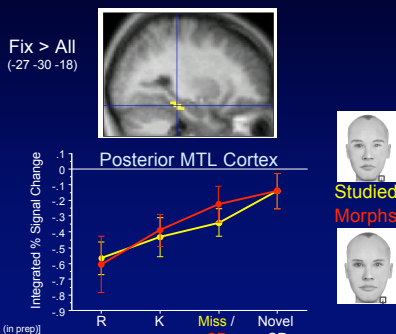
[Bunge et al. (in press) *Brain & Cognition*]

### MTL Cortex Retrieval Activation: A Familiarity Signal?



[Henson et al. (2003) *Hippocampus*]

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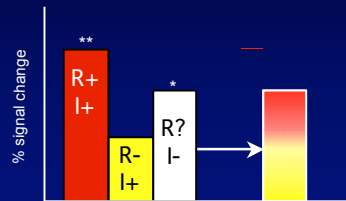
[Gonsalves et al. (in prep)]

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## Independence or Redundancy?

	Item	Recollection
Item and Source	✓	✓
Item only	✓	X
Miss	X	?



[Davachi et al (2003) PNAS]

## Conclusions

### Familiarity and Priming

- Perceptual priming ≠ Familiarity
- Conceptual priming ≠ Familiarity
- Priming = Repetition suppression in lateral cortices?
- Familiarity = Repetition suppression in MTL cortices?

### Familiarity and Recollection

- Dissociable correlates at encoding: Hipp vs. ant. MTL C
  - but, posterior vs. anterior MTL cortex also dissociate
- Familiarity at test: reduced BOLD signal in MTL cortices?
  - similarity based?
  - encoding confounds?
- At least partial independence

## Collaborators



Stanford / MIT  
David Badre  
Dav Clark  
Lila Davachi  
Brian Gonsalves  
Itamar Kahn  
Gail O'Kane

Duke  
Ian Dobbins

UC Davis  
Silvia Bunge

Harvard  
Daniel Schacter  
Orville Jackson  
Jason Mitchell

Univ. of Colorado  
Tim Curran

Princeton  
Ken Norman

Washington Univ.  
Randy Buckner

## Distinct Neurobiological Mechanisms: Predicted Patterns of Encoding Activation

