

INTRODUCTION

refers to a facilitated response to visual information that occurs on the basis of prior experience or explicit recall of that experience.

Types of priming have been described with multiple including:

- Automatic completion, speeded perceptual identification and speeded lexical decision. (intact in amnesia)
- Deliberate associations. (alternately reported to be intact in amnesia) (Prieti et al. 1997) or impaired (Shimamura & Squire, 1989)

Range of priming research in healthy controls:

- Improved performance can be contaminated by explicit remembering.
- Priming may be able to identify types of neural processes that occur for different types of priming
- fMRI, priming is strongly associated with a reduction in evoked neural activity for previously seen stimuli (Shacter & Buckner, 1998), an effect linked to the physiological phenomenon of repetition suppression (Goswami & Martin, 1998).

Experiment 1, the neural correlates of priming during lexical decision were assessed after a study phase that was designed to link 2 words together by using a **deep encoding task**.

neural correlates of priming in this study **did not appear to affect repetition suppression** even though behavioral priming in RT was obtained.

Experiment 2, the effect of study type on priming was assessed.

GENERAL METHODS

Words or pronounceable pseudo-words of five letters in length were initially studied outside the scanner. A lexical decision test was administered to participants while in the scanner. Stimuli were presented for 1000 ms ITI.

Procedure & Data Analysis

fMRI data were collected using a 3T Siemens Trio (35 3-mm slices, TE=25 ms).

Healthy volunteers were recruited from the NU community (Experiment 2, 3 were excluded due to missing EPI data).

Data were motion-corrected, smoothed (6mm FWHM), normalized to standard stereotaxic space and analyzed for consistent activity with a permutation analysis.

Significance thresholds were set via Monte Carlo analysis to verify a whole-brain positive rate of less than .05 clusters per study.

EXPERIMENT 1: Deep Encoding

Methods

Study type: Deep Encoding: Participants viewed word pairs and were instructed to create and type sentences containing the word or words.

Lexical Decision test trial types

All trials consisted of a pair of stimuli

- OLD** trials (24)= 1st and 2nd stimuli (words) same pairing as study.
- NEW** trials (24)= 1st and 2nd stimuli (words) not presented during study.
- RECOMBINED** trials (24)= 1st stimulus from the 1st word of a pair during study and a 2nd stimulus (word) that was presented during study alone.
- PSEUDO-WORD** trials (72)= contained two pseudo-words.
- MIXED** trials (144) = word not presented during study and a pseudo-word

Results

Faster RT to words seen during study

No evidence of word association

fMRI results

Area	Volume (mm ³)	Location (x,y,z)
L SPL	2812	30, 72, 45
R SPL	2000	-37, 67, 40
Post. Cing.	1641	3, 70, 34
Precuneus	1156	4, 60, 21

Both Old and Recombined trials evoked greater activity in 4 posterior regions than New words. There were no differences observed between Old and Recombined trials.

Recognition

Post-scanning, participants were instructed to identify sentences that they had created during study. Participants identified their sentences with 99%+ accuracy.

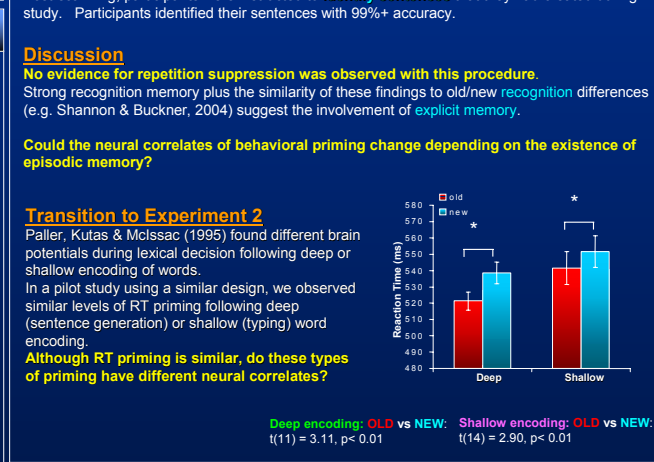
Discussion

No evidence for repetition suppression was observed with this procedure. Strong recognition memory plus the similarity of these findings to old/new recognition differences (e.g. Shannon & Buckner, 2004) suggest the involvement of explicit memory.

Could the neural correlates of behavioral priming change depending on the existence of episodic memory?

Transition to Experiment 2

Paller, Kutas, & McIssac (1995) found different brain potentials during lexical decision following deep or shallow encoding of words. In a pilot study using a similar design, we observed similar levels of RT priming following deep (sentence generation) or shallow (typing) word encoding. **Although RT priming is similar, do these types of priming have different neural correlates?**



EXPERIMENT 2: Shallow Encoding

Methods

Study type: Shallow Encoding: Participants retyped single words that appeared on a computer screen onto an adjacent screen.

Lexical Decision test trial types

- All trials consisted of a single stimulus
- STUDIED** trials (72) = word that was previously typed during study.
- UNSTUDIED** trials (72) = word not presented during study.
- PSEUDO-WORD** trials (144) = contained a pseudo-word

Results

Faster RT to words seen during study

fMRI Results

In an analysis with studied words included only if they were not confidently recognized later (response 1-4 only), two brain regions exhibited greater activity for UNSTUDIED than STUDIED words

LPFC, BA46 (-39, 24, 24)

ROI Analysis

Although there were no reliable High recognition > Low recognition (or High recognition > New) in a whole-brain analysis, we examined ROIs defined in Experiment 1 for High recognition > Low recognition

10 of 12 Ss exhibited overall greater activity to words that were well-recognized post-scanning (p < .02 by sign test) suggesting that the posterior region somewhat senses the level of explicit memory during decision.

