



# Source Memory in Older Adults: An Encoding or Retrieval Problem?

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presented by

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# Background

## Source Memory:

- The “where” and “when” of episodic memory
- Can include any contextual feature (not content)

Source memory is affected by aging more than fact or item memory (Brown, Jones, & Davis, 1995; Trott, Friedman, Ritter, Fabiani, & Snodgrass, 1999; 6 more studies)

Hypothesis: source memory relies on the integrity of the frontal lobes (Coffey et al, 1992; Raz, 2000)

- Patients with focal frontal lesions make more source memory errors than control (Janowsky, Shimamura & Squire, 1989)
- Amensics with FL lesions do poorly on source memory; those without perform normally (Simamura & Squire, 1987)
- Supported with ERPs and fMRIs

# Relation between FL and Source Memory?

## ☞ Contrary findings:

- Amnesic Korsakoff patients showed relation between FL atrophy and item, not source, memory (Kopelman, 1989)
- FL atrophy predicts fact recall, not source memory (Spencer & Raz, 1994)
- Source memory correlated with MTL functioning (Henkel et al, 1998)

☞ Boundary between contextual and content features ill-defined; much crossover

☞ Trade-off between item and source memory? (Naveh-Benjamin & Craik, 1996)

☞ Perhaps FL activation in source memory tasks product of the greater difficulty of the tasks – i.e. search strategies, decisions (Shallice, 1982; Moscovitch, 1994)

# Experiment 1: Methods

## Questions for this study:

- Processes in source memory, and FL involvement

## Experiment 1: older adults with high/low FL impairment, high/low MTL impairment

- 32 older adults from Glisky et al 1995, 8 from each group; 24 young adult undergrads
- No differences in age, education, scores on MMSE
- Two tests:
  - listened to 12-item list of voices, 3X, random order, then voices again with either same or other sentence; recognition memory test for voices (2AFC)
  - Same setup; recognition memory test for sentence that each voice spoke (also 2AFC)

# Experiment 1: Results

- ✓ 2X2 ANOVA: main effects of age and type of memory; no interaction
- ✓ Voices that spoke same sentence more likely to be recognized than different
  - Greater effect in younger than older ("same" condition)
  - No effect of neuropsychological group (item and source)

Figure removed due to copyright considerations.

Please see:

Glisky, E. L., S. R. Rubin, and P. S. Davidson. "Source memory in older adults: an encoding or retrieval problem?" *JEP: LMC* 27 (2001): 1131-1146.

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- ✓ No connection between difficulty and FL function
- ✓ Low FL group had difficulty with source recognition
  - Retrieval problem? Decision problem?
- ✓ Older adults showed smaller benefit of repeated context (9% compared with 20%)

# Experiment 2: Method

- ☞ 24 older adults, 6 from each neuropsychological group; 24 undergrads
- ☞ Chairs:
  - 32 chairs in two different locations: 16 used during study phase, 16 as distracters
  - 12 more chairs from the two locations
  - An additional 2 chairs at the beginning of each set for primacy/practice issues
- ☞ Two tests:
  - Item memory test
    - Shown chairs; judgment; 2AFC item recognition
  - Source memory test
    - The 12 chairs; judgment; 2AFC source recognition

# Experiment 2: Results

- 2X2 ANOVA showed main effects of age and type of memory, no interaction
- No same-different effects
- Near-effect of FL functioning on source memory; only group to perform significantly over chance
  - Low level of performance on source tasks may have caused floor effect
- No memory advantage for same condition, so not retrieval issue
  - Weak connection between object and location information?

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# Experiment 3

- Same as Experiment 2, but new subjects, and in test 2, subjects asked to judge how well each chair fit the room
- 2X2 ANOVA showed main effects of age and memory type, and an interaction
  - Older adults not impaired on source recognition
- Marginal same-difference effect ( $p = .10$ )
- Low FL group better than high FL at source memory
  - Encoding activated normally with high FL functioning, but in low FL only with instruction
  - Does not fit with retrieval hypothesis
    - Tradeoff between encoding and retrieval?

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# Experiment 4

- 32 older adults, 8 from each neuropsychological group; 24 undergraduates
- Same as experiment 1 (sentences with different voices), but with an orienting question (like experiment 3)
- 2X2 ANOVA: marginal effect of type of memory only significance
  - Older adults not impaired on source recognition
- Same-different effect for young and old
  - Enhanced for high FL group in item memory
- Replicates experiment 3: selective benefit of orienting for low FL group
- High FL group greater advantage for repetition of stimuli than low FL

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# Discussion

- ✓ Evidence for importance of FLs in encoding
  - Attentional issue? Integrative issue? (Schacter et al, 1994)
- ✓ Little support for importance of FLs in retrieval, but tentative
- ✓ No effects of MTL: 2AFC method instead of recall
- ✓ Performance on item and source memory tasks correlated for young, not old
  - Different method of attacking tasks?
- ✓ Experiment 2: why 12 chairs and not 16?
- ✓ Differences in education (experiment 3, 4), in MMSE (experiment 2); always lower vocab in young adults
- ✓ Still very broad issues, and general brain regions
- ✓ High FL group not impaired on source memory

# Experiment Tables: 6, 9

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# Experiment Tables: 12, 13

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