Associative Recognition in Amnesia:
Spared Performance is Related to Unitization and Familiarity Capacity

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Introduction

Previous studies have shown that associative recognition relies primarily on recollection whereas item recognition is supported by both recollection and familiarity. However, Amnesic patients with spared familairity sometimes perform normally on word-pair associative recognition (e.g., Mayes et al., 2004). These results suggest that familiarity may support associative recogniton in some circumstances.

Under what conditions might familiarity support associative recognition? We propose that one factor is the degree to which an association is processed holistically or *unitized* (e.g., Graf & Schacter, 1989). Specifically, familiarity may support the recognition of unitized associations, but recollection is necessary for recognition of non-unitized associations. Based on the unitization hypothesis, we made three predictions:

1. Amnesics with *specific recollection defitits* should show a *unitization effect* -- greater impairment for associative recognition of non-unitized word pairs relative to unitized pairs

2. Amnesics with *equal recollection and familiarity deficits* should show equal impairment for unitized and non-unitized pairs (no unitization effect)

3. Normals should show a unitization effect when they attempt to rely on *familiarity only*.

Participants

3 Hypoxic patients (R.M., G.H., E.R)
  -survivors of sudden cardiac arrest
  -specific recollection deficits
  (Yonelinas et al., 2002)

2 Left Temoral Lobectomy patients (D.S., M.G.)
  -equal recollection and familiarity deficits
  (Yonelinas et al., 2002)

7 Age- and education-matched controls

36 UC-Davis undergraduates (Experiment 1)

64 Princeton Univeristy Students (Experiment 2)

Lobectomy Lesion Sites

D.S.

M.G.

Demographics and Test Scores

	Sex	Age	Ed.	Etiology	IQ	WMS Att	WMS Gen	Doors & People %
R.M.	F	46	13	hypoxia	100	96	87	1
G.H.	M	49	16	hypoxia	110	100	77	<1
R.E.	M	78	18	hypoxia	119	125	77	9
D.S.	M	49	16	L. Lobect.	121	115	88	7
M.G.	M	29	16	L. Lobect.	95	83	NA	1

Method

2 study-test sessions on different days; 48 pairs in each session (24 old, 24 new)
Study A-B, C-D, E-F, G-H; Test A-B, C-D, E-H, G-F

1. Non-unitized encoding – items treated as *separate lexical units* in a sentence

Rate 1-4 how well each of the words fits into the sentence

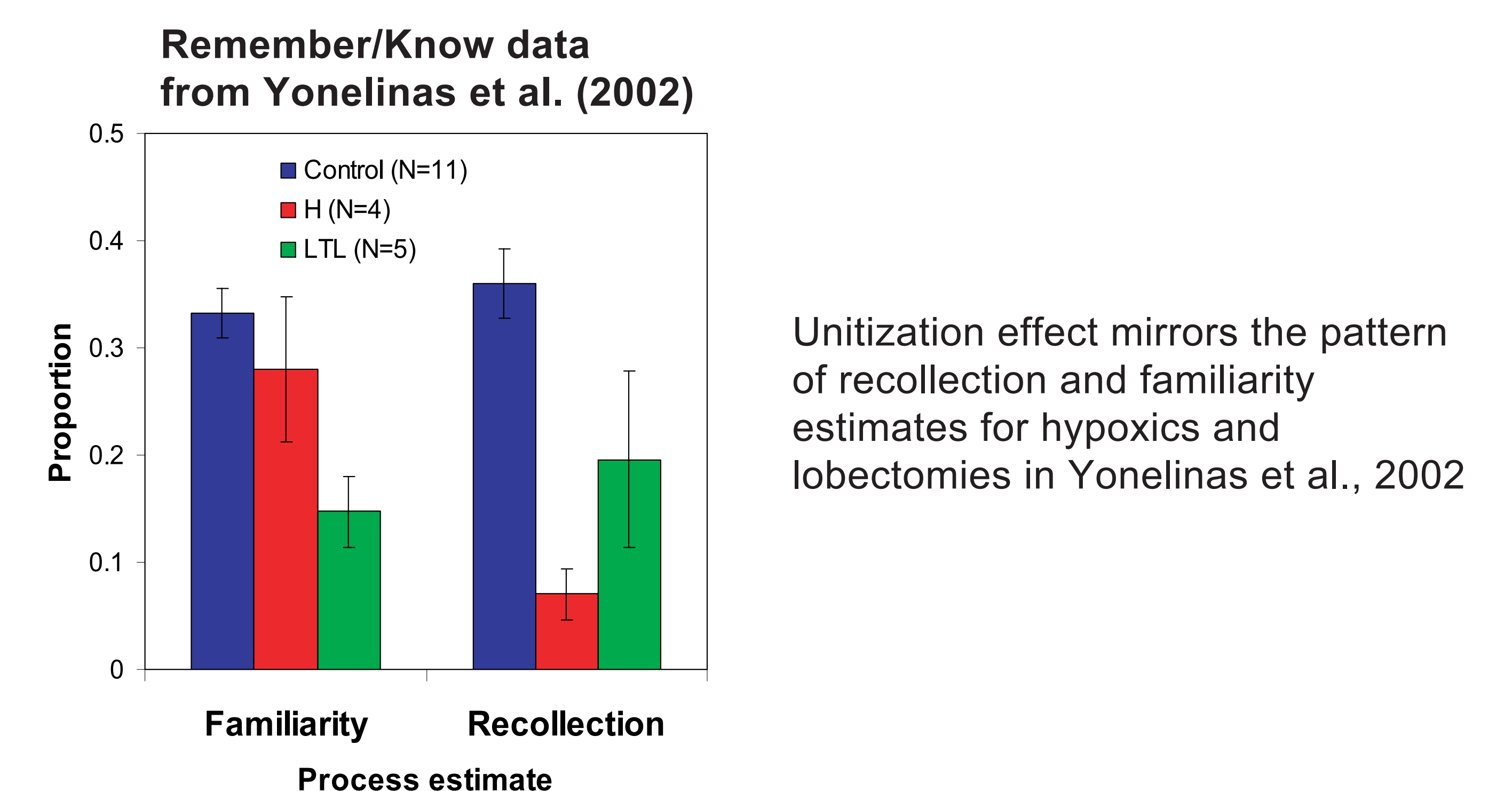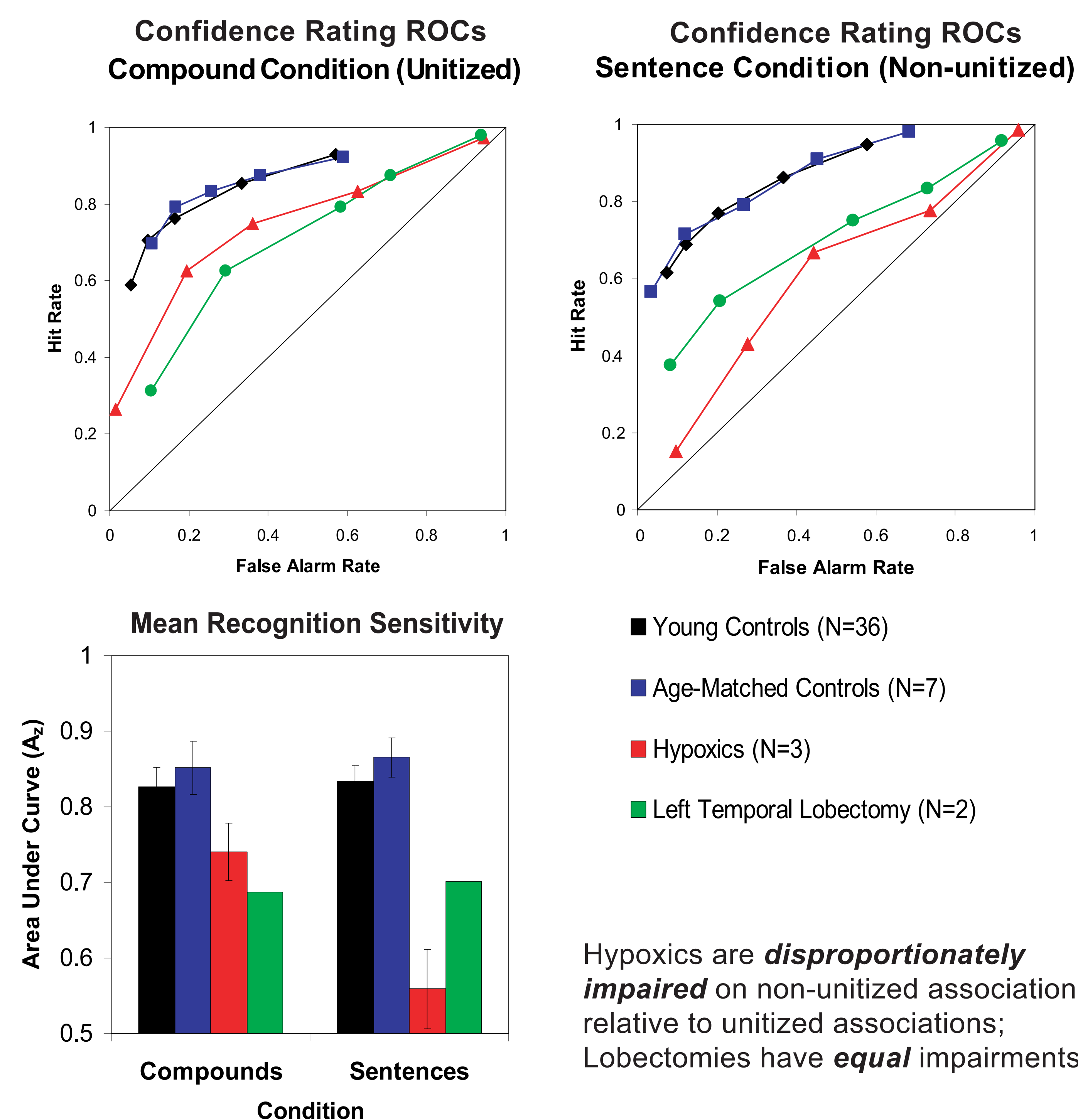CLOUD   LAWN

The _____ could be seen from the _____.

2. Unitized encoding – items were treated as a unitary *compound*:

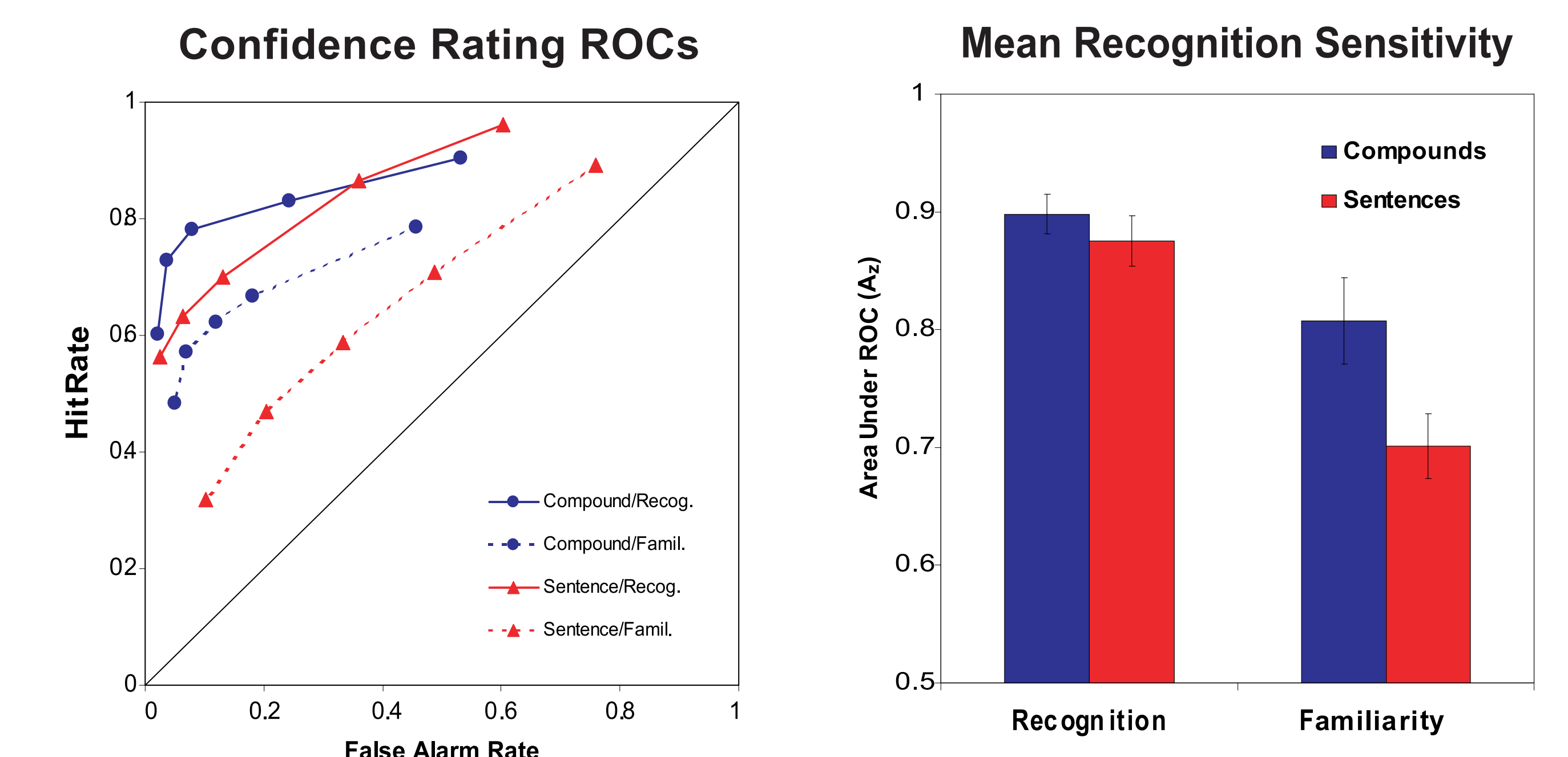Rate 1-4 how well the definition makes a compound out of the two words

CLOUD   LAWN

A yard used for sky-gazing.

Experiment 1:
Amnesic Patients vs. Controls

Confidence Rating ROCs
Compound Condition (Unitized)

Confidence Rating ROCs
Sentence Condition (Non-unitized)

Mean Recognition Sensitivity

- ■ Young Controls (N=36)
- ■ Age-Matched Controls (N=7)
- ■ Hypoxics (N=3)
- ■ Left Temporal Lobectomy (N=2)

Hypoxics are **disproportionately impaired** on non-unitized associations relative to unitized associations; Lobectomies have **equal** impairments.

Remember/Know data from Yonelinas et al. (2002)

Unitization effect mirrors the pattern of recollection and familiarity estimates for hypoxics and lobectomies in Yonelinas et al., 2002

Experiment 2:
Standard recognition instructions vs. "familiarity-only" instructions

Confidence Rating ROCs

- Compound/Recog.
- Compound/Famil.
- Sentence/Recog.
- Sentence/Famil.

Mean Recognition Sensitivity

- ■ Compounds
- ■ Sentences

Normals show a unitization effect --a greater drop for non-unitized associations-- when instructed to *ignore recollection* and judge *familiarity alone*

Comparison of all groups

- ■ Compounds
- ■ Sentences
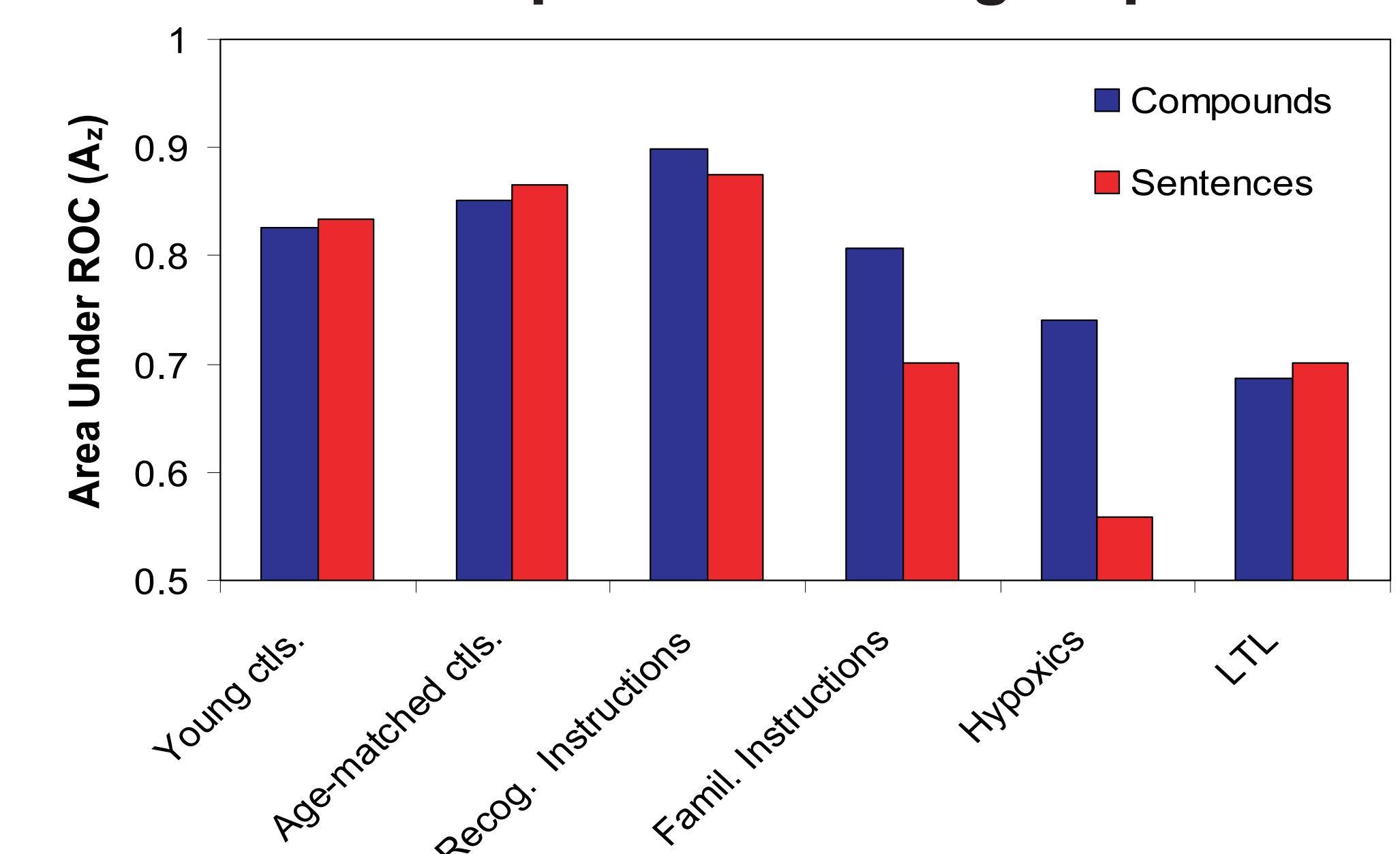
Across all groups, reliable unitization effects occur only for (1) amnesic patients with *specific recollection impairments,* and (2) normals attempting to use *familiarity only*

Discussion

Our data reveal a link between amnesic etiology, unitization, and the ability to use familiarity on an associative recognition task.

Hypoxics, who showed a *disproportionate deficit in recolleciton* in Yonelinas et al. (2002) also show a *unitization effect* in the present study.

Lobectomies, who showed *equal recollection and familiarity deficits* in Yonelinas et al. (2002) also show *equal associative recognition* for unitized and non-unitized pairings.

A unitization effect also appears for normals under instructions to ignore recollection and respond based on familiarity only.

References

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