# Exploring the Effects of Encoding and Semantic Network Properties on Memory for Related Items

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## Introduction

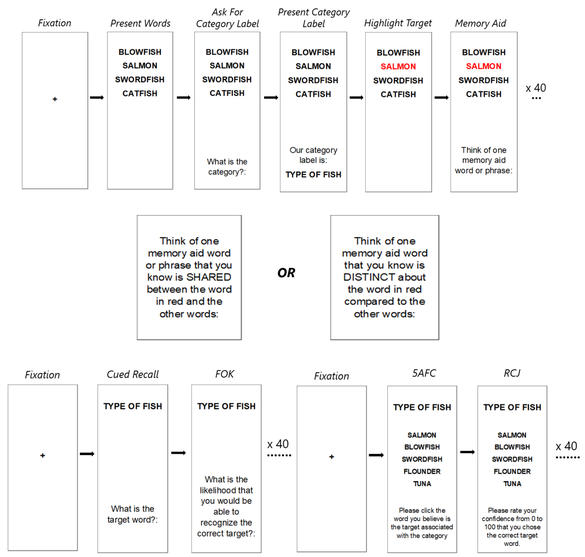
### Opposing Influences on Memory

- The literature is seemingly contradictory on the influence of relatedness in memory.
- On the one hand, shared information between associates can facilitate retrieval (e.g., Graf & Schacter, 1989).
- On the other, shared information can disrupt retrieval (e.g., Roediger & McDermott, 1995).
- A dual-representation account (Nelson & McEvoy, 2002) can help us elucidate this issue. Specifically, *implicit* word representations facilitate memory errors while *explicit* representations attenuate such errors.
- An example of an implicit representation would be an item's **typicality** in a given category.

### Semantic Associative Networks

- Examining small-world networks of words can help us understand the lexicon (Vitevitch & Castro, 2015).
- The network characteristics of words, such as **degree** (# of connections) and **clustering** (# of shared neighbors) can also help us understand implicit influences on memory.
- Here, we examine the opposing influences of these word network characteristics (*implicit*) and distinctiveness encoding (*explicit*) on memory.

## Experimental Task




## Participants

- English-speaking young adult (N = 86) volunteers from GT and KSU Psychology participant pools.
- Participants randomly assigned to one of two encoding conditions (Shared or Distinctive encoding).
- 7-day delay to bring memory performance off of ceiling.

## Materials

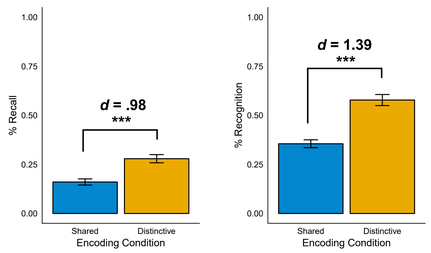
- 40 sets of categorically-related items taken from Van Overschelde et al. (2003) norms.
- Exemplar typicalities were taken from Van Overschelde et al. norms while network characteristics were derived from the Small World of Words Project (De Deyne et al., 2012).

## Results

### Memory Performance + Errors

(a) Overall recall performance.

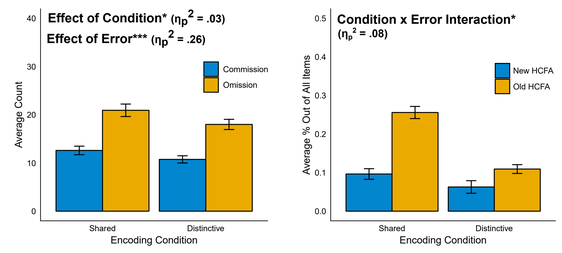
(b) Overall 5AFC performance.




- Generating memory aids that emphasize distinctive features at encoding helps memory performance at recall and recognition tests.

(c) Commission and omission error counts.

(d) High-confidence false alarm rates.

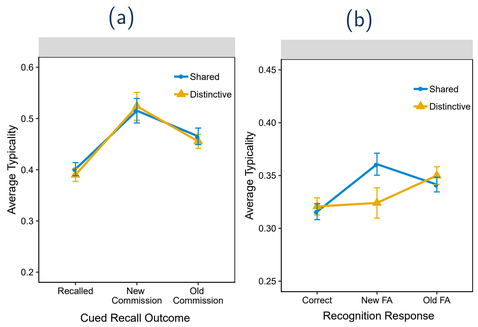



- Distinctiveness encoding helps reduce overall errors during cued recall and high-confidence false alarms during 5AFC. (HCFAs = incorrect recognition w/ CJ $\geq$ average CJ.)

### Item Typicalities

(a)

(b)

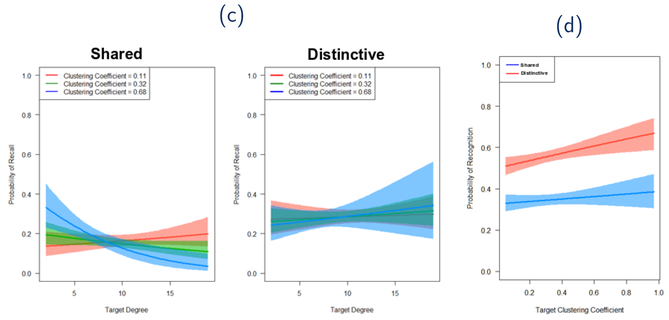



- Average typicalities for responses given during recall (a) and recognition (b) by error type.
- Participants are likely to be drawn to an unseen, but highly typical, alternative ("New Commission" and "New False Alarm"), although distinctiveness encoding helps mitigate this during 5AFC.

### Word Network Properties

(c)

(d)




- Simple slopes for a multilevel model with target degree and clustering.
- Decreases in recall probabilities across degree with respect to higher clustering coefficients is repaired in the distinctive encoding condition (c).
- Overall recognition probabilities are higher in the Distinctive condition, but both conditions show similar slopes across clustering coefficients (d). Shaded areas represent the 95% confidence bands on the slope estimates.

## Summary

### Extrinsic Influences on Memory

- Extrinsic factors (i.e. distinctiveness encoding) helped enhance overall recall and recognition performance.
- Our encoding manipulation also helped reduce memory errors, even in the face of items that are highly typical of a category (*typicality*), has many associated neighbors (*degree*), or are part of a dense network (*clustering*).

### Intrinsic Influences on Memory

- Highly-typical competitors were likely to be falsely remembered at cued recall.
- Distinctiveness encoding enhanced output monitoring during 5AFC, where individuals in the Shared Condition were more likely to consider foils of weaker typicalities.
- When focusing on shared features during encoding, items in tight semantic networks are unlikely to be recalled.

### Overall

- This task highlights the opposing influences of intrinsic & extrinsic word properties (Nelson and McEvoy, 2002).
- Distinctiveness processing at encoding helps counter the effects of typicality and semantic network properties at retrieval in a memory task with categorically-related items.

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