Words are less salient in phrases: Evidence from frequency effects in recognition memory.

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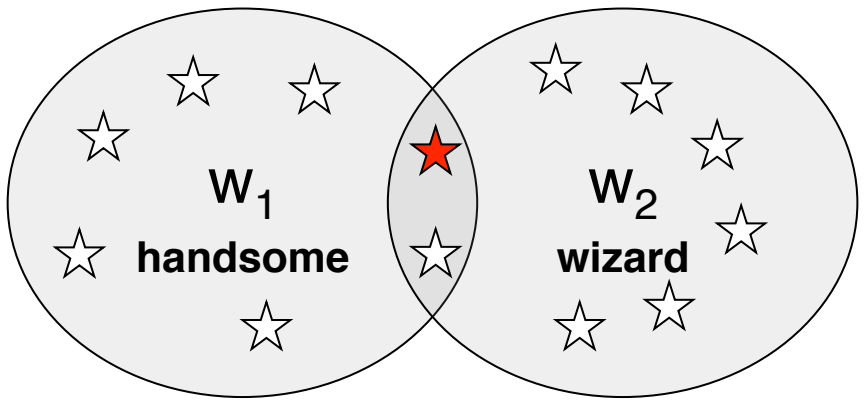
Introduction

- **High frequency words and phrases are easy** (e.g. Janssen & Barber, 2012).
- Paradoxically, **recognition memory is better for low frequency words** than high frequency words (Glanzer & Adams, 1985).
- Initial work suggests that **high frequency phrases are not better remembered**, but that low frequency words can make a phrase easier to identify (Jacobs et al., 2013).

How are phrases represented?

All words and phrases are associated with episodes (☆) and have a baseline activation

- Common words and phrases have more episodes (☆)



Encoding at study

- Calculate meaning of w_1w_2 (e.g. *handsome wizard*)
  - Meaning of w_1w_2 is often compositional
- Add the experimental episode (★) for w_1 and w_2 at their intersection

Recognition at test

- Calculate meaning of w_1w_2 again
- Find the experimental episode (★) for a phrase
  - Accessible from either the words or the phrase
  - Ignore **interfering** w_1, w_2 episodes and w_1w_2 episodes ☆
  - Phrases containing low frequency (**LF**) words have fewer ☆ that interfere with finding ★ (Reder et al., 2000)

Predictions

When phrases but not words vary in frequency – Experiments 1 & 2

1. Memory should be better for low frequency phrases
2. Memory depends more on word frequencies if phrases are presented word by word

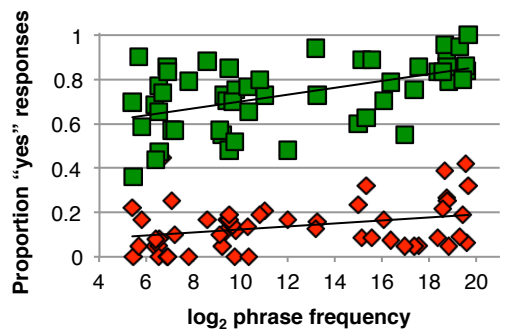
When nouns but not adjectives or phrases vary – Experiments 3-5

1. Low frequency nouns help phrase recognition
2. The low frequency advantage will be continuous with word frequency

Are people more accurate (more hits/fewer false alarms) in their memory for LF phrases?

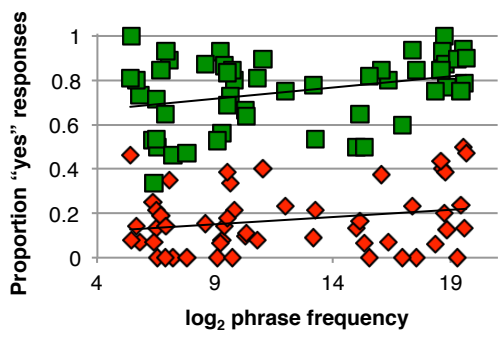
No! Just a bias to say 'no'.

Exp. 1: alcoholic beverages ≈ flaming bounds



No! (even when presented word-by-word)

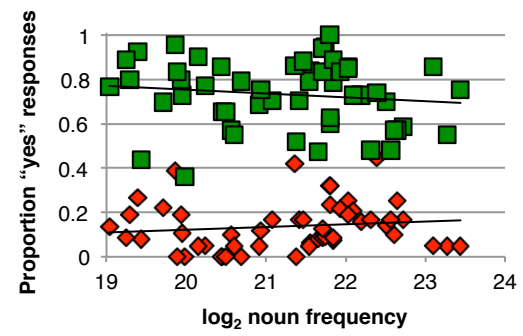
Exp. 2: alcoholic beverages ≈ flaming bounds



Are people more accurate (more hits/fewer false alarms) for phrases with LF nouns?

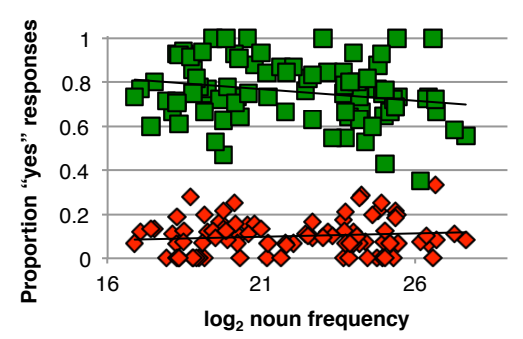
Yes!

Exp. 1: myocardial infarction > alcoholic beverages



Yes!

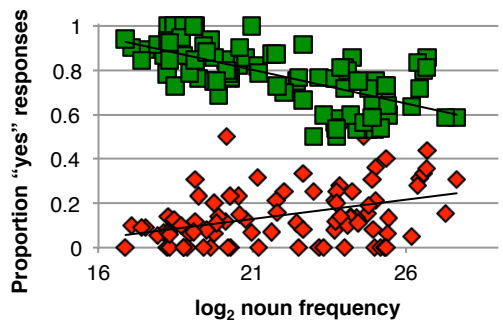
Exp. 3
handsome wizard > premature tree



Are people more accurate (more hits/fewer false alarms) in their memory for LF nouns?

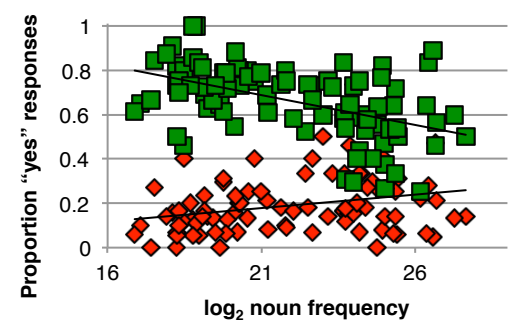
Yes!

Exp. 4 – Study word, test word:
wizard >> tree



Yes! (but slightly less)

Exp. 5 – Study phrase, test word:
wizard > tree



Conclusions

- People do represent differences in phrase frequency
- People use word frequency to judge phrase memory
- Phrases are stored somewhat compositionally
- Word frequency is less important when words occur in phrases

References

[1] Glanzer, M., & Adams, J. K. (1990). The mirror effect in recognition memory: data and theory. *JEP: LMC*, *16*, 5-16. **[2] Jacobs, C.L., Dell, G. S., Benjamin, A. S., Bannard, C. (2013).** Phrases don't behave like words: Phrase frequency effects in recognition memory. Poster presented at the annual meeting of the Psychonomic Society. Toronto, Ontario, Canada.**[3] Janssen, N., & Barber, H. A. (2012)**. Phrase frequency effects in language production. *PloS one*, *7*, e33202. **[4] Reder, L. M., Nhouyvanisvong, A., Schunn, C. D., Ayers, M. S., Angstadt, P., & Hiraki, K. (2000).** A mechanistic account of the mirror effect for word frequency: A computational model of remember–know judgments in a continuous recognition paradigm. *JEP:LMC*, *26*, 294-320.

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