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Order recall in verbal short-term memory is influenced by semantic activation

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Abstract

It has recently been suggested that order recall in short-term memory tasks is influenced by the level of activation of items in the lexico-semantic network. According to the Activated Network view, increasing the level of activation of an item would increase the probability of observing a migration of the item toward the beginning of the list (Poirier et al., 2015). We tested this prediction by manipulating the orthographic neighbourhood of to-be-recalled items. In Experiment 1, the first three items of a 7-item list were orthographic neighbours of the target item in Position 5. As predicted, at recall, the target item migrated more toward the beginning of the list than control items. In Experiment 2, all list items were orthographic neighbours of the target item located on Position 4, 5, or 6. Compared to control items, the target item migrated more toward the beginning than the end of the list.

Method

Experiment 1

- 34 participants.
- 36 trials.
  - 18 experimental trials.
  - 18 control trials.
  - List type was randomized.
- Target word in position 5 or 6.
- Visual presentation and Oral recall.

Experiment 2

- 36 participants.
  - 18 in the silent condition.
  - 18 in the articulatory suppression condition.
- 42 trials.
- List type was randomized.
- Target word in position 4, 5, or 6.
- All words are an orthographic neighbour of the target word.

Experimental List						
paix	main	paon	saut	pain	chair	thé
Control List						
lune	luxe	auge	flore	dure	anse	chêne

Experimental List						
rite	rime	rise	ride	rive	rire	rêve
Control List						
mine	bulle	page	morte	rive	plain	raie

Introduction

- It is beyond dispute that lexical and semantic factors influence performance in short-term ordered recall tasks.
- According to psycholinguistic and long-term network models, those effects occurred because semantic, lexical, and sublexical networks involved in language processing are also involved in short-term memory tasks (e.g., Cowan & Chen, 2009; Gupta, 2003; Majerus, 2009; R. C. Martin, 2006).
- We recently proposed a framework accounting for the effect of lexico-semantic factors on order recall called ANet for the Activated Network view (Poirier et al., 2015).

ANet [Activated Network view]

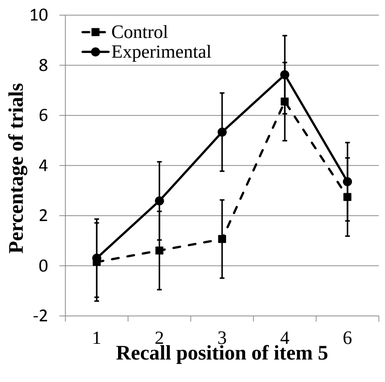
1. Encoding processes generates a **primacy gradient**.
2. The primacy gradient is represented within activation levels in a semantic network.
3. The activations represented within the primacy gradient are fed forward to a **competitive cueing** mechanism; there, items compete for selection based on their activation levels.
4. The most activated item is usually selected.

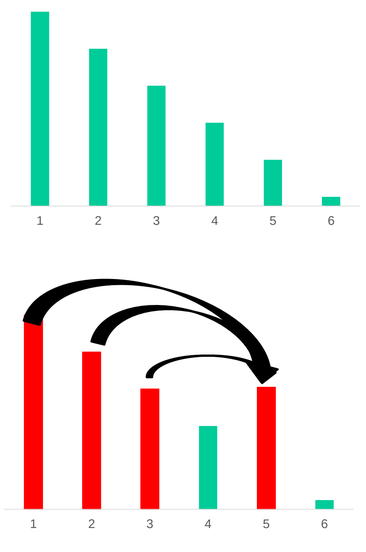
Predictions

If we increase the level of activation of a target item, this item would be more likely to be selected earlier and to be produced as a response earlier in the list.

- The model was successfully tested by Poirier et al. (2015).

Experimental List					
Officer	Badge	Siren	Fence	Police	Tractor
Control List					
Officer	Badge	Siren	Music	Tourist	Yellow

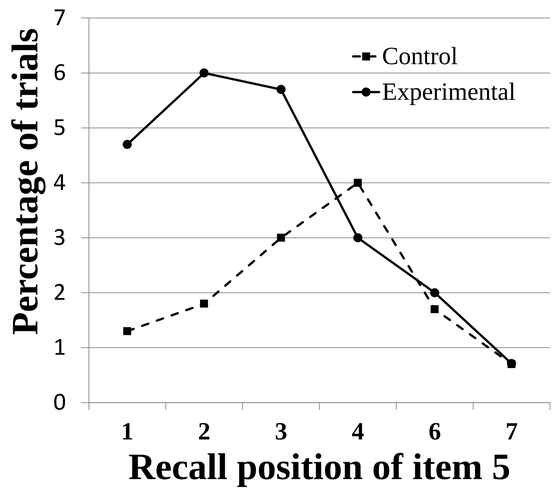


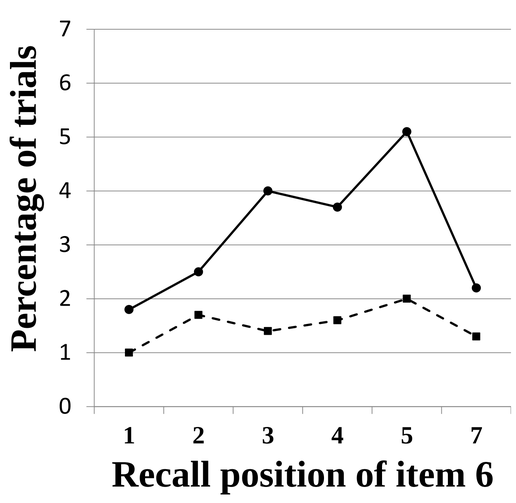


- The aim of the current study is to extend the findings to a lexical factor: Orthographic neighbours. In Experiment 1, we used the design of Poirier et al., and in Experiment 2, all words were neighbours of the target item.

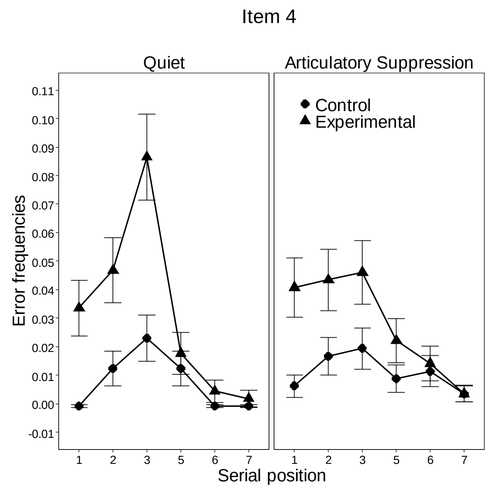
Results

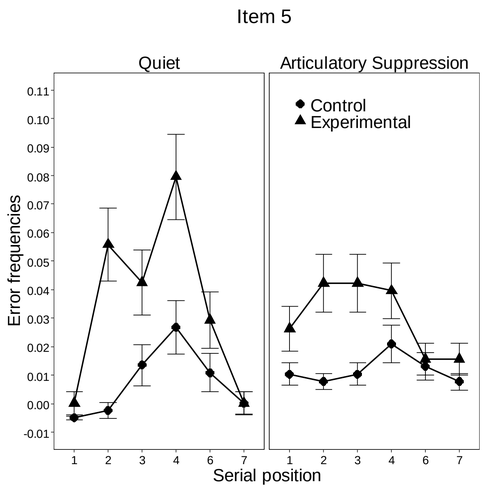
Experiment 1

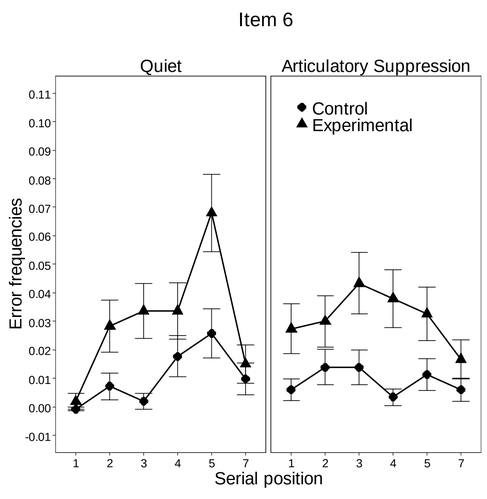




Experiment 2







Discussion

- Current results extend previous findings found with semantic similarity (Poirier et al., 2015) to a lexical factor: orthographic neighbourhood.
- ANet offers a straightforward explanation of the results.
- Current results also support psycholinguistics models of immediate memory by showing that immediate serial recall relies on available language processing systems, including activation between phonological, sublexical, lexical, and semantic networks.

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