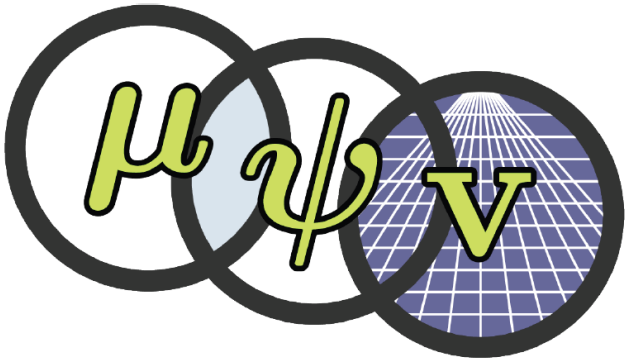

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A working memory model integrating meaning

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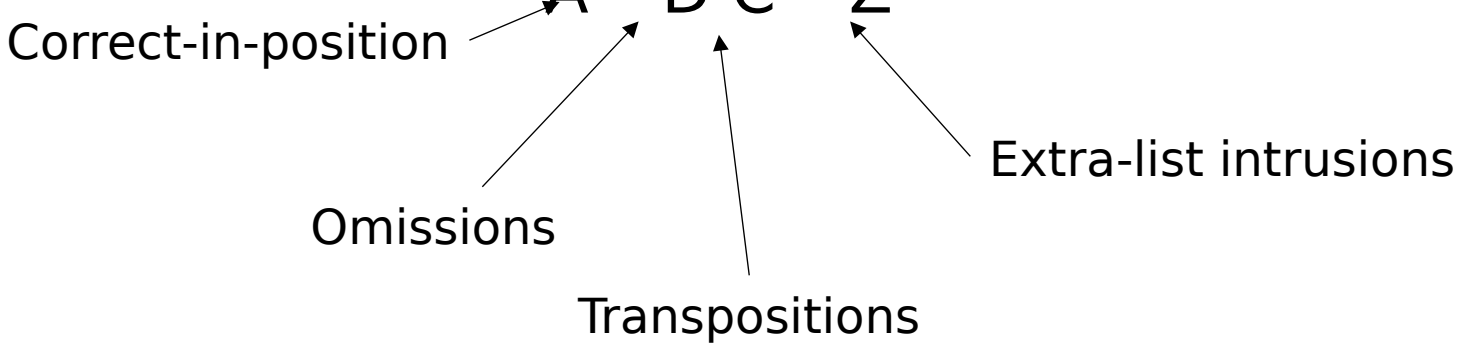
Serial recall

Encoding:

A B C D E F

Retrieval:

A * D C * Z



Serial recall

Encoding:

A B C D E F

Retrieval:

A * D C * Z

Item memory	Order memory
3/6 = 0.5	1/3 = 0.333

Nairne (2004)
Henson (2003)
Majerus (2013, 2019)

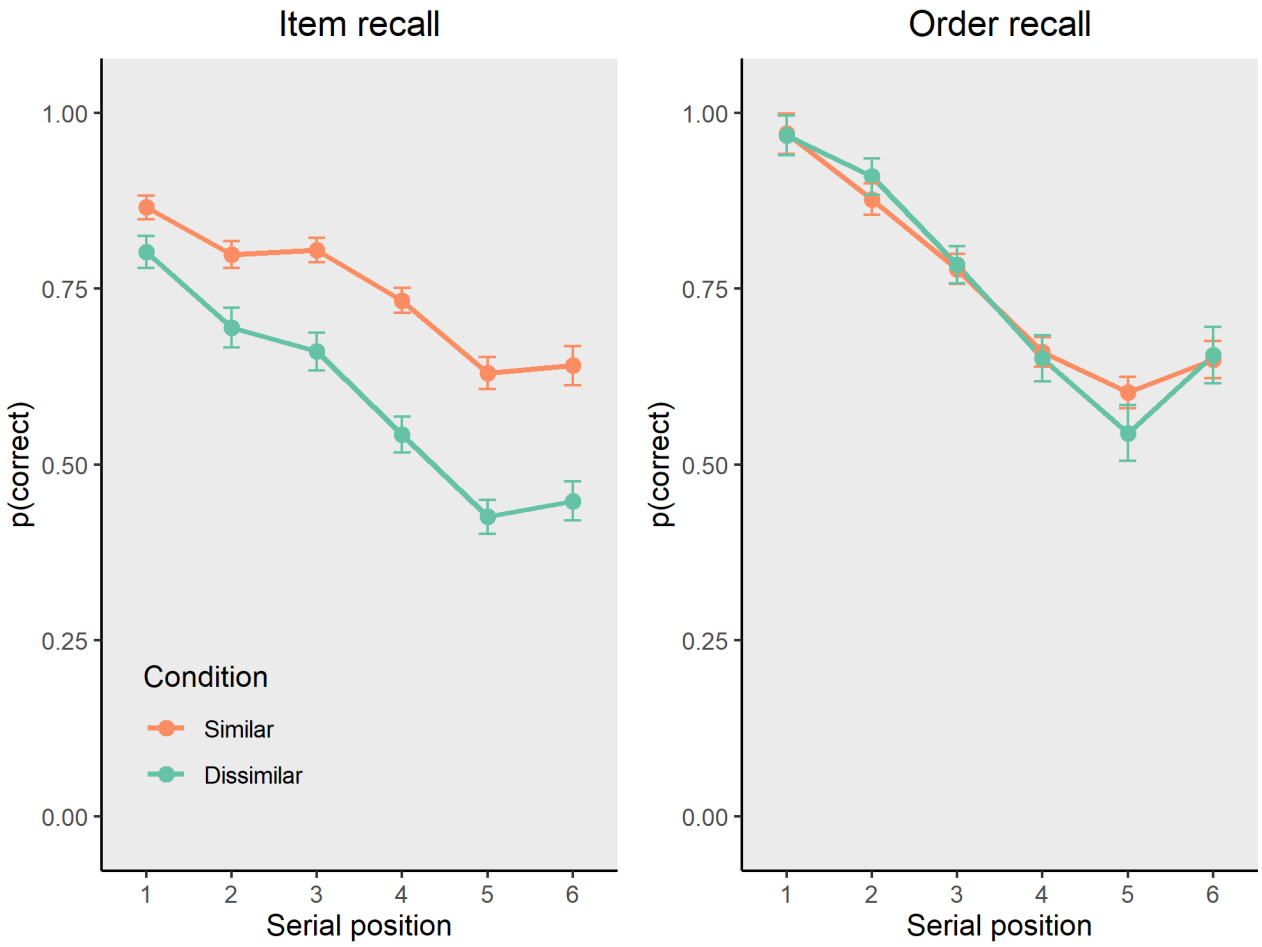
Semantic similarity

Mars, Pluto, Earth, Venus, Saturn, Jupiter

tree, guitar, puma, laptop, banana, glove

oirier & Saint-Aubin (1995) *QJEP*

Introduction



Introduction

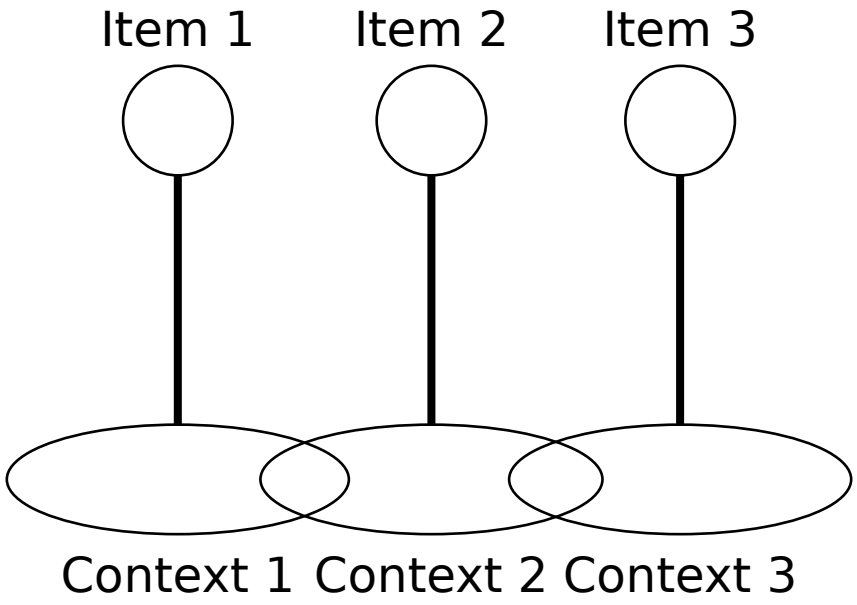
Implications: Working memory interacts with semantic knowledge.

Question: What is the nature of these interactions?

Introduction

How do we encode something into WM?

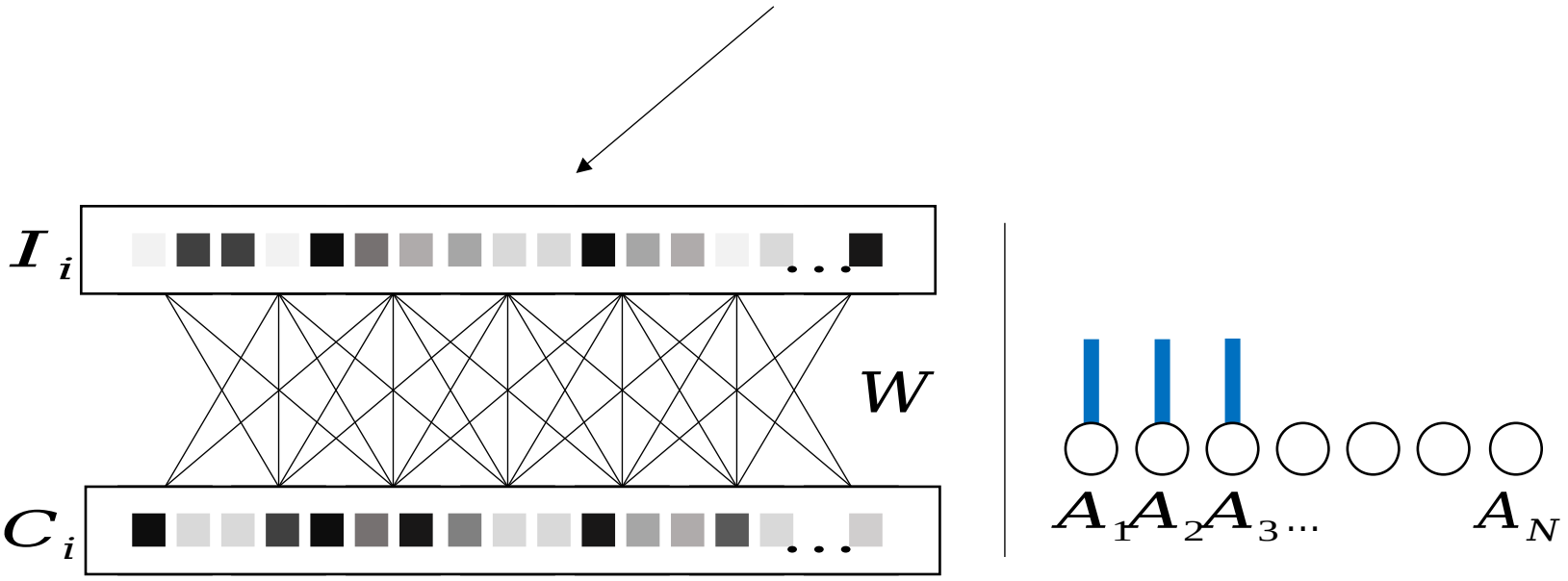
Architecture



Burgess & Hitch (1999) *Psych Review*
Farrell & Lewandowsky (2004) *JML*
Oberauer et al. (2012) *PB&R*
Henson (1998) *Cog Psych*

Connectionist architecture

Phonological and/or **orthographic** representations

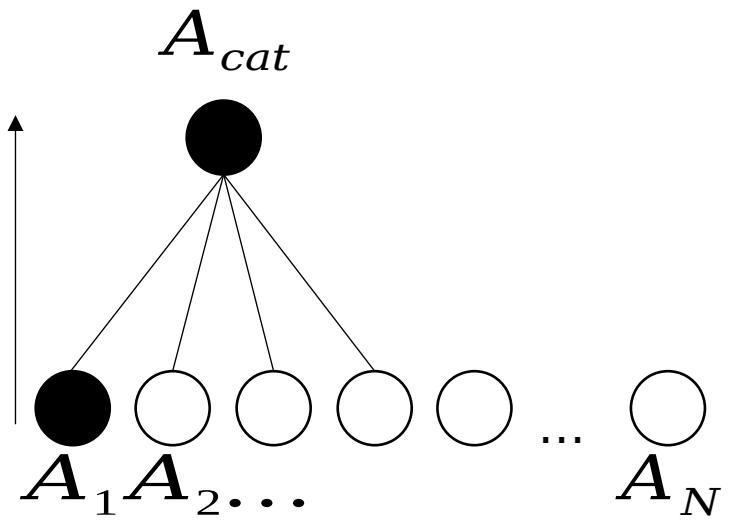


Working memory

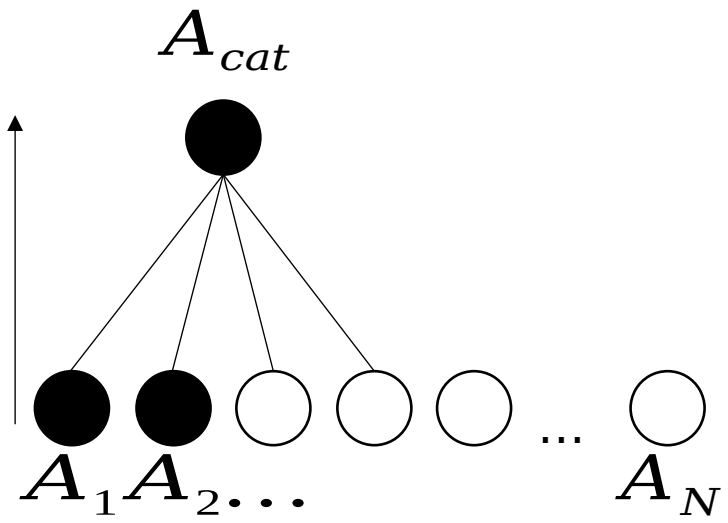
Lexico-semantic layer

Connectionist architecture

Encoding step 1

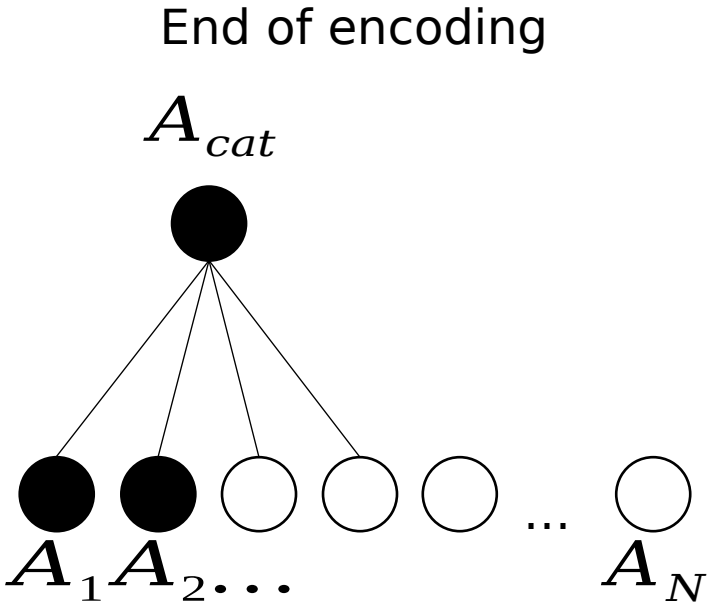


Encoding step 2



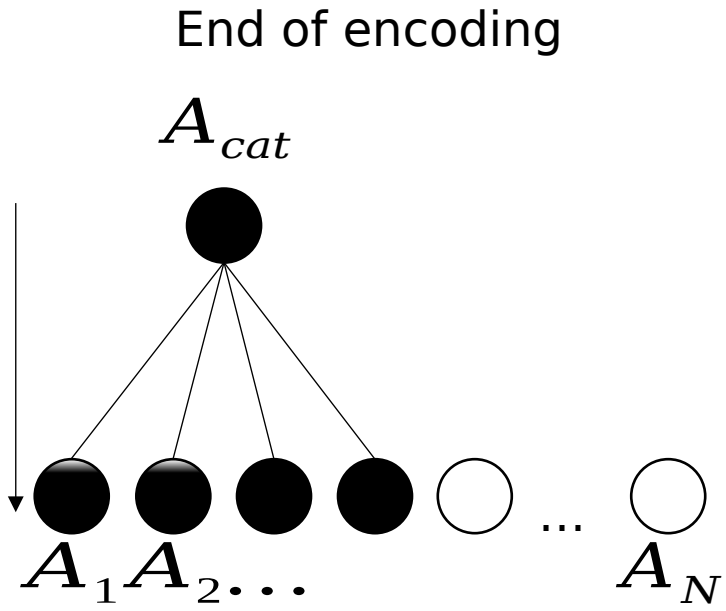
ollin & Loftus (1975) *Psych Review*
ell et al. (1997) *Psych Review*

Connectionist architecture



ollin & Loftus (1975) *Psych Review*
ell et al. (1997) *Psych Review*

Connectionist architecture



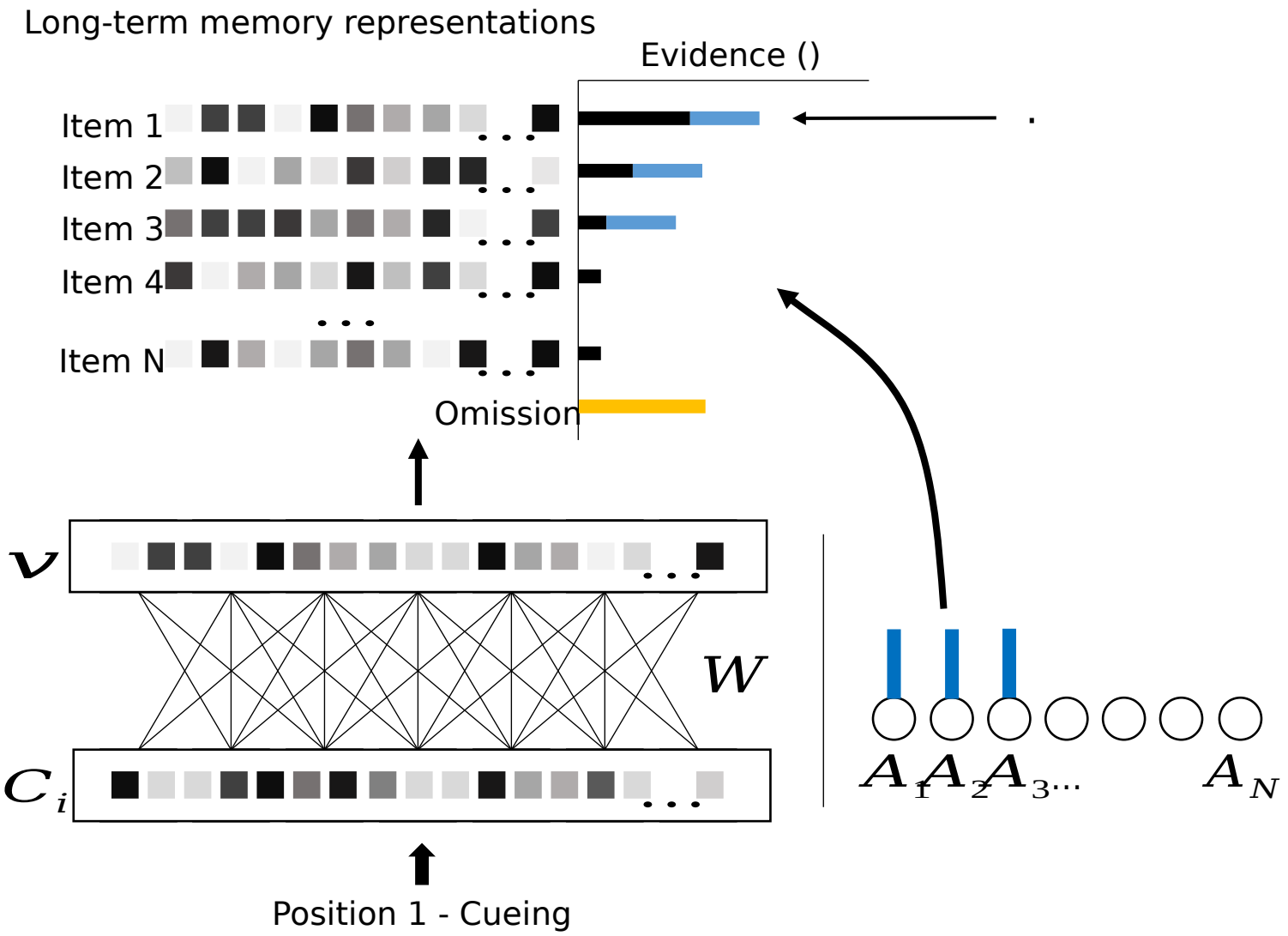
ollin & Loftus (1975) *Psych Review*
ell et al. (1997) *Psych Review*

Connectionist architecture

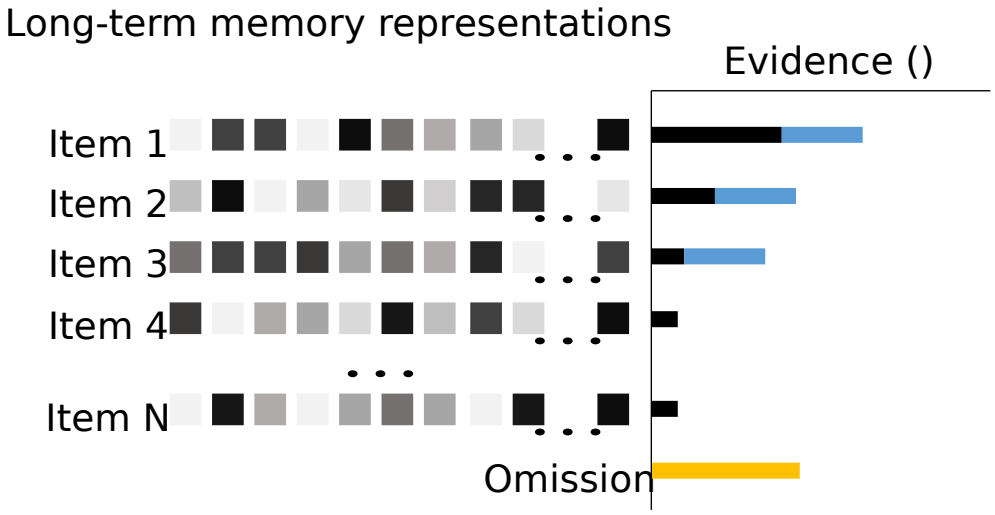
Consequence:

Semantically similar items receive stronger activation in the lexico-semantic layer than semantically dissimilar items do.

Connectionist architecture



Connectionist architecture

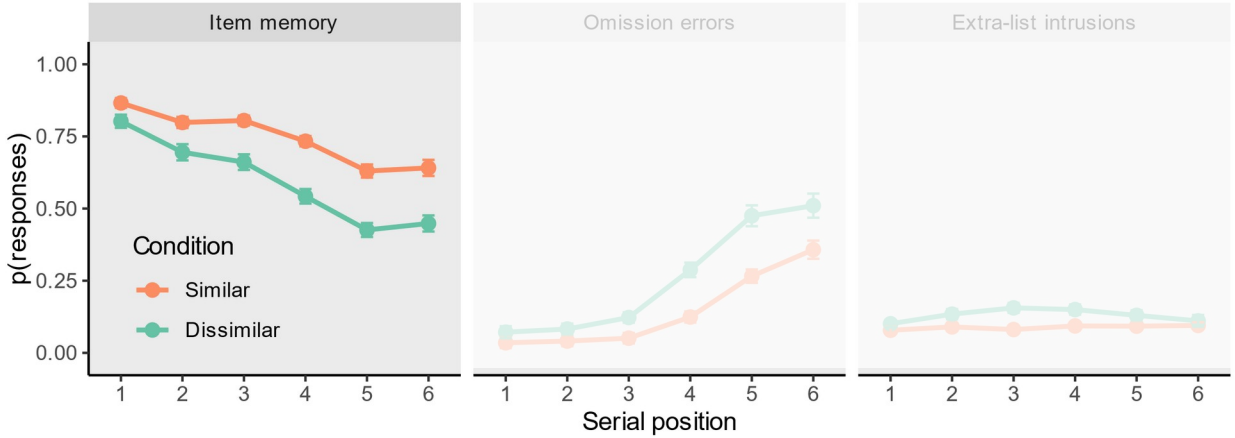


Luce’s choice rule (exponential version)

= Temperature (free parameter)

Results

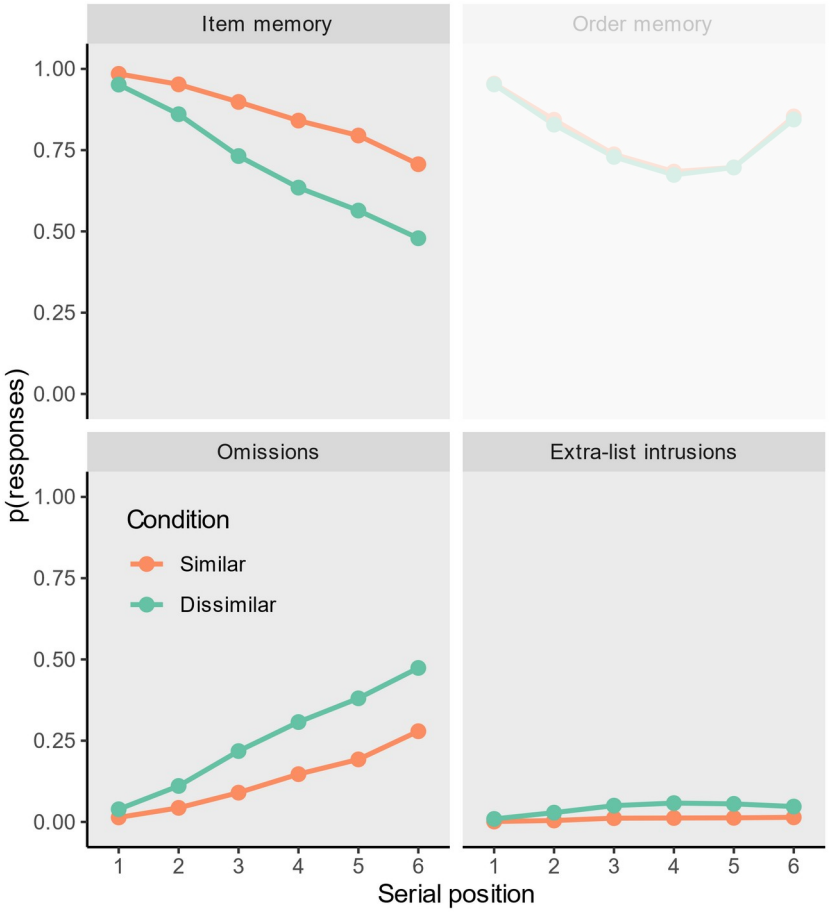
Empirical data



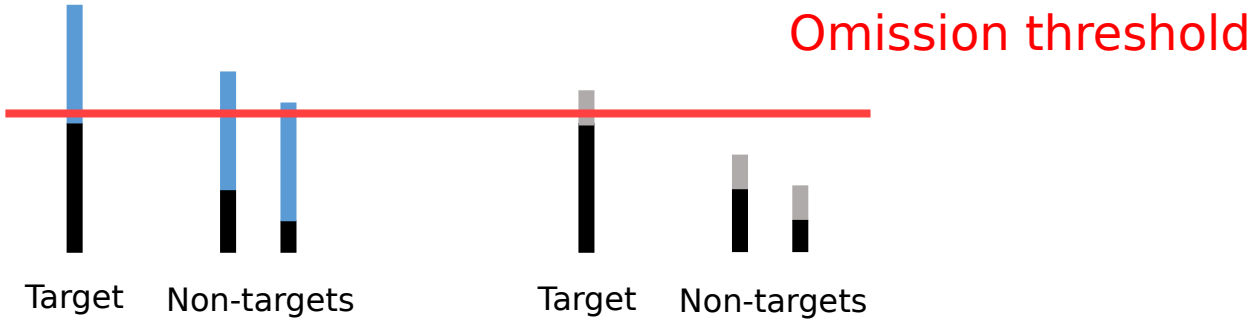
wialiewski, Krasnoff, Mizrak & Oberauer (*under review*)

Results

Model

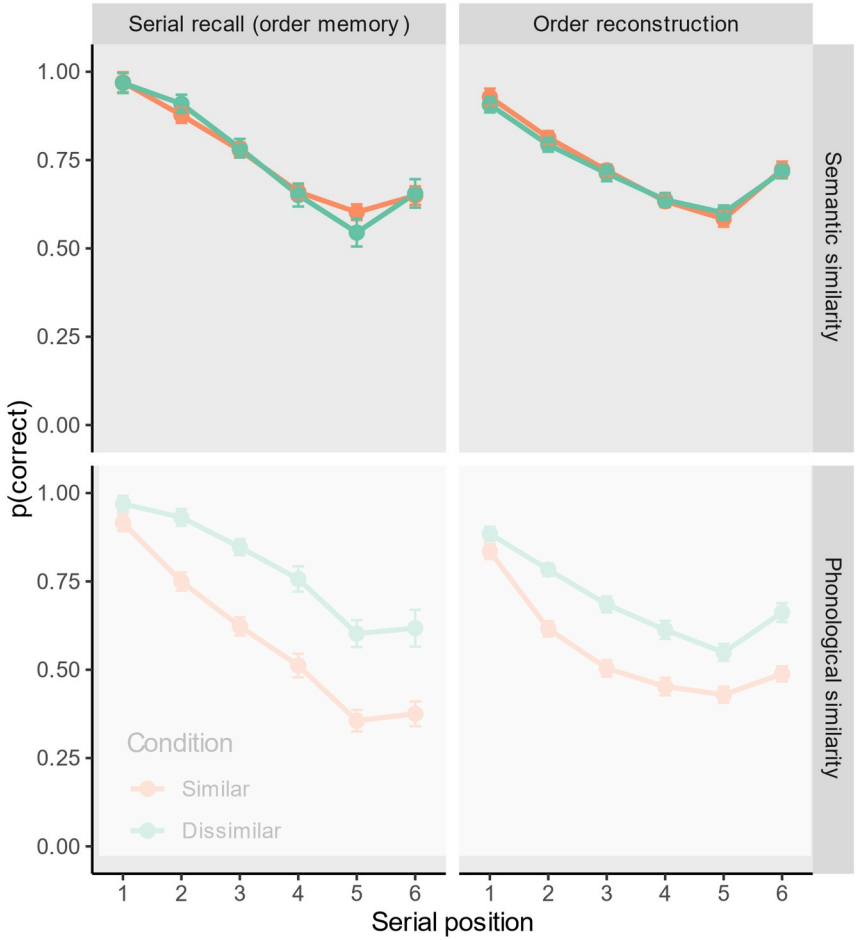


Results


Omission threshold
Target
Non-targets
Target
Non-targets
Semantically similar
Semantically dissimilar

Results

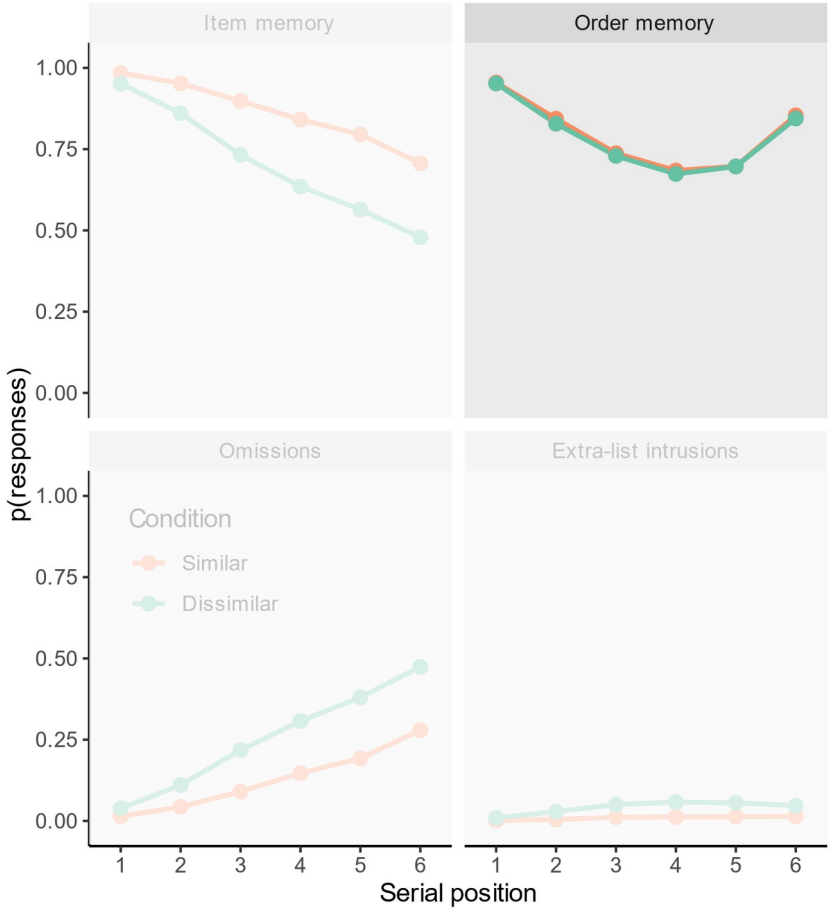
Empirical data



wialiewski, Krasnoff, Mizrak & Oberauer (*under review*)

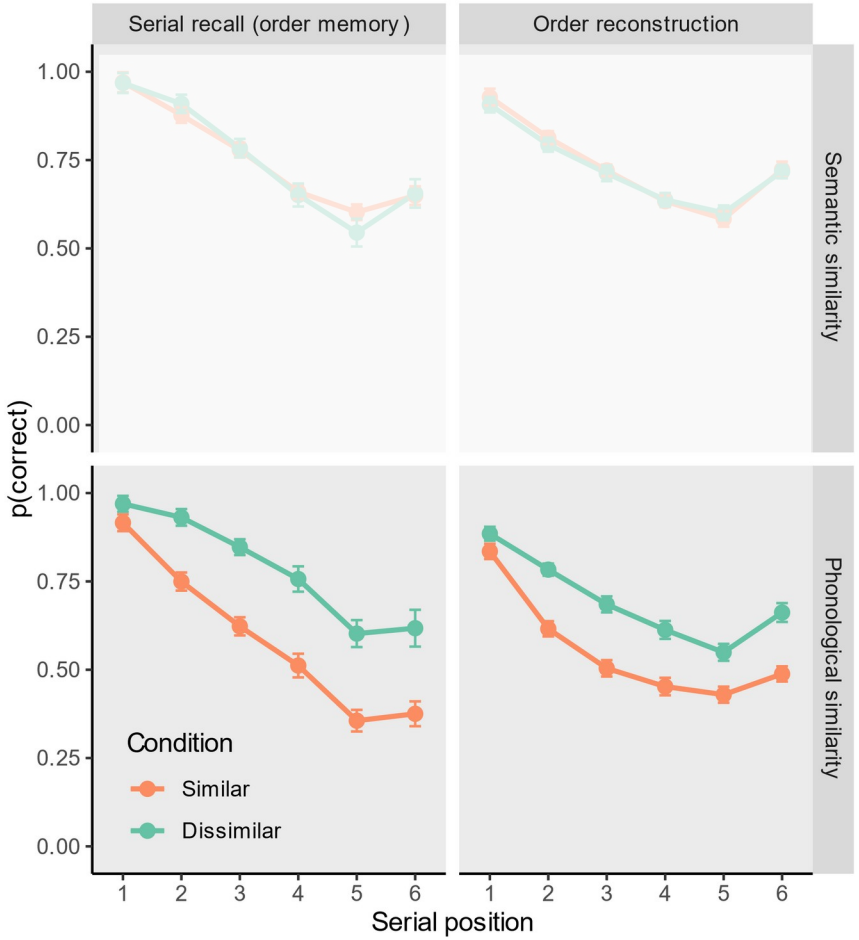
Results

Model



Results

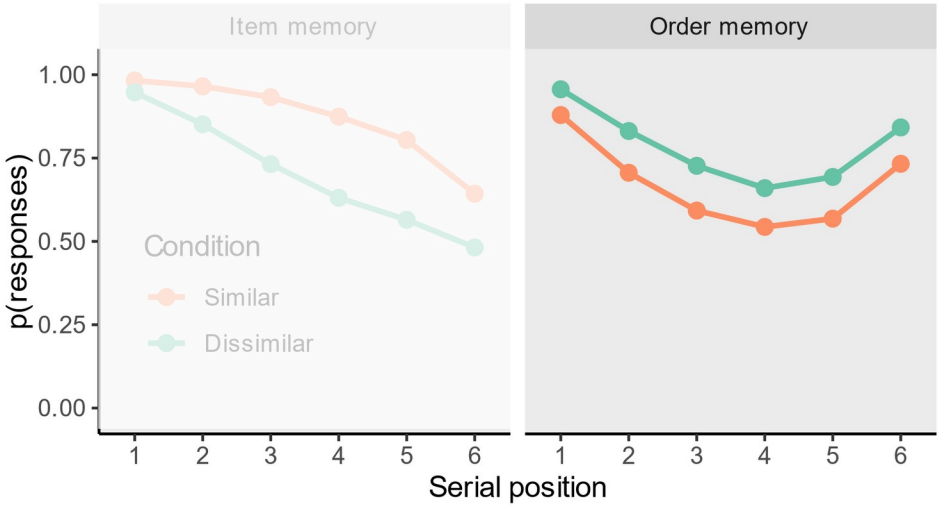
Empirical data



wialiewski, Krasnoff, Mizrak & Oberauer (*under review*)

Results

Rhyming similarity - model



Results

Discriminability problem!

Discussion

Probe recognition tasks

Mars, Pluto, Earth, Venus, Saturn, Jupiter

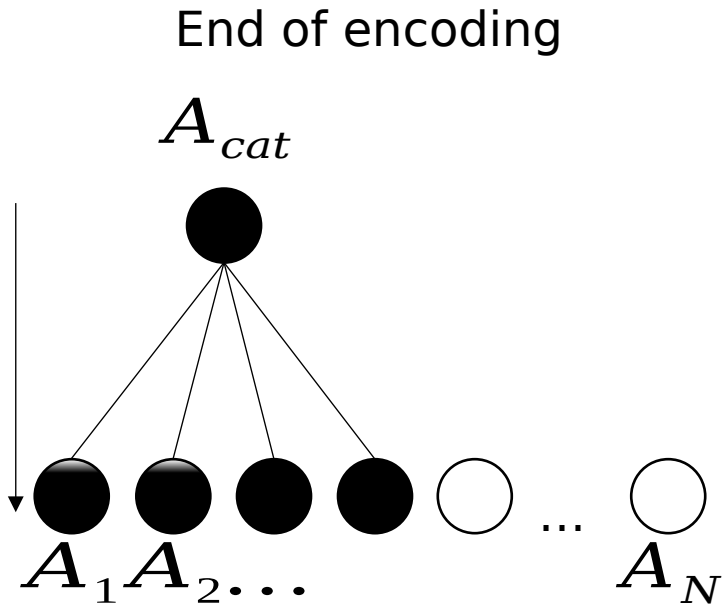
Neptun?

Leopard?

Increased false alarms

Atkins & Reuter-Lorenz (2008)

Connectionist architecture



ollin & Loftus (1975) *Psych Review*
ell et al. (1997) *Psych Review*

Discussion

Over-activation in lexico-semantic memory

Activation-monitoring framework (Gallo & Roediger, 2002)

Neptun?

Leopard?

Higher probability to respond « yes »

Is it a WM effect?

Conclusion

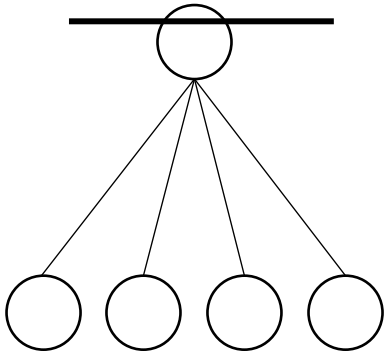
Semantic similarity **enhances item** memory…
While also leaving **order** memory **unaffected**

This pattern is well described by a model in which:

1. Semantic features are **not bound** to their context
2. Semantic similarity benefits WM through sustained activation in a lexico-semantic network

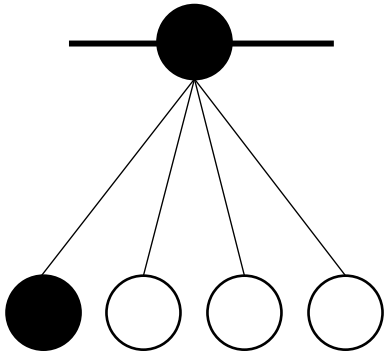
Thank you for your attention

Connectionist architecture



Connectionist architecture

Threshold updating:



Recovery: