

# Language experience accounts for individual differences in syntactic processing:

## Evidence from multi-level modeling

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### What accounts for individual differences in syntactic processing?

Assess **4 constructs** proposed to explain individual differences:

#### Reading experience<sup>1,2</sup>:

- Vocabulary<sup>5</sup>
- Self-reported reading frequency<sup>6</sup>

#### Executive control<sup>3</sup>:

- Stroop<sup>7</sup>
- Antisaccade<sup>8</sup>

#### Working memory<sup>4,12</sup>:

- Reading span<sup>9,10</sup>
- Operation span<sup>9</sup>
- Listening span<sup>10</sup>

#### Phonological ability<sup>1</sup>:

- Pseudoword repetition<sup>11</sup>

**Tasks** within construct correlate (all  $ps < .05$ )

- > Evidence for reliable measurement

z-score and use to predict syntactic processing in multi-level models

### Measure online self-paced reading time & offline comprehension

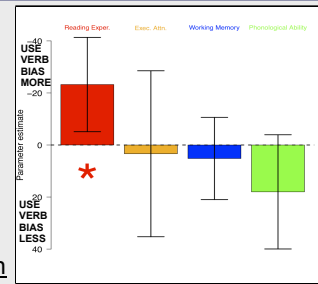
#### VERB BIAS

Sensitivity to how often particular verbs are used in particular structures  
How much does disambiguation (*that*) benefit reading of sentential complements?

Sentential complement-biased verbs: (disambiguation should be *less* helpful)

- “The film director suggested *(that) the scene should be removed.*”
- vs Direct object-biased verbs: (disambiguation should be *more* helpful)
- “The primary suspect established *(that) the alibi had been a total lie.*”

Individual diff. measure: AmbiguityxBias effect in resid. reading time in critical region



#### RELATIVE CLAUSE EXTRACTION

How much more difficult are object-extracted relative clauses?

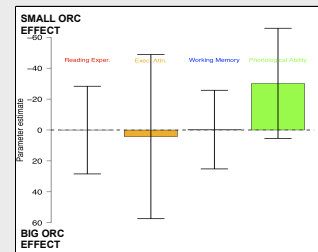
Subject-extracted relative clauses: (typically *easier*)

“The dog which chased the bear up a tree scratched the cubs.”

vs Object-extracted relative clauses (typically *harder*)

“The dog which the bear chased up a tree scratched the cubs.”

Individual diff. measure: ORC vs SRC effect in residual reading time within RC



#### GLOBAL ATTACHMENT AMBIGUITIES

How strong is low attachment preference?

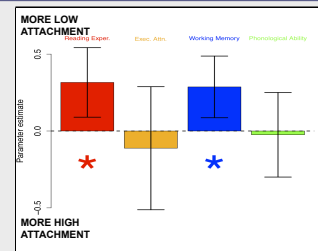
“The neighbor of the actor who hated himself for lying left town in a hurry.”

Low attachment questions: “Did the actor hate himself?” (typically prefer *yes*)

High attachment questions: “Did the neighbor hate himself?” (typically prefer *no*)

Individual difference measure: Log odds of low attachment answer

- > Signal detection measures control for any bias to respond *yes*



#### CONCLUSIONS

**Language experience** is most robust influence

- > Only one to influence **online** measures

Effects of **domain-general abilities** only seen in **offline** measure

Possible **phonological ability effect** on extraction type

- > Suggests different abilities may influence different difficulties

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References on back.

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### Additional analyses

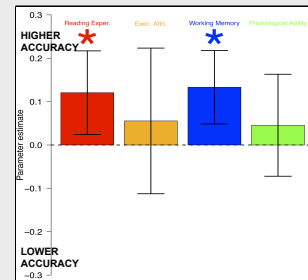
#### ACCURACY (RELATIVE CLAUSE ITEMS)

Individual diff. measure: Accuracy in answering comprehension questions

Accuracy on RC items predicted by **reading speed** and **working memory**

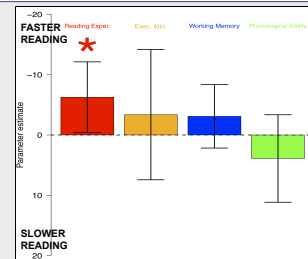
But no differences across relative clause types

Accuracy on other items near ceiling; no individual differences



#### OVERALL READING SPEED

Individual diff. measure: Reading speed across all items (critical and filler)



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