Language experience accounts for individual differences in syntactic processing: Evidence from multi-level modeling

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Assess 4 constructs proposed to explain individual differences:

**Reading experience**\(^{1,2}\):
- Vocabulary\(^9\)
- Self-reported reading frequency\(^8\)

**Executive control**\(^3\):
- Stroop\(^7\)
- Antisaccade\(^8\)

**Working memory**\(^{4,12}\):
- Reading span\(^9,10\)
- Operation span\(^9\)
- Listening span\(^10\)

**Phonological ability**\(^1\):
- Pseudoword repetition\(^11\)

Tasks within construct correlate (all \(p < .05\))
- Evidence for reliable measurement
- z-score and use to predict syntactic processing in multi-level models

What accounts for individual differences in syntactic processing?

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: Ambiguity\(\times\)Bias 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)

REFERENCES