The relationship between phonological viability and syntactic complexity

John R. Starr, Marten van Schijndel, Helena Aparicio

Cornell University

jrs673@cornell.edu

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RESEARCH QUESTION

What is the relationship between sub-syllabic, segmental structure and syntactic processing?

BACKGROUND

- Previous work that investigates the syntax-phonology interface focuses on how prosodic structure like feet [1] and intonational phrases [2, 3] influence syntactic production and processing.
- However, it is unclear which levels of the prosodic hierarchy are linked to morphosyntactic structure [4, 5, 6, 7].
- In this work, we examine lower levels of the prosodic hierarchy (sub-syllabic / segmental structures) and how they interact with syntactic structure during processing.

SELECT REFERENCES

[1] McCurdy et al. (2013). *Journal of Eye Movement Research*.
[2] Kubozuno (1987).
[3] Tooley et al. (2014). *Journal of Experimental Psychology*.
[4] Selkirk (2011). In *The Handbook of Phonological Theory*.
[5] Steedman (2000). *Linguistic Inquiry*.
[6] Nespor & Vogel (1986). *Prosodic Phonology*.
[7] Chomsky (1999). In *Ken Hale: A Life in Language*.
[8] Kuznetsova et al. (2017). *Journal of Statistical Software*.

STIMULI

Critical region!

	1	2	3	4	5	6
MATRIX:	Last	night	the	brick	smashed	through …
EMBEDDED:	I	hoped	the	blick	smashed	through …
C-EMBEDDED:	The	window	the	bnick	smashed	through …

Table 1: Three sample stimuli from one experimental item (additional 6 sample stimuli not shown). Across all conditions, the TARGET appears in the same linear position (word 4); words 5 & 6 are identical.

- 3 phonological TARGETS:
  1. REAL Word: brick (control)
  2. VIABLE Nonce: blick
  3. UNVIABLE Nonce: bnick
- 3 STRUCTURES where the TARGET surfaces:
  1. MATRIX clause subject
  2. EMBEDDED clause subject
  3. CENTER-EMBEDDED clause subject

RESULTS

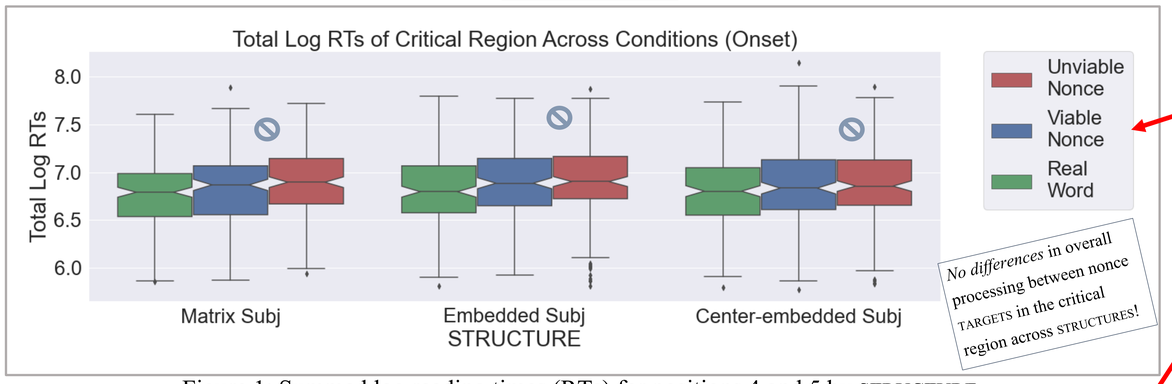

Figure 1: Summed log reading times (RTs) for positions 4 and 5 by STRUCTURE. Notches indicate 95% CIs.

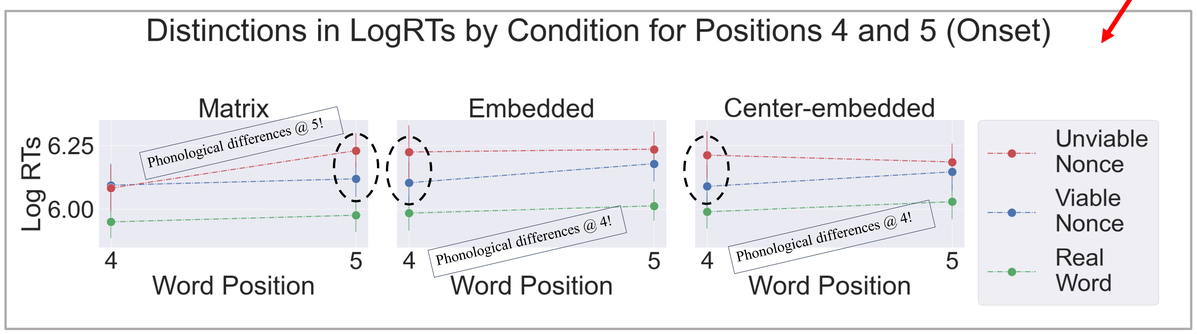

Figure 2: Log RTs by STRUCTURE. Significant differences between nonce targets (as determined by maximal mixed-effects models fit to each position[LogRTs ~ TARGET+ (1+ TARGET | subject) + (1+ TARGET | item)] via lmerTest [8]) are circled.

DISCUSSION

- Total RTs of critical region is consistent across nonces…
- … but a timing trade-off that follows STRUCTURE arises:
  1. Embedded STRUCTURES show immediate phonological differences.
  2. Non-embedded STRUCTURES show late phonological differences.

CONCLUSIONS

1. Syntactic complexity uni-directionally governs when sub-syllabic structure is processed.
2. Simpler signals are…:
   - processed *earlier* in syntax
   - processed *faster* in phonology