

## Theme session New perspectives on communicative efficiency — Does One Size Fit all in Crosslinguistic Dependency Length Minimization?

**Motivation:** Dependency Length Minimization (DLM; Temperley, 2007), motivated by communication efficiency, predicts that words or phrases which are syntactically dependent on each other tend to occur closer. While prior work has claimed this preference for shorter dependencies to be language-universal, most findings come from written corpora. In comparison, recent work by Liu (2019) looking at English demonstrated a weaker tendency for DLM in spontaneous conversations in contrast to written texts. Kramer (2021) showed a higher degree of DLM in naturalistic speech than in writing in the head-final languages, yet the opposite patterns hold in head-initial languages. These observations indicate even within the same modality, there could be language-specific differences in the preference for DLM. The mixed evidence above calls for exploration of how dependency length affects word orders across registers crosslinguistically.

**Our study:** Our preregistered experiment, using the double PP construction as a test case, asks whether DLM is reflected in acceptability judgments in English and Hindi, using *audio stimuli* (Sedarous & Namboodiripad, 2020).

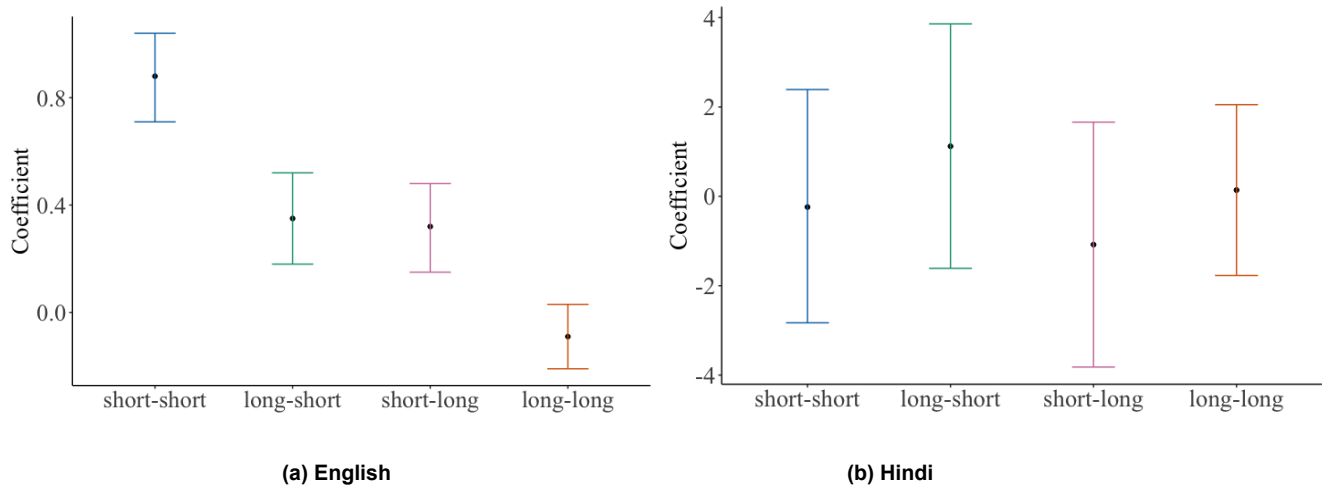
- (1) a. English: *The researcher **looked** [PP1 **through** the lens (that was adjusted)] [PP2 **at** the sky (that was darkening)];*  
b. Hindi: *Dadi [(apne puraane) bistar **par** PP1] [(chhote bacche ke) kamre **me** PP2] **so rahi thi***

All experimental items had animate subjects and intransitive head verbs immediately followed by two adjacent PP dependents. We manipulated dependency length by attaching relative clauses (English) or adjectival phrases (Hindi) to each of the two PPs, creating four conditions: SHORT-SHORT, SHORT-LONG, LONG-SHORT, LONG-LONG. For English (N=128), participants heard 5 items from each condition (plus 60 fillers of varying acceptability) and rated them on a 1-7 Likert scale. The ratings were transformed into by-subject z-scores, then subjected to mixed-effect analyses. For Hindi (N=73), the procedure was the same, except that participants heard 6 items from each condition (plus 69 fillers of varying acceptability).

**Results and discussion:** If DLM predicted acceptability, for English, we expected that SHORT-LONG would be rated higher than LONG-SHORT. Instead, we found no significant difference between the LONG-SHORT (mean(z)=0.25;  $\beta$ =0.35) and SHORT-LONG conditions (mean(z)=0.22;  $\beta$ =0.32). The lowest mean ratings and coefficient value were for LONG-LONG sentences (mean(z)=-0.09;  $\beta$ =-0.09), and SHORT-SHORT sentences were most acceptable (mean(z)=0.78;  $\beta$ =0.88); acceptability followed sentence length (cf. Lau et al. 2016). Because Liu (2020) found no preference for DLM in written Hindi, we expected that LONG-SHORT and SHORT-LONG would be rated comparably. Indeed, we found this, but our results showed no significant effect for *any* of the four conditions (LONG-LONG: mean(z)=0.25;  $\beta$ =0.22; SHORT-SHORT: mean(z)=0.22;  $\beta$ =-0.02; LONG-SHORT: mean(z)=0.19;  $\beta$ =-0.02; SHORT-LONG: mean(z)=0.28;  $\beta$ =-0.02). These findings suggest that dependency length may not play a strong role in acceptability, at least with audio stimuli, as compared to how it predicts online processing behavior with written stimuli or patterns in corpora. Further, these results lead us to consider how construction-, language-, and task-specific efficiency-based explanations might be; lifelong experience with a flexible constituent order language like Hindi might not lead to the same processing costs which are found in English for these simple sentences. As such, investigating the contexts in which DLM does and does not seem to be relevant could shed further light on the role it plays in shaping typological patterns.

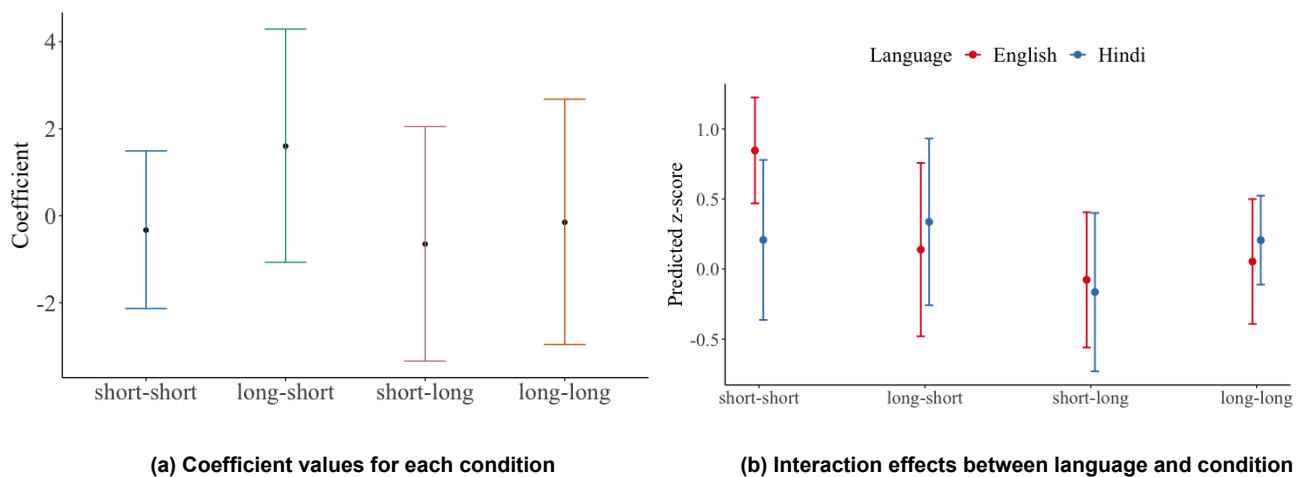
**Figure 1. Coefficients values for each condition in the individual mixed-effect model for each language.**

Acceptability ~ CONDITION \* (SENT\_LEN + PP1\_LEN + PP2\_LEN) + (1|PARTICIPANT) + (1|ITEM)



**Figure 2. Results for regression analysis when combining data of the two languages together.**

Acceptability ~ CONDITION \* (LANGUAGE + SENT\_LEN + PP1\_LEN + PP2\_LEN) + (1|PARTICIPANT) + (1|ITEM)



## Key references

- Kramer, Mathew. 2021. Dependency Lengths in Speech and Writing: A Cross-Linguistic Comparison via Youdepp, a Pipeline for Scraping and Parsing Youtube Captions. *Proceedings of the Society for Computation in Linguistics*, 4(1), 359–365.
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- Polinsky, Maria. 2016. Structure vs. use in heritage language. *Linguistics Vanguard*, 2(1).
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