Effects of word order on L1 and L2 semantic prediction
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Previous research shows that adult L2 speakers use semantic cues to predict upcoming input during language comprehension (e.g., Chambers & Cooke, 2009; Dijkgraaf et al., 2017; Ito et al., 2018). However, this research has relied on subject-first (SVO) sentences and no studies have investigated whether L2 speakers also use semantic cues predictively when embedded in a different word order that poses difficulties and is used less frequently in L2 production compared to L1 production (e.g., Jackson & Ruf, 2017; O'Brien & Féry, 2015). Here, we investigate how syntactic structure, i.e. word order differences, affects the timing and magnitude of semantic prediction, especially when L1 and L2 word orders differ, to investigate whether and how syntax constrains L2 semantic prediction, as compared to L1 semantic prediction.

In a visual-world experiment, 32 L1 English-L2 German speakers and 32 L1 German speakers listened to subject-first (SVO) and adverb-first (AdvVS) sentences. For subject-initial sentences, English and German share SVO surface order (1), while non-subject initial sentences have V3 order in English (AdvSV), but V2 order in German (2). We tracked participants' eye-movements to image displays (Fig. 1) and measured if they used semantic information from the lexical verb predictively to anticipate the upcoming noun (constraining-verb; 1a/2a). Looks to the target in sentences using modal verbs (neutral-verb; 1b/2b), in which the lexical verb appears at the end of the sentence, served as a baseline (see Dahen & Tanenhaus, 2004, for L1 Dutch).

(1a) Simone$_{SUB}$ füttert$_V$ täglich [den Hund]$_{OBJ}$ im Garten.　　(SVO; constraining-verb)
　　 Simone　　 feeds　 daily　 the dog　　　 in the garden
(1b) Simone$_{SUB}$ soll$_{Vmod}$ täglich [den Hund]$_{OBJ}$ im Garten　 füttern$_V$. (SVO; neutral-verb)
　　 Simone　　 should daily　 the dog　　　 in the garden feed
　　 "Simone feeds/should feed the dog daily in the garden."
(2a) Im Sommer　 springt$_V$ täglich [der Frosch]$_{SUB}$ ins Wasser.　　(AdvVS; constraining-verb)
　　 In summer　 jumps　 daily　 the frog　　　 into the water
(2b) Im Sommer　 wird$_{Vmod}$ täglich [der Frosch]$_{SUB}$ ins Wasser springen$_V$. (AdvVS; neutral-vb)
　　 In summer　 will　　 daily　 the frog　　　 to the water jump
　　 "In summer the frog will jump/jumps into the water daily."

Data were analyzed using a bootstrapping procedure with confidence intervals (Stone & Lago, 2020) to identify the time point at which looks to the target diverged in constraining-verb versus neutral-verb sentences. An analysis of looks time-locked to verb onset revealed more looks to the target in constraining-verb versus neutral-verb sentences prior to the onset of the target noun for both SVO and AdvVS sentences among both L1 and L2 speakers, though prediction was generally delayed for L2 speakers. For L1 speakers, the divergence point for SVO sentences (806ms [CI: 782, 850]) and AdvVS sentences (894ms [CI: 833, 1020]) were similar, with overlapping CIs (Fig. 2). For L2 speakers the divergence point for SVO sentences (1169ms [CI: 1071, 1343]) and AdvVS sentences (1317ms [CI: 1224, 1479]) were also similar, with overlapping CIs (Fig. 2). A second analysis to examine effects of L2 proficiency revealed that among the L2 speaker group, higher proficiency was associated with more looks overall to the target noun (from verb to noun onset) in both word orders, but that L2 speakers engaged in predictive processing regardless of proficiency level and word order. These results demonstrate that adult L2 speakers engage in semantic prediction across syntactic contexts, including contexts not present in the L1, suggesting that any modulations in L2 semantic prediction based on syntax may be quantitative, not qualitative, in nature (Kaan, 2014).
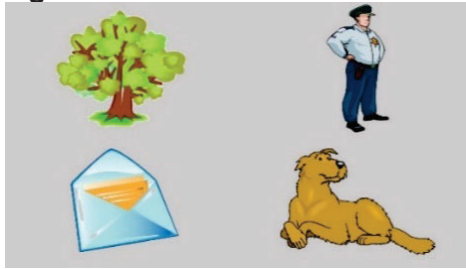
Figures

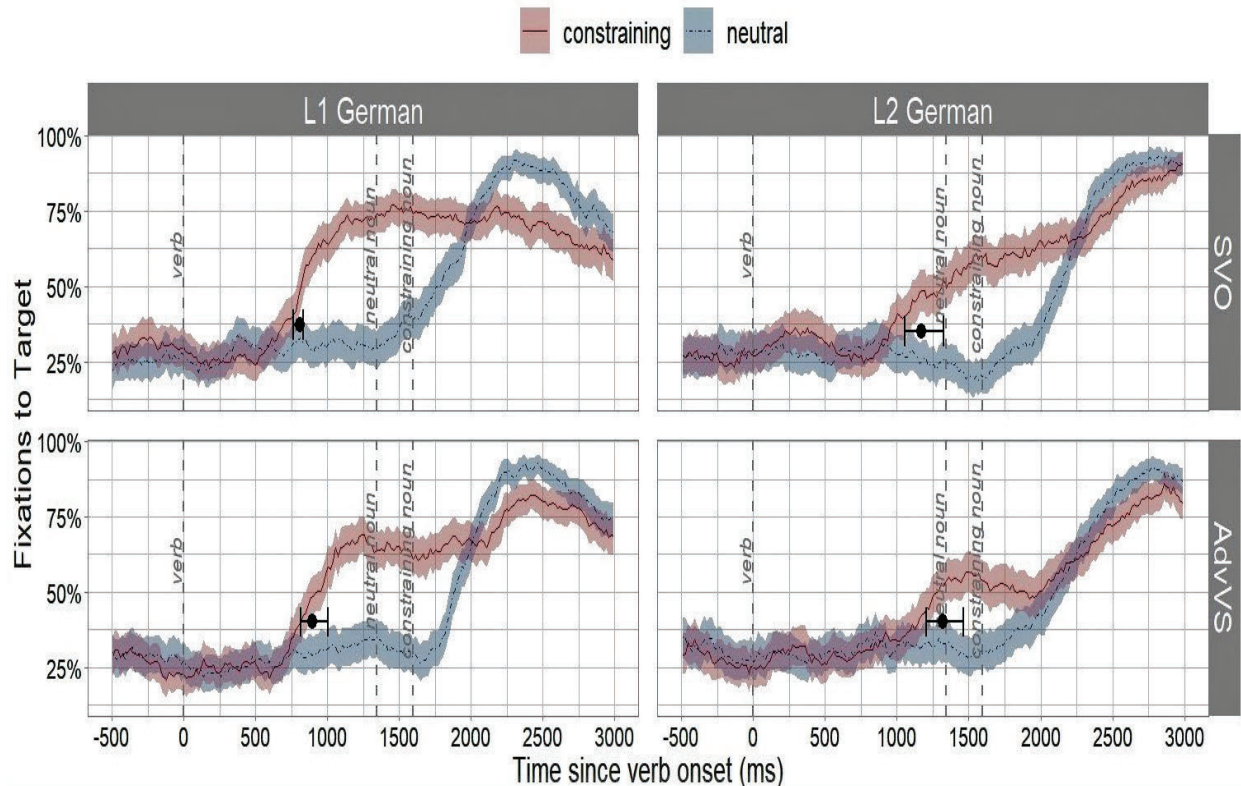

Figure 1. Image display (for 1a/1b)

Figure 2. L1 and L2 speaker fixations to target noun in neutral-verb vs. constraining-verb sentences. Divergence points (with bootstrapped 95% confidence intervals) in black.

References

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