**What matters in processing of scrambling: Cross-populational investigation in Russian**

Irina A. Sekerina (College of Staten Island) and Glenn A. Stark (Independent scholar)
*irina.sekerina@csi.cuny.edu*

Psycholinguistic studies of word order in scrambling languages with grammatical case markings found mixed results for children and L2 adults—target-like comprehension in Turkish (Özge et al., 2019), but difficulty in Japanese (Hara, 2011) and German (Schouwenaars et al., 2018). In Russian, a language under investigation in the present study, monolingual children develop target-like comprehension of OVS word orders gradually between ages 4-7 (Janssen & Meir, 2019). Heritage Russian-English bilingual adults also show difficulties in comprehending OVS offline (81%, Ionin et al., 2020).

The present study compared 3-word canonical SVO and scrambled OVS sentences in 3 groups of Russian speakers: monolingual adults ($n$=17), 5-to-7-year-old monolingual children ($n$=28), and bilingual HL adults ($n$=21). In the Visual World paradigm, participants viewed a single picture (Fig.1) paired with either a spoken SVO (*Korova vezvet loshadku* 'The horse-NOM is pulling the cow-ACC') or OVS (*Loshadku vezet korova* 'The horse-ACC, is pulling the cow-NOM') sentence. The 2 Ns were unambiguously marked with NOM (Agent) or ACC (Patient). Participants performed sentence-picture matching while their eye movements were recorded.

**Results.** In both analyses, a consistent effect of Group emerged, but with differential patterns between children and HL adults. *(1) Accuracy.* HL speakers patterned (93%) between monolingual adults (99.4%) and children (83%) (Fig. 2). Word Order was a significant predictor of their accuracy (SVO>OVS, $p < .001$), and so was Age of Arrival ($p = .006$). No such effects were found for children (SVO=OVS, $p = .08$). *(2) Eye movements* (Fig. 3). We conducted a novel bootstrapping analysis (Stone, Lago, & Schad, subm.) and identified and estimated confidenece intervals for divergent points in anticipatory looks to the Agent between SVO and OVS based upon long runs of statistically significant differences: 600 ms for monolinguals and 467 ms for HL bilinguals (after the verb onset, but before N2); but no divergent point for children. Thus, in contrast to the offline accuracy results, in online processing, HL adults patterned with monolingual adults: They clearly were sensitive to the case in OVS and anticipated N2 before its occurrence in speech while children did not treat SVO and OVS differently.

**Discussion.** Monolingual Russian children showed above chance accuracy, with similar error rate in SVO and OVS, but gradual emergence of sensitivity to case marking in processing. HL adults demonstrated less accuracy in comprehending OVS offline (=Ionin et al., 2019), but it was modulated by the age of arrival (participants born in the U.S.= children's error rate vs. ceiling for those who arrived later). In contrast to children, HL bilinguals used the case marking on N1 and anticipated the Agent at the same point in the sentence as monolingual adults (i.e., at before N2). Thus, age and proficiency matter for successful processing of scrambling, suggesting that a complete theory of syntactic complexity and prediction in scrambling must integrate extra-linguistic cognitive and developmental factors that characterize different populations.

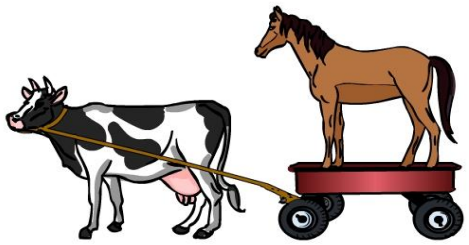

*Fig. 1.* Visual context

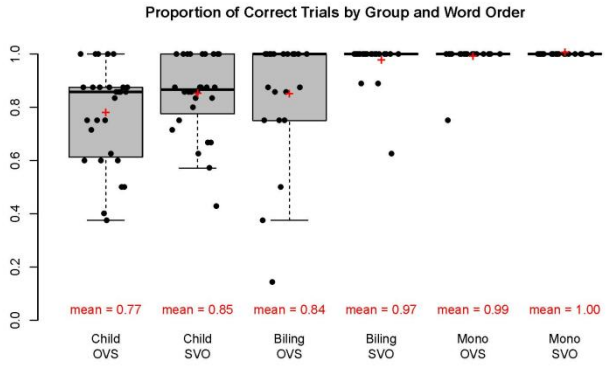


*Fig. 2.* Accuracy as a function of Word Order & Group

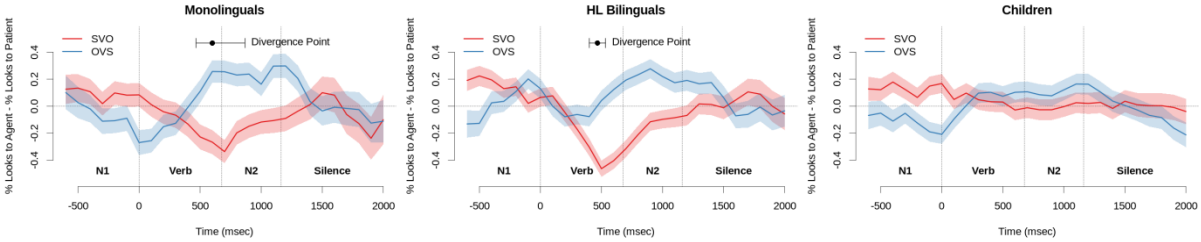


*Fig. 3.* Differences in looks between Agent & Patient (Agent advantage) in SVO (red) vs. OVS (blue)

**References**


Janssen, B., & Meir, N. (2019). Production, comprehension and repetition of accusative case by monolingual Russian and bilingual Russian-Dutch and Russian-Hebrew-speaking children. *Linguistic Approaches to Bilingualism, 9*, 736-765.

Hara, M. (2011). Real-time reading and reactivation evidence of syntactic gap processing in Japanese Scrambling. Proceedings of the 2009 L2 Research Forum.

Ionin, T. et al. (2020). Word order and information structure in Russian as a heritage or L2. In M. M. Brown & A. Kohut (Eds.), *Proceedings of BUCLD-44*. (pp. 210-223).

Özge et al. (2019). Why wait for the verb? Turkish speaking children use case markers for incremental language comprehension. *Cognition, 183*, 152-180.

Polinsky,M.,& Scontras, G. (2020). Understanding heritage languages. *Bilingualism: Language and Cognition, 23*, 4-20.

Schouwenaars, A. et al. (2018). German children's processing of morphological cues in wh-questions. *Applied Psycholinguistics, 39,* 1279-1318.

Stone, K., Lago, S., \& Schad, D. (submitted). Divergent point analysis of visual world data. Applications to bilingual research. *Bilingualism: Language & Cognition*.