

Processing Grammatical Aspect in a Visual World: English vs Russian

Serge Minor, Natalia Mitrofanova, Myrte Vos, Gillian Ramchand

UiT – The Arctic University of Norway

Despite the importance of aspectual marking in natural language and the theoretical questions that arise concerning grammaticalization and morphological regularity in marking the cognitive distinction of ongoing vs. completed events, it is difficult to find online processing studies where the results can be compared across languages. In our study, we investigated the processing of verbal aspect by Russian and English-speaking adults using identical task and stimulus materials. **The study.** Each experimental trial included an audio preamble which located the narrative in the past (e.g. *It was a rainy day*), followed by a sentence-picture matching task where the participants were presented with a pair of pictures on a screen: one representing an Ongoing Event (OE), i.e. an action in progress (Fig. 1), and one representing a Completed Event (CE), i.e. the result that obtained after the action was completed (Fig. 2). While looking at the pictures, the participants were presented with an audio stimulus of a sentence in the past tense. In both the investigated languages we manipulated the aspect of verb in the audio stimulus. In the Russian version of the Experiment, half of the audio stimuli involved a Perfective verb and half involved an Imperfective verb. In the English version, half of the audio stimuli involved a verb in the Past Progressive form and half involved a verb in the Simple Past form (cf. ex. 1-2). The participants were asked to choose the picture that best corresponded to the audio stimulus. Each experiment included 24 test trials involving different verbs/event types. 19 out of 24 pairs of pictures were the same for the Russian and English versions of the experiment. The participants' eye-movements and offline responses were recorded. We tested 124 adult L1 Russian speakers in Moscow (mean age=22) and 35 adult L1 English speakers in Edinburgh (mean age=20). **Offline results.** Table 1 summarizes the offline responses in the two groups of participants. Russian participants overwhelmingly pointed to OE pictures upon hearing Imperfective verb sentences (98% of the trials), and to CE pictures for Perfective verb sentences (95% of the trials). English participants pointed to the OE picture when they heard a sentence containing a verb in the Past Progressive form (97% of the trials), however when presented with a sentence containing a verb in the Simple Past form they chose the CE picture in only 59% of the trials, not significantly higher than chance. **Online results.** Fig. 3 and 4 illustrate the eye-movement patterns of the Russian and English participants in two aspectual conditions. A cluster-based permutation analysis (cf. Maris & Oostenveld 2007) revealed that Russian speakers began looking at the OE picture significantly more often than the CE picture in the Imperfective condition during a time interval starting at 350 ms after the onset of the verb (which is before the average Imperfective verb offset at 736 ms). Conversely, they began looking at the CE picture significantly more often than the OE picture in the Perfective condition during a time interval starting at 600 ms after verb onset (again, before the average Perfective verb offset at 733 ms, cf. Fig. 3). English speakers exhibited a strikingly different pattern of eye-movements (cf. Fig. 4). In the Simple Past condition, our analysis revealed no statistically significant clusters of difference in the proportion of looks to the OE and CE pictures, i.e. in contrast to the Russian Perfective condition, the participants did not look reliably more at the CE picture than at the OE picture. In the Past Progressive condition, the analysis of looks to the OE vs CE pictures revealed two significant clusters of difference: a smaller early cluster at 700-1200 ms after the onset of the lexical verb, and a larger later cluster which begins at 1550 ms after verb onset and lasts until the end of the trial. **Discussion.** Our results show clearly that the simple past in English is not in paradigmatic opposition to the past progressive in this context, unlike in Russian. Even more interesting is the progressive vs. imperfective comparison: offline results were at ceiling in choosing the OE in both languages, but English speakers reacted differently, and with increased latency compared to the Russian. More cross-linguistic comparison is clearly needed, but we speculate that the observed contrast in gaze patterns reflects the difference between the processing of a lexical distinction in Russian vs. a regular rule-based compositional process in English. We conclude that this methodology is sensitive enough to track fine-grained differences in the online processing of grammatical categories and gives the potential to investigate effects of lexicalization, grammaticalization and online semantic composition.



Fig. 1. Ongoing event



Fig. 2. Completed event

Group	Imp/Prog		Perf/SPast	
	Ongoing	Compl	Ongoing	Compl
Russian	0.98	0.02	0.05	0.95
English	0.97	0.03	0.41	0.59

Table 1. Offline responses by participant group and aspect.

Examples:

(1) Babuška vjazala novyj sviter
 grandma knit.IMP.PAST new jumper
 'Grandma was knitting a new jumper.'

(2) Babuška svjazala novyj sviter
 grandma knit.PF.PAST new jumper
 'Grandma knitted a new jumper.'

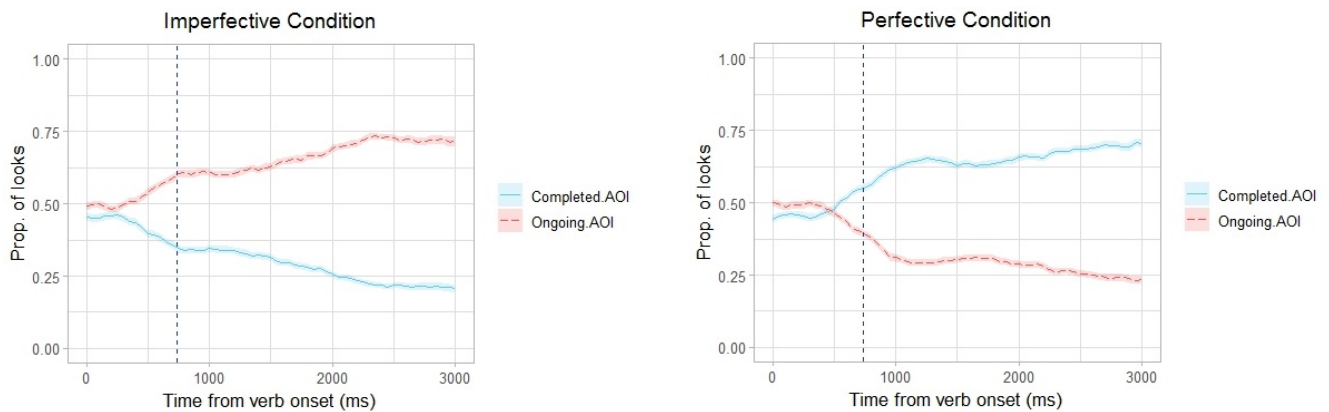


Fig. 3. Russian data. Proportions of looks to the Completed vs Ongoing Event picture in 50 ms time bins starting from the verb onset in the Imperfective and Perfective conditions. Vertical dashed blue lines represent the average verb offset.

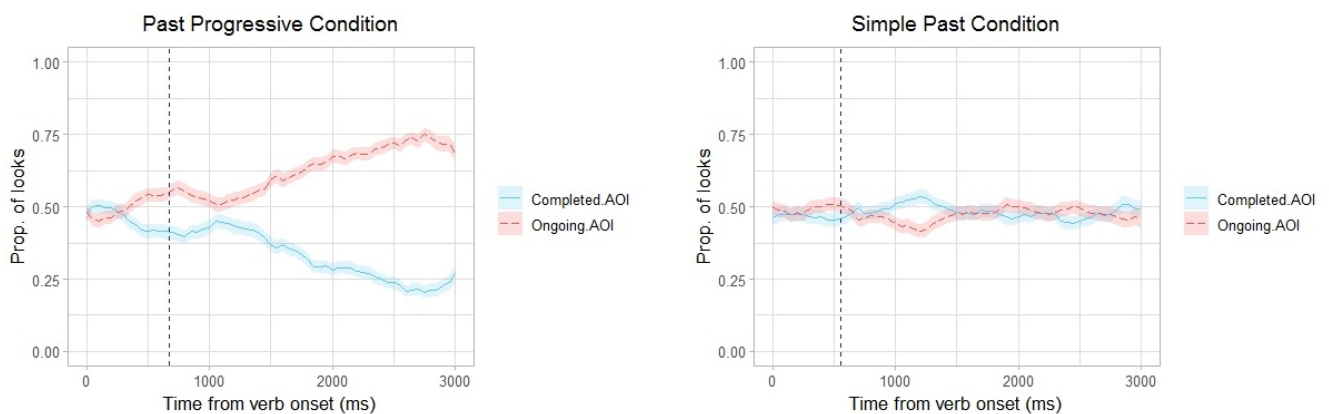


Fig. 4. English data. Proportions of looks to the Completed vs Ongoing Event picture in 50 ms time bins starting from the lexical verb onset in the Past Progressive and Simple Past conditions. Vertical dashed blue lines represent the average verb offset.