Event Completion, Not Ongoingness, Is Language Dependent: Crosslinguistic Evidence from ERPs in English and Russian

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Verb aspect is a lexico-grammatical feature that defines the temporal distribution of an event. According to English and Russian linguistic theories, English past simple (perfective: *washed*) is associated with completion, but is not morphologically marked for aspect and can refer to both completed and in-progress events. Aspectually marked past progressive (imperfective: *was washing*) is restricted to unfolding events. In contrast, Russian marks aspect obligatorily. Perfective carries a completed connotation, while imperfective, although associated with ongoingness, can be used as a general past reference. Extant literature in English suggests that aspect serves to build a mental model of an event [1]. Perfective emphasizes event completion within a temporal boundary [2, 3], while imperfective presents an event in progress, providing richer details [4], but no specific event stage. To date, little examined effects of aspect on the mental representations of events in non-English languages.

In this ERP study we examined (1) whether differences in aspect usage influence the mental representations of event stage (completed, in-progress); (2) whether aspect processing is semantic or morphosyntactic in languages with different degrees of aspect marking obligatoriness. Our hypotheses and predictions are that (1) Russian perfective and English imperfective will result in specific mental representations of event stage (completed for Russian; in-progress for English); (2) Obligatoriness of aspectual marking determines whether semantic (N400) or morphosyntactic (P600) mechanism is engaged.

Participants were native speakers of English (N=19) and Russian (N=19). The design was 2 Event (In-progress, Completed) x 2 Aspect (Perfective, Imperfective) (Table 1). The stimuli were 256 pictures and descriptions, presented in 4 blocks. In the two experimental blocks, the events in the pictures and the verb stems in the descriptions matched semantically. In the perfective block, all verbs were perfective. Half were preceded by completed events (congruent), and half, in-progress events (incongruent). Likewise, in the imperfective block, all verbs were imperfective, and were preceded by completed (incongruent) and in-progress events (congruent). In the two control blocks, the events and the verb stems did not match semantically in incongruent trials, leading to an outright semantic violation. The order of blocks was counterbalanced with subjects. In each trial, a picture was presented for 500 ms, followed by a description, word-by-word. Comprehension questions appeared after each trial.

In English, only perfective verbs preceded by semantically-matched in-progress events elicited a sustained negativity starting at 300 ms, which reached statistical significance 500–900 ms, compared to perfective verbs preceded by semantically matched completed events (p=0.002), anteriorly (Fig.1a,c). This suggests recomputation of a mental model to integrate information about a previously held assumption regarding event completion [5]. **In Russian**, only perfective violations resulted in a wide-spread enhanced positivity that reached significance in the 600–900 ms time window (p=0.015) (Fig.1b,d), suggesting morphosyntactic mechanisms and consistent with previously reported morphosyntactic P600 effect for perfective violations in Slavic languages [6]. Being more semantically specific and less flexible in aspectual meaning interpretations, Russian perfective likely elicited greater attention to its grammatical features. In control blocks, semantic violation at lexical verbs in both perfective and imperfective blocks elicited N400 effects in both groups (Fig.2).

In conclusion, imperfective in both English and Russian was not associated with a specific event stage, consistent with previous literature [1,3]. Obligatory aspect marking engages morphosyntactic processing, i.e. specific verb morphology is associated with event stage. Less obligatory marking likely engages semantic processing, with the match between verb form and event stage processed more holistically, as a function of verb semantics. We found crosslinguistic similarities in the association between aspect and mental representations of event stage, but the processes supporting this association differed based on language-specific aspectual system.

Table 1. Design and Examples of Stimuli. Asterisk (*) indicates violation.

Picture	Condition	Sentence
(in progress)	Exp (aspect) Ctrl (semantic)	She ***cleaned / was cleaning** the glasses. She **was *licking / cleaning** the glasses.
(completed)	Exp (aspect) Ctrl (semantic)	She ***was shredding / shredded** the cabbage. She ***ate / shredded** the cabbage.

Figure 1. Aspect Violations. ERPs for the aspect violation conditions (red) and the aspect match conditions (black). *1a, 1b:* Averaged waveforms of 6 anterior electrodes (AF3, AF4, AFz, F1, F2, Fz). *1c, 1d:* Averaged waveforms of 9 central electrodes (FC1, FC2, FCz, C1, C2, Cz, CP1, CP2, CPz). The topographies are based on the difference waves between the two conditions.
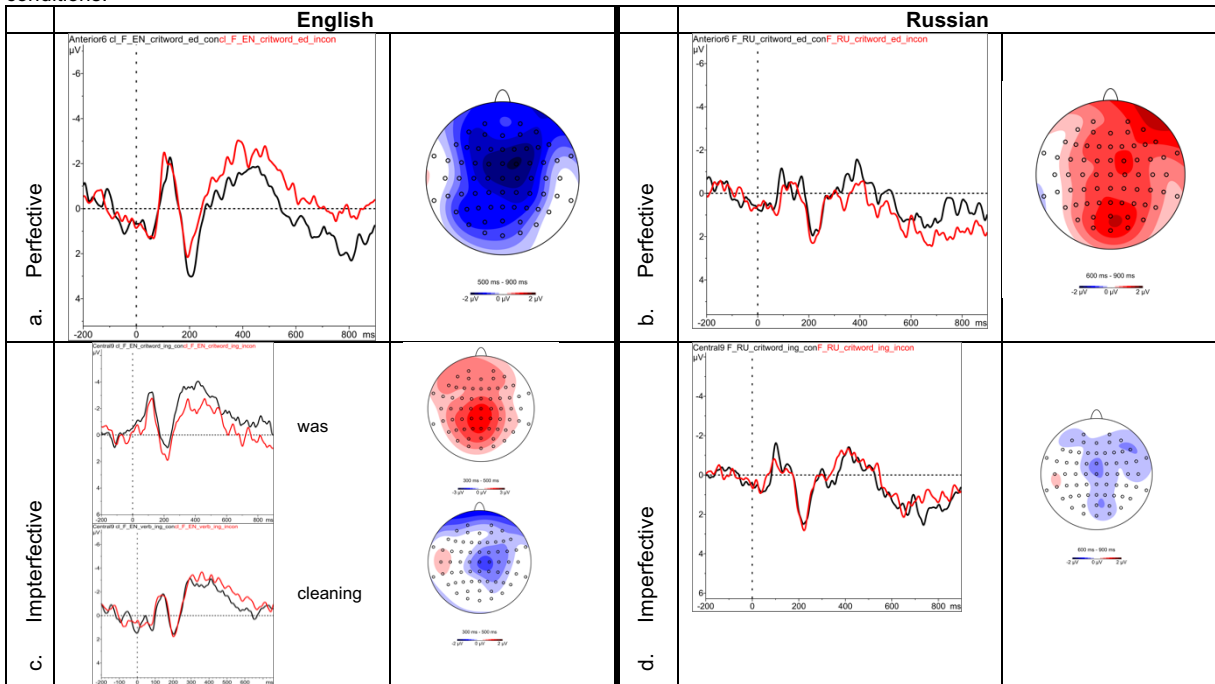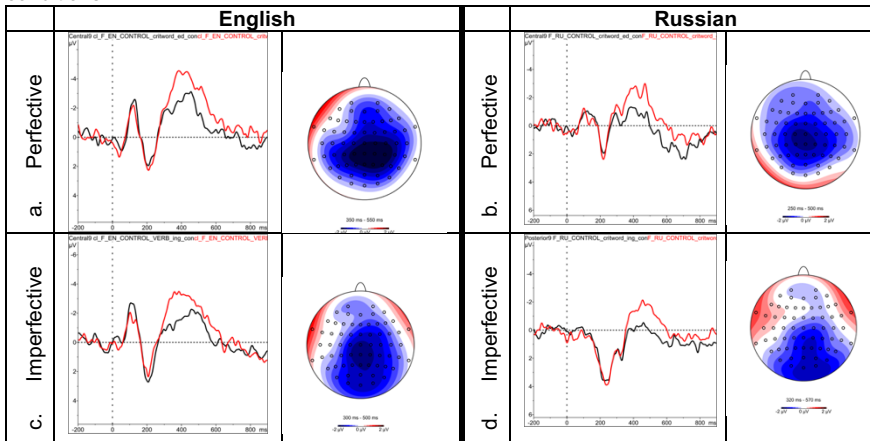

Figure 2. Semantic Violations. ERPs for semantic violation conditions (red) and semantic match conditions (black). *2a, 2b, 2c:* Averaged waveforms of 9 central electrodes (FC1, FC2, FCz, C1, C2, Cz, CP1, CP2, CPz). *2d:* averaged waveforms of 9 posterior electrodes (P1, P2, Pz, PO3, PO4, POz, O1, O2, Oz). The topographies are based on the difference waves between the two conditions.

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