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# The role of surprisal in processing grammatical aspect during reading

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Studies have shown that during sentence processing people generate expectations about upcoming input which modulate processing time (see Kamide, Altmann, & Haywood, 2003; Levy, 2008). In this study, we investigate how probability-based expectations about grammatical aspect, i.e., the internal flow of time in an event, influence online processing (see Madden & Zwaan, 2003; Ferretti, Kutas, & McRae, 2007). We report results of an eye-tracking experiment in Finnish, as it is one of the few languages that morphologically marks grammatical aspect on transitive objects (rather than on the verb). Accusative case signals the perfective aspect and the partitive case the imperfective (Huumo, 2010). This allows us to investigate whether expectations about grammatical aspect are already generated early in time at the verb.

We carried out a sentence reading experiment with eye-tracking. The materials consisted of 150 transitive clauses. A given participant ($n$ = 46) saw a particular verb only once, either in the partitive or accusative condition (e.g., *Tutkija kloonasi marsua/marsun laboratoriossa* 'The researcher was cloning/cloned the guinea pig in the laboratory). For each verb, co-occurrence frequencies for the case markings were extracted from the Finnish Internet Parsebank (Kanerva, Luotolahti, Laippala, & Ginter, 2014) and were operationalized as surprisal, i.e., inverse log probability of the case marking given the verb (Levy, 2008).

A generalized additive mixed-effects model was fitted to the gaze duration on the verb and indicated an increase in gaze duration when surprisal increased. However, the difference in case marking was not statistically significant. To the best of our knowledge, this is the first study to offer evidence that aspectual information is activated early in time and already at the verb. The results support the view that semantic representations are rich and contain item-specific probabilistic information over prior experience with event structures.

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