Predictive processing in poetic language: ERP data on rhythmic omissions in metered speech

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Predictions during language comprehension are currently discussed from many points of view. One area where predictive processing may play a particular role concerns poetic language that is regularized by meter and rhyme, thus allowing strong predictions regarding the timing and the stress of individual syllables. There is experimental evidence that metrical regularity enhances ease of processing (e.g. Obermeier et al. 2015). However, the exact mechanism by which these predictions are exploited has not been directly examined by methods with a specific focus on top-down processes.

The present EEG study (n=20; 64 electrodes) examined whether the predictability of strong and weak syllables within metered speech, as is prevalent in poetic language, would differ as a function of meter type (here: foot type). Strong, i.e. accented positions within a foot should be more predictable than weak, i.e. unaccented positions. Our focus was on disyllabic pseudo-words that solely differed in foot type, i.e. between trochee vs. iamb, with trochees providing the preferred foot in German. To this end, we looked at a specific type of the so-called Mismatch Negativity (MMN) that is elicited when an anticipated auditory stimulus is omitted. The resulting omission MMN (oMMN) is particularly interesting because its elicitation is not depending on a physical stimulus. It is therefore considered the optimal method for examining the error signal caused by top-down predictions.

Omissions in deviant position were realized as either omitting the first or the second syllable, arriving at a 2-by-2 design with the factors foot type and omission position. Analyses focused on the mean amplitude differences between deviant and standard responses.

The result pattern was characterized by an interaction of the effects of foot type and omission position. A decomposition of this interaction revealed that oMMN latencies differed between trochee and iamb, but only for omission in first syllable position. There, omissions in trochees elicited earlier oMMN responses. The results thus suggest that omissions in initial position are modulated by foot preferences in German. German shows a bias towards trochaic foot structure. Hence, particular importance is assigned to the first syllable in disyllabic words. A missing strong syllable in this position elicits an earlier violation response because the prediction in this position has been stronger. Altogether, predictive processing seems to be enhanced in metered speech, especially if the meter is based on the preferred foot type.

References: Obermeier, C., Kotz, S. A., Jessen, S., Raettig, T., Koppenfels, M. v. & Menninghaus, W. (2015). Aesthetic appreciation of poetry correlates with ease of processing in event-related potentials. Cognitive Affective & Behavioral Neuroscience. DOI 10.3758/s13415-015-0396-x.

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