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The P600 and P3 ERP components are linked to pupil dilation as correlate of norepinephrine activity

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Abstract

The P600 event-related potential component is elicited by linguistic violations and continues to inform neurocognitive models of language comprehension (e.g., Kuperberg, 2021). It has also been suggested to be a variant of the oddball-sensitive, domain-general P3 component (e.g., Coulson et al., 1996). In a sentence comprehension and an oddball paradigm we find that the task-elicited pupil dilation, a putative correlate of norepinephrine release from the locus coeruleus, is similarly affected by both manipulations. Crucially, the size of the pupil dilation predicts the amplitude of both components on a trial-by-trial basis. This suggests that both components rely on a shared neural generator and, more specifically, that both may be linked to norepinephrine release in response to rare and motivationally significant stimuli (Nieuwenhuis et al., 2005; Sassenhagen et al., 2014; 2015). Our findings thus question the domain-specificity of the P600 and give further insights into the role of neuromodulators in cognition.