N1, P2, and P3b are affected by the matching-stimulus-interval in an auditory equiprobable Go/NoGo task

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Abstract
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N1, P2, and P3b are affected by the matching-stimulus-interval in an auditory equiprobable Go/NoGo task

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Aims: It has been demonstrated that as the target-to-target interval (TTI) and the nontarget-to-nontarget interval (NNI) increase P3b amplitude augments in a linear fashion. A similar response pattern has also been demonstrated for N1, but this has been explored with TTI only. This study aimed to discern whether both TTI and NNI affect early sensory components (N1 and P2) in a fashion analogous to the P3b. Method: Thirty university students completed an auditory equiprobable Go/NoGo task with a variable SOA and manipulations of TTI and NNI whilst their EEG activity was recorded. Data were corrected for EOG artefact, epoched, baseline-corrected, filtered, and averages were computed for five separate TTIs and NNIs for each subject. An unrestricted temporal principal components analysis with VARIMAX rotation was applied, and factors identified as N1, P2, and P3b ERP components were analysed further. Results: Across stimuli, P3b showed a linear increase as interval increased. This trend did not differ significantly between targets and nontargets. N1 amplitudes became more negative as interval increased before plateauing at the longest interval (15 s); this did not differ with stimulus type. A similar linear trend was observed for P2 with amplitudes augmenting as interval increased. Again, there was no difference in this linear trend between targets and nontargets. Conclusions: Here we demonstrated that NNI effects are present for N1, and that changes in both TTI and NNI affect N1, P2, and P3b in a similar fashion. Together, these findings indicate that matching-stimulus-interval effects are present at the early sensory stages in sequential processing, for both task-relevant and background information. The mechanism of TTI and NNI effects is currently unknown, but these findings could suggest that early-perceptual processes, or a refractory period effect, are contributing to this phenomenon.

Keywords: event-related potentials (ERPs), Target-to-target interval (TTI), Sequence effects, Interstimulus interval (ISI), P3(00), Principal Components Analysis (PCA), Nontarget-to-nontarget interval (NNI)

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