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Abstract

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Keywords

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Sequential response processes in a cued CPT: A temporal PCA study

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Aims: Event-related potentials (ERPs) are extensively studied in cued Continuous Performance Tests (CPTs) in relation to imperative stimuli (Target/NonTarget), but less so for the cue. There is contention in the literature as to whether the contingent negative variation (CNV), elicited by the cue, affects imperative ERPs. This study aimed to clarify the sequential response processes for the cue and imperatives in this paradigm. **Method:** Seventy participants performed a numbered-variant of the visual Gordon-CPT, with 1000 ms SOA, while continuous EEG was recorded. The cue (1) warned participants to either: press a button to the Target (9), or inhibit responses to NonTargets (0-8). Single trial ERPs were extracted for the cued imperatives and subjected to an initial Principal Components Analysis (PCA) to obtain the CNV component. To better analyse response components, separate PCAs were then conducted on the cue and imperatives. The imperatives were analysed in 2 ways: an unbaselined set relative to the pre-cue period was compared to a set baseline-corrected to the pre-imperative activity to remove CNV processes. To determine ERP component similarities between data sets, congruence coefficients (r_c) were computed and latencies were assessed. **Results:** The CNV peak extracted in the initial PCA was identical to that in the unbaselined imperatives dataset ($r_c = .99$). Similar sequential ERP components were identified in the cue and imperatives PCA datasets: N1, PN, P2, N2c, N2b, P3 and SW. Cue components correlated better with the unbaselined imperatives than the baselined dataset. All cue and imperative response components were comparable ($r > .80$), except the N2cs, which showed little resemblance. Latencies also correlated strongly ($r = .99$). **Conclusions:** These results demonstrate that CNV removal from the imperative ERPs is unnecessary. The identification of comparable ERP components, with similar latencies, to the cue and imperatives, suggests that similar sequential processes occur for these stimuli.

Keywords: Continuous Performance Test (CPT), event-related potentials (ERPs), Sequential Processes, Principal Components Analysis (PCA), Contingent Negative Variation (CNV)

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