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Proceedings of the Annual Meeting of the Cognitive Science Society

Title

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Journal

Proceedings of the Annual Meeting of the Cognitive Science Society, 37(0)

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Publication Date

2015

Peer reviewed

P3 as a neural index of response inhibition

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Abstract: This study aimed to identify which ERP are specifically related to response inhibition. Electrophysiological activity was recorded from 30 subjects, and was submitted to a temporospatial principal component analysis to detect and quantify the main components associated with response inhibition. A modified go/nogo composed of three types of stimuli (frequentGo, infrequentGo, and infrequentNogo) was used to dissociate activity related to response inhibition from that related to novelty processing. InfrequentGo and infrequentNogo trials differed in the type of response (execution vs. inhibition), but not in their frequency of appearance. Neither the anterior nor the posterior N2 displayed larger amplitudes for infrequentNogo than infrequentGo trials. By contrast, both the anterior and the posterior P3 showed larger amplitudes for infrequentNogo than for infrequentGo trials. Present results suggest that P3 plays a key role in motor response inhibition. These findings substantiate and extend the current evidence and previous findings from our group.