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Slow negative brain potentials as reflections of specific modular resources of cognition

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Abstract

The paper summarizes a series of experiments in which the topography and the amplitude of slow event-related brain potentials (slow ERPs) was studied in cognitive tasks which imposed different amounts of load on functionally distinct processing modules. The results suggest that the topography of slow ERPs reflects the relative activation/inactivation of distinct cortical cell assemblies while the absolute amplitude of the negative maximum seems to reflect how much a particular cell assembly is activated at a particular time. Translated into the terminology of cognitive resource theories one could say that tasks which evoke distinct slow wave patterns draw on independent resources. Likewise, the amplitude of a slow wave pattern could be related to the construct of resource allocation, i.e. the larger the amplitude of a slow wave pattern the more resources of a particular type are allocated to a task. These findings are discussed with respect to possible generator mechanisms of slow waves and in relation to possible causes of capacity limitations of the human information processing system. © 1997 Elsevier Science B.V.

Keywords: ERPs; Slow waves; Mental resources; Cognition; Memory; Imagery; Topographic mapping

1. Introduction

Psychological theories on mental resources, whether formulated as unidimensional Kahneman (1973) or multidimensional (Wickens, 1980; Wickens, 1984),

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