Reference-independent ERP old/new effects of auditory and visual word recognition memory: Joint extraction of stimulus- and response-locked neuronal generator patterns

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Abstract

The ERP recordings from which the analyses were based were obtained under the condition of a continuous mismatch negativity paradigm, in which each stimulus was presented in a random order, with the exception that each stimulus (i.e., a word or a nonword) was presented twice. Each stimulus was followed by a response, which was either correct or incorrect, and the response was either delayed or immediate. The correct responses were followed by a correct response, while the incorrect responses were followed by an incorrect response. The response latency was recorded for each response, and the response accuracy was calculated for each stimulus.

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Introduction

The use of ERPs to study memory has been a major focus of research in cognitive neuroscience for several decades. ERPs can be used to study a variety of memory tasks, including the retrieval of old versus new information, the encoding of new information, and the recognition of old versus new information. ERPs can also be used to study the effects of memory retrieval on neural activity, such as the positive and negative components of the ERP, which are thought to be associated with old and new memory retrieval, respectively.

Methods

The ERP recordings were obtained from the calvaria of seven adult marmoset monkeys (five males and two females), each with a mean age of 2.5 years. The monkeys were trained to perform a continuous mismatch negativity task, in which each stimulus was presented in a random order, with the exception that each stimulus (i.e., a word or a nonword) was presented twice. Each stimulus was followed by a response, which was either correct or incorrect, and the response was either delayed or immediate. The correct responses were followed by a correct response, while the incorrect responses were followed by an incorrect response. The response latency was recorded for each response, and the response accuracy was calculated for each stimulus.

Results

Several ERP components were observed during the performance of the continuous mismatch negativity task, including the positive and negative components of the ERP, which were thought to be associated with old and new memory retrieval, respectively. These components were found to be sensitive to the retrieval of old versus new information, with the positive component showing a larger amplitude for old information than for new information, and the negative component showing a smaller amplitude for old information than for new information. The positive component was also found to be larger for correct responses than for incorrect responses, while the negative component was found to be smaller for correct responses than for incorrect responses.

Discussion

The results of this study provide evidence for the use of ERPs to study the effects of memory retrieval on neural activity, and for the use of these effects to study the retrieval of old versus new information. The positive and negative components of the ERP were found to be sensitive to the retrieval of old versus new information, with the positive component showing a larger amplitude for old information than for new information, and the negative component showing a smaller amplitude for old information than for new information. These results suggest that ERPs can be used to study the effects of memory retrieval on neural activity, and for the use of these effects to study the retrieval of old versus new information.

References


