Neural correlates of successful encoding in schizophrenia: an event-related potential study

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Abstract

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Neural correlates of successful encoding in schizophrenia: An event-related potential study

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Aims: Individuals with schizophrenia demonstrate pronounced deficits in cognitive processing with particular impairments in episodic memory. This may reflect a difficulty in the ability to encode new information. The subsequent memory paradigm has been used in the study of memory formation to segregate neural processes responsible for successful encoding. In healthy controls subsequently remembered items are associated with a more positive ERP waveform than those later forgotten. The aim of the study was to investigate neural correlates of encoding in schizophrenia using a subsequent memory paradigm. Method: EEG was recorded in 20 patients and 19 healthy controls during the semantic encoding of single words. ERPs were sorted according to whether words were subsequently recognised. Group differences were determined in late positivity (LPP; area under the curve 450-750 ms), as well as for N1, P2 and N400 ERP peak amplitudes, as a function of subsequent recognition. Results: Patients tended to perform poorer than controls on the recognition test (slower [p=0.069] and less accurate [p=0.006]). Mean amplitude of the encoding-related LPP was greater for recognised than not-recognised words (p=0.035, eta-squared=0.12), with patients showing reduced mean amplitude compared to controls regardless of whether the word was recognised (p=0.018, eta-squared=0.15). Further, compared to controls, patients showed significantly reduced P2 (p=0.032, eta-squared=0.11) and frontal N400 peak amplitudes (p=0.012, eta-squared=0.15) during encoding. Conclusions: The results suggest that reduced activation of encoding processes contributes to poorer recognition memory performance in schizophrenia, however the relative importance of early attentional (P2) and later semantic processing (N400 and LPP) alternations cannot be determined from the present study.

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Keywords: Schizophrenia, episodic memory, encoding, event-related potential (ERP), subsequent memory paradigm


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