

Poster Exhibition (abstracts)

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Verbal memory encoding in patients with schizophrenia: an event-related fMRI-study.

S. Heinze (1,2), B.W. Müller (1), G. Sartory (2), A. Hesse (1), A. de Greiff (1), M. Forsting (1), M. Jüptner (1)

1) Clinic for Psychiatry and Psychotherapy, University of Duisburg-Essen
2) Dept. Clinical Psychology, University of Wuppertal

Verbal memory deficits have been shown to be extant among cognitive dysfunctions in schizophrenia. They have also been found to be of major importance in the long-term adaptation of patients to community life. The aim of the present study was to investigate verbal memory encoding by means of event-related functional magnetic resonance tomography (fMRI).

We assessed eighteen patients with schizophrenia (DSM-IV: 295.30; PANSS positive 12.6, negative 12.9, global 27.6) and fifteen healthy controls matched for age, gender and education. During scanning, nine word lists consisting of 19 always new nouns were presented. Words were alternated with fixation crosses; each stimulus was presented for 2.7 sec. Seven word lists were to be learned and two lists were to be read (baseline condition). Immediately after presentation of each list subjects were asked to reproduce the words. Data acquisition was carried out on a 1.5 T Siemens Sonata Scanner. Event-related data analysis was carried out using SPM2 and random-effects analyses ($p < .001$, uncorrected).

Of the 133 words to be learned, patients recalled a mean of 40.4 (SD 16.1) words and controls recalled a mean of 50.6 (SD 11.3) words ($p = .05$). During encoding of subsequently remembered versus forgotten words control subjects showed activation in left inferior to middle temporal gyrus (BA 20), right medial paracentral lobule (BA 6), fusiform gyrus (BA 37), superior parietal lobule (BA 7) and middle occipital gyrus (BA 19). Patients showed left hemisphere activation in superior frontal gyrus (BA 10) and inferior/middle frontal gyrus (BA 11), anterior cingulate gyrus (BA 32), middle temporal gyrus (BA 21/37) as well as inferior (BA 40) and superior parietal lobule (BA 7).

The patient sample in our study showed few symptoms on the PANSS and only moderate verbal memory deficits. Both, patients and control subjects activated the left lateral temporal cortex during successful verbal encoding - a region which has been shown to be related to encoding success of verbal information in healthy controls (Otten et al., 2002; Heinze et al., 2003). Additional right parietal activation in control subjects may point to a visuo-spatial encoding strategy (Fletcher et al., 1995) which has been associated with higher verbal memory performance (McCauley et al., 1996, Heinze et al., 2004).

References

Fletcher PC, Frith CD, Baker SC, Shallice T, Frackowiak RS et al. The mind's eye--precuneus activation in memory-related imagery. *Neuroimage* 1995; 2:195-200.

Heinze S, Müller BW, Sartory G, de Greiff A, Forsting M et al. Erfolg und Strategie: Zur funktionellen Bildgebung verbaler Enkodierungsprozesse. In Neuro-Visionen. Perspektiven in Nordrhein-Westfalen. Hossmann K-A (Hossmann K-As). Paderborn: Ferdinand Schöningh; 2004. pp. 99-100.

Heinze S, Sartory G, Müller BW, de Greiff A, Forsting M et al. Brain activation during verbal encoding. *Neuroimage* 2003; 19:S1-S101.

McCauley ME, Eskes G, Moscovitch M. The effect of imagery on explicit and implicit tests of memory in young and old people: a double dissociation. *Can J Exp Psychol* 1996; 50:34-41.

Otten LJ, Henson RN, Rugg MD. State-related and item-related neural correlates of successful memory encoding. *Nat Neurosci* 2002; 5:1339-1344.