Early visual processing deficits during a working memory task in schizotypy

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Introduction

• Schizophrenia associated with impaired early visual processing.
• Reflects in reduced early components of visual-evoked EEG responses (P1)⁻²
• P1 reflects low frequency activity – unclear if the deficit is due to power or phase abnormality?
• Early visual deficits associated with impaired working memory (WM)¹
• In relatives too - vulnerability markers? ¹
• Possible biomarkers for efficacy of novel drugs?
• Does schizotypy reflect vulnerability?

Question

• Reduced early visual evoked responses and WM in schizotypal personality?

Methods

• Subjects
  - 18 and 20 healthy volunteers scoring high and low on the Schizotypal Personality Questionnaire (Raine et al.)
  - EEG processing
    - Epochs: 400–1000 ms (encoding: last image in the series; retrieval: probing stimulus).
    - Filters: low-pass forward phase shift of 0.5 Hz (6dB/octave) and high-pass-0.05 phase shift of 30 Hz (24dB/octave).
  - EEG analysis
    - ERP preprocessed and analyzed using BESA version 5.2 (Brain Electrical Source Analysis, Gräfelfing, Germany).
    - Time-frequency representation in the 4–14 Hz range was obtained using complex Morlet wavelet transform.
• Non-EEG cognitive tasks CANTAB, Cambridge.
• fMRI: Associative Learning (PAL) memory.
• Intra-Extra-Dimensional Set Shift (IED, central executive)

Paradigm

• Encoding: 1, 2 or 3 images of 400 ms with an interstimulus interval of 600 ms
• Maintenance: 6 second delay
• Retrieval: Probing stimulus for 3 seconds, participants press a button to indicate whether it was part of the encoding series

Behavioural results: ERP task

• Effect of WM load: p<0.001
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• No group effect
• Group effect: p=0.034

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References

(3) El-Deredy, W., Haenschel, W., Deakin J.F.W. “Visual information processing deficits as biomarkers of vulnerability to schizophrenia: An event-related potential study in schizotypy.” Neuropsychologia, in press.