

# Abnormal synchronization of left and right primary auditory cortex activity during a mismatch negativity task in people at risk for psychosis

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## ABSTRACT

Abnormal auditory processing of deviant stimuli, as reflected by mismatch negativity (MMN), is often reported in schizophrenia. At present, it is still under debate whether this dysfunctional response is specific to the full-blown schizophrenia diagnosis or rather a marker of psychosis in general. The present study tested MMN in patients with schizophrenia (SCZ), with bipolar disorder (BD), with a first episode of psychosis (FEP), and in subjects at clinical high risk for psychosis (CHR).

Source-based MEG activity evoked during a passive auditory oddball task was recorded from 135 patients grouped according to diagnostic subgroup (SCZ, BD, FEP, and CHR) and 135 healthy controls also divided into four subgroups, age- and gender-matched with diagnostic subgroups. The magnetic MMN (mMMN) elicited over the left and right auditory region was analyzed in the time domain as event-related field (ERF) and in the time-frequency domain as Theta power, Theta inter-trial phase coherence (ITPC), and Theta inter-site phase coherence (ISPC).

The clinical group as a whole showed reduced mMMN in all the analyses, without any statistically significant interaction between diagnosis and mMMN reductions. The mMMN subgroup contrasts showed lower ERF amplitude in all the diagnostic subgroups. While SCZ also showed significant power and ITPC reductions and indications of diminished ITPC were observed in CHR, no significant power and ITPC decreases characterized BD and FEP. Importantly, ISPC revealed significant synchronization reductions of left and right primary auditory cortex activity in SCZ, BP, and CHR, but not in FEP.

Significant mMMN alterations in people experiencing psychosis, also for diagnoses other than SCZ, suggest that this neurophysiological response may be a marker of psychosis. Additionally, the evidence of diminished functional connectivity between the primary auditory cortexes might reflect altered brain functional integration, or “dysconnection”, as a core feature of psychosis, also associated with risk for this mental illness.