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SCHIZOPHRENIA Factsheet

October 2020

What is electroencephalography (EEG)?

Electroencephalography (EEG) uses electrodes on the scalp to measure electrical activity from the brain. Quantitative spectral EEG investigates several waveforms, and so the activity can be measured, but EEG also gives rise to event related potentials (ERP), which measure the EEG activity directly evoked by a stimulus, often using cognitive or perceptual stimuli. Error-related negativity is a response-locked ERP that has been associated with monitoring of actions and detecting errors. Error-related negativity is typically followed by the error positivity component. In contrast to error-related negativity and error positivity, feedback negativity is elicited by externally provided feedback about positive rather than negative outcomes. Spectral waveforms measured by EEG include delta waves (up to 4 Hz), which are slow waves with high amplitude; theta waves (4-7 Hz), which are also slow waves; alpha waves (8-12 Hz), which occur mostly at rest, beta waves (12-30 Hz), which are fast waves with low amplitude, occurring during times of alert concentration, and gamma waves (30-100+ Hz) which occur during certain cognitive and motor functions. One example of an ERP is the P300 wave, which is measured primarily over the parietal lobe and is used as a measure of cognitive function. EEG is also used to measure electrical activity during sleep, to identify disruptions to sleeping patterns.

What is the evidence for EEG?

Moderate to high quality evidence finds theta and delta wave activity are increased and P300 amplitude is decreased in people with schizophrenia. Moderate quality evidence also finds increased beta wave activity and decreased alpha wave activity.

Moderate to high quality evidence finds a large effect of reduced error-related negativity in people with psychosis and a medium-sized effect in those at risk of psychosis. There were no differences in error positivity or feedback negativity.

Moderate quality evidence finds people with schizophrenia had large effects of shorter total sleep time, more awake time, longer sleep onset latency, and lower sleep efficiency. There were medium-sized effects of increased stage 1 sleep, decreased stage 4 sleep, decreased slow wave sleep, and decreased REM latency. There were small effects of decreased stage 3 sleep and increased REM duration. Moderator analyses found medication-naïve patients had shorter total sleep time, longer sleep onset latency, decreased sleep efficacy, and longer awake time. Patients recently withdrawn from antipsychotics had shorter total sleep time, longer sleep onset latency, decreased sleep efficacy, longer awake time, increased stage 1 sleep, decreased stage 2, 3, and 4 sleep, decreased slow wave sleep and shorter REM latency. Patients on antipsychotics had significantly longer sleep onset latency, increased stage 2 sleep, and decreased total REM sleep.

For more information see the technical table

NeuRA
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NeuRA (Neuroscience Research Australia) is one of the largest independent medical and clinical research institutes in Australia and an international leader in neurological research.

Diseases of the brain and nervous system pose the greatest health, economic and social burden of any disease group because they are chronic, debilitating and have no known cures.

Medical research is the cornerstone of efforts to advance the health and wellbeing of families and the community. Our dedicated scientists are focussed on transforming their research into significant and practical benefits for all patients.

While we hope you find this information useful, it is always important to discuss any questions about schizophrenia or its treatment with your doctor or other health care provider.

HOW YOUR SUPPORT HELPS

We are able to make significant advances due to the generosity of countless people. Your donation allows us to continue to work towards transforming lives. For information on how you can support our research, phone **1300 888 019** or make a secure donation at **neura.edu.au/donate/schizophrenia**.

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