

# Resting-state EEG and Reading Skills in German-speaking Children

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## Abstract

Resting-state neural oscillations have been linked with attention and language processing, yet their specific role in reading skills remains unclear. We studied the associations between resting-state EEG and reading skills among 83 German-speaking first to third graders. Our analyses focused on power spectrum density across four frequency bands (delta, theta, alpha, beta) and cluster-based connectivity, in children with varying reading abilities, controlling for age. Spectral analysis showed no significant associations between reading skills and frequency bands. Functional connectivity analysis revealed a negative association with delta-band activity in the central-parietal and with theta-, beta- and delta-band activity in the central-occipital network. Pseudoword reading and reading comprehension were negatively associated with theta-band activity in the left central-occipital and delta-band activity in the right central-occipital network, respectively. Our findings provide insights into the complex relationship between neural oscillations and early reading and suggest resting-state functional connectivity as a neural marker of reading skills.