

Abstract

Maturation lag hypothesis and abnormal alternative cortical connection hypothesis are two major hypotheses on dyslexia. This current study aimed at investigating if these hypotheses can explain different levels of reading skills, rather than only explaining group differences between dyslexia and normal subjects as found in previous studies. This current study investigated the correlations 1) between reading skill and EEG power at different frequency bands (both based on Individual Alpha Frequency (IAF) and fixed frequency windows) 2) between reading skill and functional connectivity measures (i.e. global and local efficiencies) at frequency bands based on IAF for 8-10 years old monolingual children ($n = 67$) with a wide range of reading skills at resting state using EEG. Significant negative correlations were found between reading skill and EEG power (delta and theta), which is also in line with maturation lag hypothesis. However, in connectivity analysis, significant correlations between reading skill and connectivity measures were not found, which the maturation lag hypothesis failed to explain the different levels of reading skills. No correlations were found between reading skill and alpha power as expected, which is also in line with the abnormal alternative cortical connection hypothesis.

Keywords: reading skill, dyslexia, resting-state EEG, resting state functional connectivity, maturation lag hypothesis, abnormal alternative cortical connection hypothesis, delta, theta and alpha oscillations