

The trajectory of the functional excitation-inhibition balance in an autistic and allistic developmental sample

Hannah Plueckebaum

University of Kaiserslautern-Landau, Kaiserslautern, Germany

Lars Meyer

Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany

Ann-Kathrin Beck

University of Kaiserslautern-Landau, Kaiserslautern, Germany

Thomas Lachmann

University of Kaiserslautern-Landau, Kaiserslautern, Germany

Katharina H. Menn

Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany

Abstract

Imbalances between the brain's excitatory (E) and inhibitory (I) systems can lead to structural and functional cortical deviances which have been associated with various developmental conditions including autism. However, the developmental trajectory of such EI imbalances across childhood and adolescence as well as its relationship to autism traits is not well understood yet. In this study, we determined a functional measure of the EI balance from resting-state electroencephalogram recordings of 92 autistic and 100 allistic children (6-17 years of age) and related it to behavioral assessments of autism traits and language ability. Our results revealed differential EI trajectories for the autistic compared to the allistic children. Moreover, the EI trajectories related to individual language ability in which elevated excitability in late childhood and early adolescence was linked to decreased listening comprehension. Our findings therefore show that the developmental trajectory of EI balance shares variance with autism trait development.