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Structural brain networks and behavioral measures of attention in adolescents who were born prematurely

Robert Juan Trevino, Olga Tymofiyeva, Trevor Flynn, Justin Yuan, James A Barkovich and **Duan Xu**
University of California San Francisco, USA

One in 10 births leads to a child being born prematurely and who, therefore enters the world with a higher risk of several health problems as well as early death. Those that survive often have severe neurodevelopmental problems, attentional problems being among the most consistently reported cognitive impairments related to prematurity. To develop effective interventions, it is essential to better understand the neural correlates of attentional problems in prematurely born children. Diffusion tensor imaging allows to non-invasively map structural brain networks by utilizing of the white matter microstructure. The purpose of this study was to investigate the correlation between the brain connectivity and attention deficits in children that were born prematurely. Based on previous research, in children with attention-deficit/hyperactivity disorder (ADHD), the hypothesis of this study detailed that the structural connectivity in middle frontal gyrus (MFG) will be weakened in adolescents with attention deficits. The study included 24 adolescents (age 10-14, average age 12.5 years) who were born prematurely and who underwent MRI imaging and cognitive assessments. Of the 24 subjects, 12 have been determined to have attention deficits. On average, the group with attention deficits had a lower node strength of the right and left MFG hemispheres compared to the group without attention deficits. The independent sample t-test was marginally non-significant (p=0.08) in the right hemisphere and less significant in the left hemisphere (p=0.18). The results of this study indicate that attentional problems in adolescents who were born prematurely may be associated with a weaker structural connectivity of the frontal gyrus, a brain region known to be involved in attentional processes. Our study is the first one to examine the neural correlates of attention deficits in adolescents who are known to have been born preterm. This knowledge could lead to a better understanding of the mechanisms that play a role in development of attentional deficits in children born prematurely.

Biography

Robert Juan Trevino is a Biomedical Engineering Undergradutate from the Unversity of Texas at San Antonio going into his final year. He is an MARC*U*STAR and Amgen Scholar and was able to work in the lab of Duan Xu at the Biomedical Imaging Department at the University of California, San Francisco.

robert.trevino@utsa.edu

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