Volumetric and Cortical Thickness Analysis of the Insular Cortex in Children with a History of Preschool Onset Depression

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The insula, a region of the brain located in the cerebral cortex and component of the limbic system, participates in emotion and mood regulation. Major depressive disorder (MDD) is a debilitating and common psychiatric disorder, which can affect emotions, thoughts, sense of self, behaviors, physical functioning, and biological processes. Children as young as three years old can express clinically significant symptoms of depression; therefore, it is necessary to identify anatomical differences in the brain to better understand the underlying neurobiology of childhood depression. Research with depressed adults showed volume reduction in the left anterior insula compared to healthy controls. We hypothesize a decrease in left insula volumes in depressed subjects compared to healthy controls. Past studies show cortical thinning in depressed adult subjects. We hypothesize depressed subjects will show insular cortical thinning compared to the control group. For this study, we used a subset of 30 subjects from a larger longitudinal study of children with preschool onset depression. The average age of subjects was 10 years; we also matched for sex, IQ, and income. Two groups, healthy controls and affected, containing 15 subjects were analyzed. We acquired MRI images, which show the structural anatomy of the brain. Using a computer program, we manually traced the left and right insula. We measured both volume size and cortical thickness of the insula.

We expect to see results consistent with our hypotheses; however, we are unsure if the proposed changes will be identified during early childhood. Due to the shortage of literature on childhood depression, it is necessary to identify neurobiological of depression markers in children. Future research should include volumetric and cortical thickness analysis on anterior and posterior regions of the insular cortex.