

Poster Session A

B-75

Neural Correlates of Emerging Executive Functioning in 2–5 Year Olds

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Objective: Executive functions (EF) are core building blocks that underlie higher-order cognitive functions. EF deficits are associated with many developmental disorders and believed to involve the interplay between disparate brain regions and brain systems. However, the relationship between the maturation of these neural systems on the emergence of EF, through white matter (WM) myelination, remains to be elucidated. **Method:** 110 children (mean age = 3.5 ± 0.9 years; 64 Male, 49 Caucasian) participated in the study. Brain myelination was quantified throughout the brain using an MRI-based multicomponent relaxometry approach (mcDESPOT). Within 7 days of MRI, children underwent cognitive assessment and parents completed the Behavior Rating Inventory of Executive Functioning-Preschool version (BRIEF-P). Non-parametric correlations were examined between myelin measures throughout the brain and BRIEF-P indices using 3 general linear models, including age and the Early Learning Composite from the Mullen Scale of Early Learning as covariates. **Results:** Statistically significant positive (i.e., increasing myelin with higher T-scores) relationships ($p < 0.05$ FWE) were identified between myelin and the BRIEF-P Working Memory scale (bilateral frontal and left temporal areas), Metacognition index (bilateral frontal) and Global composite. Statistically significant negative relationships ($p < 0.05$ FWE) were identified between myelin and the BRIEF-P Emotional Control scale (diffuse areas) and Flexibility index (right subcortical and parietal lobe). **Conclusion(s):** Myelination plays an important role in EF emergence in very young children. Positive relationships may be the result of increased connectivity but less mature capacity to sustain efficient management of information. The negative relationship may suggest better emotion regulation/flexibility. Directionality and areas of relationship warrant further study.