

Fixel-based analysis

Fixel-based analysis (FBA) is a quantitative [framework](#), which identifies microstructural and macrostructural changes in individual fiber populations within [voxels](#) containing crossing fibers.

In a [prospective longitudinal cohort](#) of very [preterm](#) (VPT) and full-term FT children, they used [Fixel-Based Analysis](#) to investigate associations between the maturation of white matter fiber density (FD), fiber-bundle cross-section (FC), and combined fiber density and cross-section (FDC) and math computation ability at 7 (n = 136 VPT; n = 32 FT) and 13 (n = 130 VPT; n = 44 FT) years, as well as between change in white matter and math computation ability from 7 to 13 years (n = 103 VPT; n = 21 FT). In both VPT and FT children, higher FD, FC, and FDC in visual, sensorimotor, and cortico-thalamic/thalamocortical white matter tracts were associated with better math computation ability at 7 and 13 years. Longitudinally, accelerated maturation of the posterior body of the corpus callosum (FDC) was associated with greater math computation development. White matter-math associations were similar for VPT and FT children. In conclusion, white matter maturation is associated with math computation ability across late childhood, irrespective of birth group ¹⁾.

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