

**Public Abstract**

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Title:Mapping the Language-Specific Cerebrocerebellar Network of the Human Brain Through Diffusion Tensor Imaging

Language is arguably the key factor that has influenced the evolution of the human brain. Previous research on endocasts, our only direct evidence of the brains of human ancestors, has revealed a disproportionate increase in size of the cerebellum relative to the cerebrum. Recent neurological findings indicate that the cerebellum plays a role in modulating language through neural connections to the cerebrum. Our research has mapped the connectivity among the cerebellum and language areas in the cerebrum through a specialized form of magnetic resonance imaging (MRI), diffusion tensor imaging (DTI), and verified that the cerebellum is a key component of the language network in the human brain. When compared with behavioral measures of language we found significant correlations between connectivity in the language-specific cerebrocerebellar network (LSCN) and language production. This research provides critical data on how much can be known about language from the study of fossil brain endocasts by testing the assumption that brain structure, specifically in the LSCN, correlates with language ability. We are now able to test the hypothesis that these same suites of features are reliably reproduced on endocasts. This evidence is essential for making predictions about the behavior of fossil hominin ancestors from endocast data.