Relationships between Presence or Absence of ADHD and fMRI Connectivity Writing Tasks in Children with Dysgraphia

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Abstract

The relationship between presence or absence of Attention Deficit Hyperactivity Disorder (ADHD) in persisting developmental dysgraphia (impaired handwriting) and brain connectivity during writing tasks was investigated. Thirteen participants (6 males, 1 female with ADHD; 4 males, 2 females without ADHD) in upper elementary or middle school grades performed four fMRI writing tasks—two cognitive (mind wandering and planning to compose) and two transcription (handwriting and spelling). Presence or absence of ADHD was correlated with brain connectivity on all four fMRI writing tasks during scanning, rather than just on the fMRI handwriting task as predicted based on prior research. However, the nature of the fMRI functional connectivity (from which of four seeds with which of eight brain regions) for the four fMRI writing tasks varied as a function of presence or absence of ADHD. The significance of these findings is discussed for both understanding the invisible biological bases of co-occurring ADHD and persisting developmental dysgraphia and teaching students with developmental dysgraphia and co-occurring ADHD.