

EEG functional connectivity patterns in children with Tourette syndrome and attention deficit hyperactivity disorder

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Introduction

- Tourette syndrome (TS) and attention deficit hyperactivity disorder (ADHD) frequently co-occur.¹
 - TS+ADHD: ↑ cognitive, psychosocial and behavioral difficulties.²
- It remains unclear whether TS and ADHD have common or distinct neurobiological underpinnings.
 - Prior research suggest additive effects of TS and ADHD, but it is still unclear which specific frequency bands are implicated.³

Objectives

- Assess how TS and ADHD separately and jointly impact functional connectivity.
- Assess whether functional connectivity is associated with behavioral and emotional problems in TS and ADHD.

Methods

- Participants (aged 10-14)
 - TS (n = 51, 6 girls)
 - ADHD (n = 24, 5 girls)
 - TS+ADHD (n = 29, 4 girls)
 - Typically developing children (n = 33, 10 girls)
- Measure: Child Behavior Checklist (CBCL) Internalizing and Externalizing scales.
- Procedures:
 - Eyes-open resting-state (7 minutes) EEG recordings.
- Brain sources reconstructed using weighted minimum norm estimation.⁴
- Functional connectivity computed across 68 cortical regions⁵ in 5 frequency bands (delta, theta, alpha, beta, and gamma).
- Statistical analyses: Network-based statistics (main effects and interactions).

Results

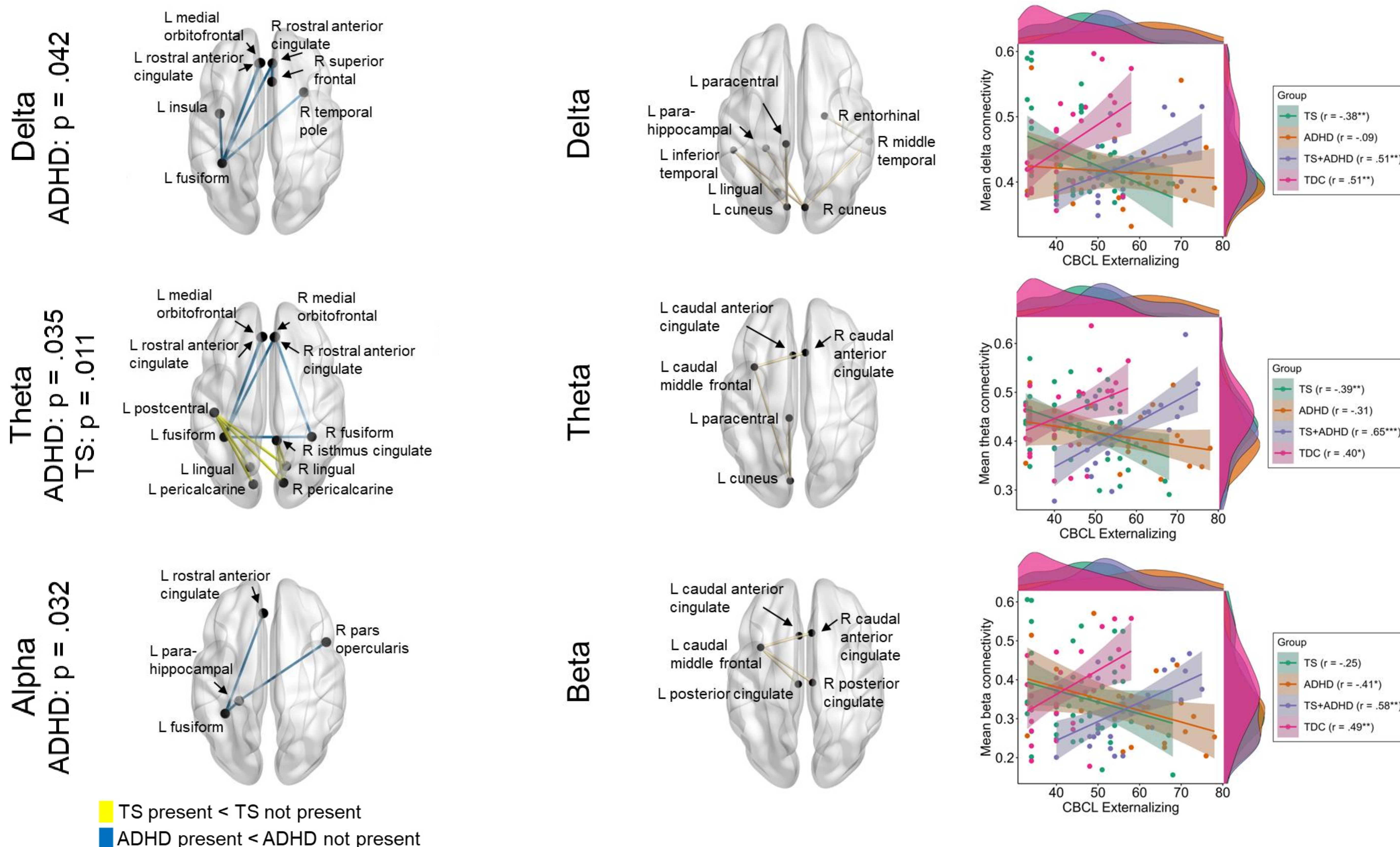


Figure 1: Additive effects of TS and ADHD on functional connectivity

Figure 2: Externalizing problems and functional connectivity

Conclusions

- Both TS and ADHD are associated with decreased connectivity in different networks, suggesting additive effects of TS and ADHD.
- TS by ADHD by Externalizing interactions across three frequency bands: different patterns of functional connectivity are associated with externalizing problems in children with TS+ADHD, relative to those with either TS or ADHD.
- TS and ADHD may be additive for basic neurobiological aspects but may interact for more complex processes.

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