

Neurocognitive Heterogeneity within ADHD and Typically Developing Children

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BACKGROUND

ATTENTION-DEFICIT/HYPERACTIVITY DISORDER

ADHD is a developmental disorder characterized by deficits in attention and hyperactivity. Most research has assumed ADHD differs only along diagnostic subtypes, but distinct neurocognitive profiles of ADHD have been found to nest within heterogeneity in the typically developing (TD) population (Fair et al., 2012; Vaidya et al., 2019).

VAIDYA ET AL. (2019)

- Clustered ADHD, autism spectrum disorder, and TD children based on normalized domain scores on the ADHD Rating Scale, Child Behavior Checklist (CBCL), and Brief Rating Inventory of Executive Function (BRIEF)
- Identified three subgroups characterized by weaknesses in flexibility and emotion regulation; inhibition; and working memory, organization, and planning

OBJECTIVES

- Replicate the methods of Vaidya et al. (2019)
- Cluster subjects with additional affective processing and risk taking measures, known to differ in children with ADHD as well (Nigg & Casey, 2005)

METHODS

DEMOGRAPHICS

- 80 children (8-12 years, mean=9.85, sd=1.29)
 - 33 TD (14 F)
 - 47 ADHD (19 F): 3 ADHD-H (1 F), 13 ADHD-I (8 F), 21 ADHD-C (8 F), 9 sub-threshold (1 F), 1 unknown (1 F)

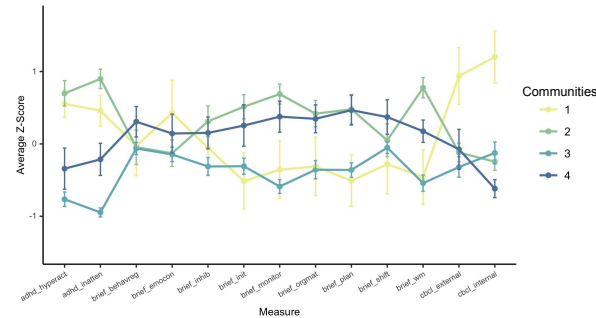
ANALYSES

- Analysis 1: Vaidya Replication
 - Z-scores from the Conners 3rd Ed, CBCL, and BRIEF
- Analysis 2: All Features Comparison
 - Z-Scores from the Conners 3rd Ed, CBCL, and BRIEF
 - Z-Scores from the UPPS-P impulsive rating scale for children, affective reactivity index, emotion regulation checklist, behavioral inhibition and behavioral activation subscales, domain-specific risk-taking children's scale, and brief sensation seeking scale for children

RESULTS

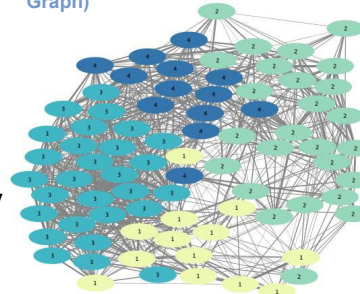
Vaidya Replication

FIGURE 1. Vaidya Replication. Neurocognitive profiles (Z-score by measure) for four communities



Communities 1 and 3 align with Vaidya et al.'s (2019) flexibility/emotional control group, and community 2 aligns with their metacognition group. Community 4 is unique with muted Conners 3 scores and a lower CBCL internalizing syndrome.

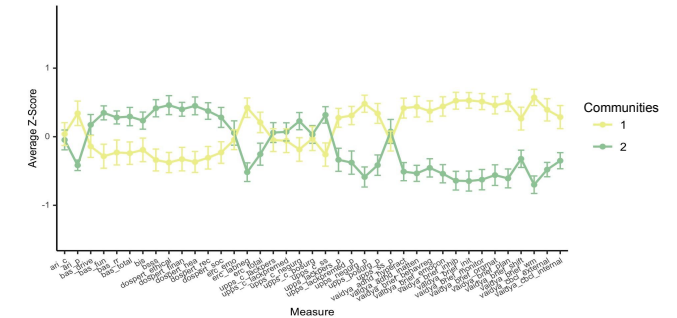
FIGURE 3. Vaidya Replication (Edge-Weighted Spring Embedded Graph)



Community Subjects by Diagnosis
 • 1: 14 (13 ADHD) • 2: 26 (23 ADHD)
 • 3: 29 (5 ADHD) • 4: 11 (6 ADHD)

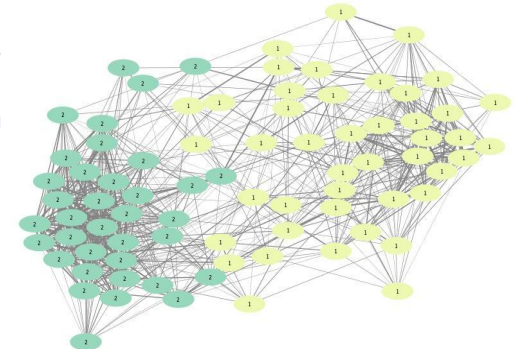
All Features Comparison

FIGURE 2. All Features Comparison. Neurocognitive profiles (Z-score by measure) for two communities



Community 1 aligns with communities 2 and 4 of the Vaidya Replication, and community 2 aligns with communities 1 and 3 of the Vaidya Replication.

FIGURE 4. All Features Comparison (Edge-Weighted Spring Embedded Graph)



Community Subjects by Diagnosis
 • 1: 44 (37 ADHD)
 • 2: 36 (10 ADHD)

CONCLUSIONS

VAIDYA REPLICATION

- Evidence for Vaidya et al.'s (2019) flexibility/emotional control and metacognition groups exist in our sample
- A unique group was characterized by muted ADHD symptom burden and EF, but low CBCL internalizing syndrome

ALL FEATURES COMPARISON

- The addition of features decreased heterogeneity, filtering the Vaidya Replication communities into communities of high and low burden

FUTURE DIRECTIONS

- Future research should determine the best clustering measures to encompass all aspects of ADHD without allowing measures to overlap, thus minimizing noise present in the All Features Comparison