Influence of Comorbid Attention-Deficit/Hyperactivity Disorder on Activity Level and Adaptive Skills in Children with ASD: The ACE GENDAAR Network

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Background

- **Autism Spectrum Disorder (ASD)** is a neurodevelopmental disorder that is commonly associated with deficits in social, adaptive, and communication skills.
- **Attention-Deficit/Hyperactivity Disorder (ADHD)** is characterized by inattention, hyperactivity, and impulsivity that impairs functioning.
- Despite distinct sets of diagnostic criteria for ASD and ADHD in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V), studies have found that both, individuals and children with ASD, to demonstrate behaviors that are characteristic of ADHD.
- Previous research estimates that between **30 and 50%** of individuals with ASD manifest ADHD symptoms (Davis & Kollins, 2012).
- In addition, according to a study done by Leyfer et al., 31% of their sample of children with ASD met the DSM-IV-TR diagnostic criteria for ADHD.
- Research has shown that individuals with ASD tend to have decreased community involvement. However, it is not well studied in individuals who have co-occurring ASD and ADHD.
- This study explores the relationship between social and community engagement (involvement in organizations, sports, organized group activities, school) and adaptive skills of individuals with **ASD** and co-occurring **ASD+ADHD**.

Hypotheses

- We expect that children with ASD+ADHD compared to children with ASD only, will have greater impairment in adaptive skills and will score lower on the CBCL total standard score (total score of activities, school and social subscale).
- We hypothesize that there will be a positive correlation between social activity involvement and adaptive skills. That is, children with more community participation will have better adaptive skills.

Methods

Participants:

- Children 8-17 years of age with ASD from the ACE GENDAAR network (A four-site NIH funded project examining sex-based neural differences in children with ASD).
- All participants included in the sample met ASD criteria on standardized autism assessments (ADOS-2 and ADI-R) and scored ≥70 DAS-II verbal IQ domain.

	N	Verbal IQ	CBCL Total Score	Vineland-II Adaptive Score
ASD Only	89	M=104.82, SD=19.96	M=35.60, SD=9.28	M=79.80, SD=12.95
ASD+ADHD	64	M=98.83, SD=15.74	M=34.55, SD=9.21	M=72.66, SD=12.45
Total	168 (m=75, f=93)	M=102.31, SD=18.50	M=35.08, SD=9.22	M=76.43, SD=13.32

Measures Collected:

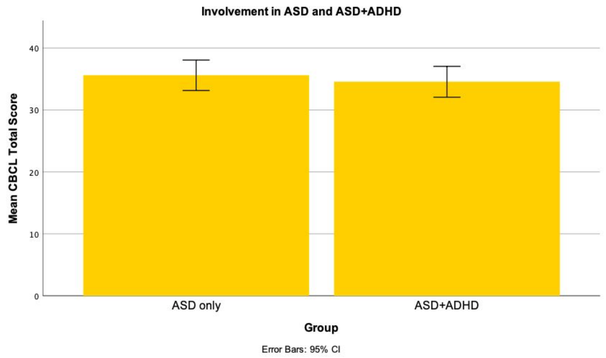
- **CBCL ADHD Score (Score of ≥63):** Parents completed the Child Behavior Checklist (CBCL) reporting on child activity (involvement in sports, school, organizations, hobbies, chores), ADHD symptoms, overall behavioral problems, and overall competence. Participants scoring ≥63 on ADHD symptoms scale were counted as having clinically significant ADHD.
- **CBCL Total Score:** Total score based on the Child Behavior Checklist, including sub scales that measure for activities, school and social involvement. The total score is also referred to as activity score in the poster.
- **Impairment of Adaptive Skills (Score of <70):** Parents completed the Vineland-II, a parent interview assessing adaptive skills. Sub-scales included Communication, Daily Living, Socialization, and Adaptive Composite. Participants scoring <70 are considered to have clinical impairment of adaptive skills.

**Cutoff scores based on DSM-IV*

Results

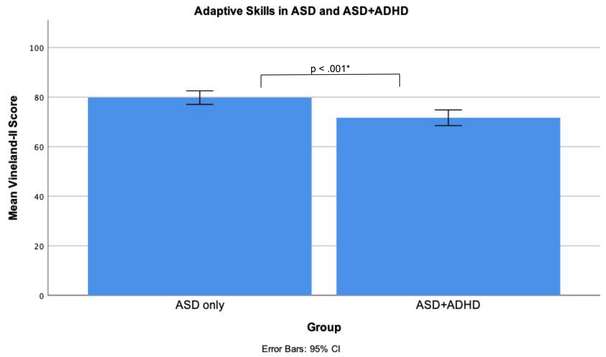
Q1: Is there a difference in activity level for children with ASD only and ASD+ADHD?

One way analysis of variance was implemented between CBCL total score for both ASD only and ASD+ADHD groups. There was **no significant main effect** of activities between the groups *F(1,118) =.84, p =.36*.



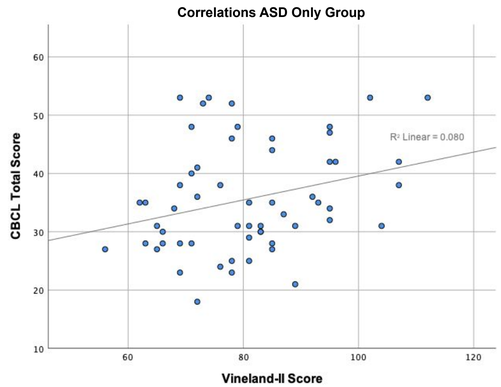
Q2: Is there a difference in adaptive skills for children with ASD only and ASD+ADHD?

One way analysis of variance was implemented between Vineland-II adaptive score for both ASD only and ASD+ADHD groups.

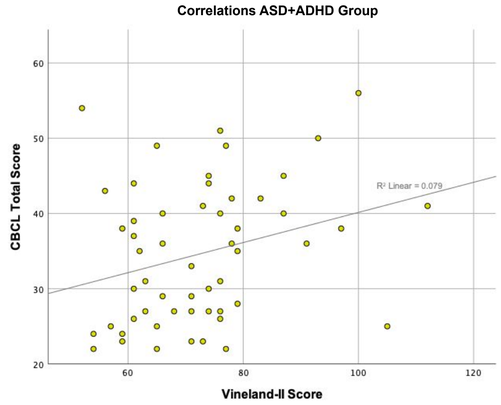


There is a **significant main effect** of adaptive skills between the groups *F(1,110)=14.62, p < .001* in that participants with co-occurring ASD and ADHD tend to have more adaptive impairments than participants with ASD only. However, **neither group is considered "clinically impaired"** (with a mean score >70).

Q3: Is there a relationship between activity level and adaptive skills within the ASD and ASD+ASD groups?



Correlations were run between CBCL total scores and Vineland Adaptive Skills standard score within the ASD Only group. There are **positive correlations** between adaptive skills and CBCL total score (r=.282, *p=.03*) suggesting that those with higher adaptive scores (less impairments) tend to have higher activity level within this group.



Correlations were run between CBCL total scores and Vineland Adaptive Skills standard score within the ASD+ADHD group. There are **positive correlations** between adaptive skills and CBCL total score (r=.281, *p=.04*) suggesting that those with higher adaptive scores (less impairments) tend to have higher involvement level within this group.

Discussion

- Currently, there is a limited amount of resources that standardize diagnoses and courses of treatment for individuals with ASD+co-occurring comorbidities. The results of this study highlights the importance of considering these comorbidities when deciding on interventions for individuals with ASD to better create a targeted intervention approach.
- Although a significant difference was not found in the activity score across the groups, there was a significant main effect of adaptive skills that supported our hypothesis predicting that children with comorbid ASD+ADHD would score lower in their adaptive skills (more impairments) even though scores were not in the clinically impaired range.
- In addition, we hypothesized that a higher activity level would be positively correlated with a higher level of adaptive skills. There was a significant positive correlation for both, the ASD only and ASD+ADHD groups between activity level and adaptive skills suggesting that a higher activity level is correlated with higher adaptive skills regardless of condition.
- Our study was focused on the role of the ADHD comorbidity and did not take into account the role of other comorbidities such as OCD, depression that may play a hindering role in the activity levels or adaptive skills of children. Further research should focus on extending this research to include other co-occurring morbidities that could present a barrier to community involvement and adaptive skills. Lastly, both the Vineland-II and CBCL are parent-based measures and rely on the accuracy of parent reports and is not observational measures.

Acknowledgements and References

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Leyfer, O.T., Folstein, S.E., Bacalman, S. et al. (2006). *Comorbid Psychiatric Disorders in Children with Autism: Interview Development and Rates of Disorders.* The Journal of Autism and Developmental Disorders. 36, 849–861.

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