



Characterizing Language Atypicalities in Autism Spectrum Disorder

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Our Multidisciplinary Team

- Speech Language Pathology
- Natural Language Processing
- Psychology
- Psychiatry
- Computational Linguistics
- RAs, students, and volunteers

Learner Outcomes

- Prioritize pragmatic language as a robust indicator for differential diagnosis of ASD and ADHD
- Identify benefits of administering parent-informant questionnaires for systematic analysis of pragmatic language in children
- Discuss language profiles of children with ASD, ADHD, and TD based on structural, and pragmatic abilities

Why Pragmatics?

- Communication development
 - Linguistic content and structure
 - Functional use, social context
- Language in action
- Hallmark of Autism
 - Also found in other neurodevelopmental disorders
- Identifying specific patterns of communication development may support diagnostic differentiation

How to Assess?

- Difficult to assess pragmatics with high confidence using typical standardized assessment
- Social communication is better observed over time
 - Parent-report measures capture differences well

Goals

- Compare specific linguistic and pragmatic aspects of communication
 - Autism Spectrum Disorder (ASD)
 - Typical development (TD)
 - Attention Deficit Hyperactivity Disorder (ADHD)
- Analyze parent responses to explore language profiles among these groups
 - Validated parent-report questionnaire

Participants

- 174 children
 - 101 with ASD (mean age: 11.3 years; 84% male)
 - 28 with TD (mean age: 11.6 years; 43% male)
 - 45 with ADHD (mean age 11.5 years; 69% male)

Methods

- Children's Communication Checklist - 2nd Edition (CCC-2):
 - Typical vs. disordered language development
 - 70 items across 10 scales
 - Strengths and difficulties
 - GCC and SIDI scores

Methods

- General Communication Composite (GCC)
 - **Structural**: Speech, Syntax, Semantics, Coherence
 - **Pragmatic**: Initiation, Scripting, Context, Nonverbal
- Social Interaction Difference Index (SIDI)
(Initiation + Nonverbal + Social Relations + Interests)
Pragmatic & Autistic Traits
 - (Speech + Syntax + Semantics + Coherence)

Structural Language

Methods

- Analysis of variance (ANOVA)
- Analysis of covariance (ANCOVA) to compare scores across clinical groups
 - TD, ASD, ADHD

Results

- Nine ANOVA models revealed significant ($p < .001$) between-groups differences
 - Children with ASD scored significantly lower on all CCC-2 scores than children with ADHD and TD
 - Games-Howell post-hoc tests
 - Larger effect sizes for pragmatic than structural scaled scores
 - Pragmatic: η^2 : .56 - .65
 - Structural: η^2 : .20 - .47

Language Profiles

Measure	TD	ADHD	ASD	<i>P</i> -values
CCC-2	<i>n</i> = 28	<i>n</i> = 45	<i>n</i> = 99*	
GCC	112.0 (8.3)	96.9 (12.8)	73.1 (11.6)	<.001
SIDI	3.1 (5.1)	-3.4 (7.5)	-7.3 (8.9)	<.001

*Missing data from 2 of the 101 participants with ASD

Results

- TD scores > ADHD scores > ASD scores
 - With the exception of two structural scales (Speech & Syntax)
- Covarying cognitive scores reduced the size of CCC-2 differences across groups only minimally
- When structural scores were covaried alongside cognitive scores, pragmatic scores remained significantly different across diagnostic groups
 - η^2 : .49

Conclusions

- Results suggest a robust and significant difference in pragmatic language abilities between children with ASD and ADHD
 - Clinical application in differential diagnosis
- Basis for identifying linguistic profiles in ASD and ADHD
 - CCC-2 manual describes differentiation between language impairment and ASD
- Parent questionnaires to supplement assessment of pragmatic language
 - Cost / Benefit
 - ASD diagnostics when ADHD is an additional consideration

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Thank You

Questions, comments, collaboration?

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