

# Evaluating the relation between ADHD symptoms and externalizing behaviors in children with Autism Spectrum Disorder

Miles Feller, B.A., Chloe Quinnett, B.A., Kaitlyn Drafton, B.S., Tara Rutter, M.S., Beverly J. Wilson, Ph.D., Devon Yamane, Jennifer Carron

## Background

- Children with autism spectrum disorder are at increased risk for externalizing problems (Bos, Diamantopoulou, Stockman, Begeer, & Rieffe, 2018).
- This situation is further complicated by the high comorbidity between ASD and ADHD, which has been linked to long-term negative outcomes (Factor, Ryan, Farley, Ollendick, & Scarpa, 2017).
- A recent study found that 78% of children presenting with ASD and parent-reported challenging behaviors also met criteria for ADHD (Brookman-Fraze, Stadnick, Chlebowska, Backer-Ericzen, & Granger, 2018).
- Given that early interventions for these disorders are most effective (Turner-Brown, Hume, Boyd, & Kainz, 2019), more research is needed on ASD, ADHD and externalizing symptoms in young children prior to diagnosis.

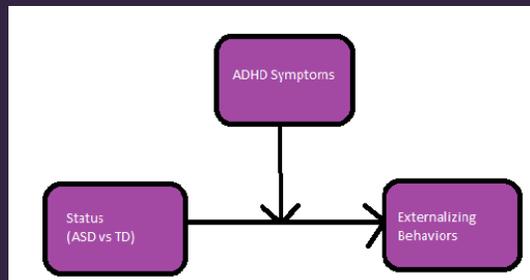


Figure 1. Conceptual moderation model

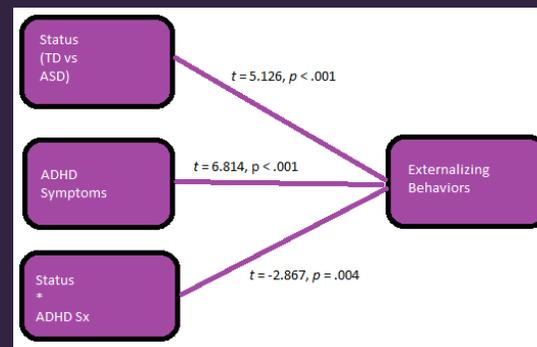
## Objectives

This study investigated whether the relation between ASD status (ASD vs typical development, TD) and externalizing behavior would vary based on differences in ADHD symptoms.

## Methods

- Participants were 208 children (3-6:11 years) and their parents. Our sample included 127 TD children (47.7% female) and 81 children with ASD (16.7% female). Child's diagnostic status was determined by diagnostic reports provided or medically released by parents.
- Additionally, parents completed the Autism Behavior Checklist (ABC; Krug et al. 1980) to confirm that TD participants did not exhibit symptoms that are commonly associated with ASD.
- Parent ratings from The Behavioral Assessment System for Children—Second Edition (BASC-2; Reynolds & Kamphaus, 2006) provided an estimate of externalizing problems whereas the ADHD subscale from the Conners estimated ADHD (CBRS, 1990).

Figure 2. Statistical moderation model



## Results

We used the linear regression to test our moderation model. Our model included the covariate of sex, which explained 5.5% of the variance in externalizing problems. The main effects of developmental status and ADHD symptoms on externalizing were both significant,  $t(195) = 5.126, p < .0001$ ;  $t(195) = 6.814, p < .0001$ , respectively, and jointly accounted for 35.3% unique variance in externalizing problems. The interaction between status and ADHD symptoms was also significant,  $t(195) = -2.876, p < .001$ , explaining an additional 3.3% unique variance. The overall model explained 44.7% of the variance in externalizing problems,  $F(4, 195) = 39.44, p < .0001$ . Externalizing problems were higher for the ASD and TD groups when ADHD symptoms were also high versus lower but this relation between ADHD and externalizing was stronger for the TD group.

## Conclusions

Our findings are consistent with research showing that children with ASD and comorbid ADHD symptoms exhibit higher rates of externalizing behavior than children with low rates (Factor et al., 2017; Sprenger et al., 2013; Tureck et al., 2013). This study extended prior research by examining ADHD and externalizing behavior in a large young sample of children with ASD or TD and varying levels of ADHD symptoms. Our findings are limited by the cross-sectional nature of our study and the use parent report in lieu of observations of externalizing. Future research should verify these findings using a longitudinal design.

Externalizing Behaviors on ADHD Symptoms

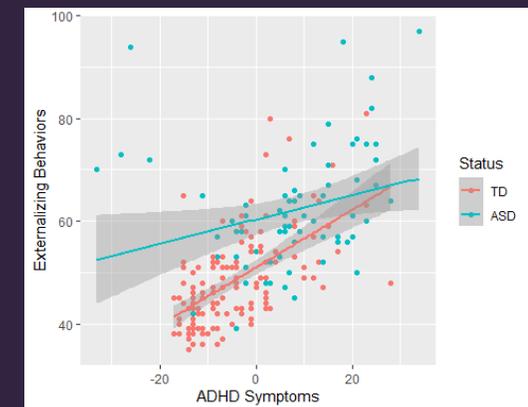


Figure 3. Significant Interaction Model

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