



# Brief Report: Predictors of School Refusal Due to Bullying in Children with Autism Spectrum Disorder and Attention-Deficit/Hyperactivity Disorder

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## Abstract

Children with Autism Spectrum Disorder (ASD) or Attention-Deficit/Hyperactivity Disorder (ADHD) are at increased risk for bullying victimization. School refusal is a 'red flag' for identification of bullying in children with ASD and/or ADHD. This study examined the impact of diagnoses, demographics, and school variables on school refusal due to bullying. Participants were 97 parents of 154 children with ASD, ADHD, ASD+ADHD, other diagnoses, or no diagnosis. Children with ASD+ADHD were most likely to refuse school due to bullying. Classroom aides and behavior problems were protective and risk factors, respectively. In the final regression model, child diagnosis no longer predicted school refusal. School refusal and problem behavior warrant consideration as a marker of distress for victimized children.

**Keywords** Autism Spectrum Disorder · Attention-Deficit/Hyperactivity Disorder · School refusal · Bullying · Victimization

At least one-third of school-age children are involved in bullying (Zych et al. 2015). Bullying victimization rates increase to 46–94% in Autism Spectrum Disorder (ASD; Sreckovic et al. 2014) and 43–65% in Attention-Deficit/Hyperactivity Disorder (ADHD; Winters et al. 2018). Identifying bullied youth is crucial due to the risk for poor academic performance, psychosocial difficulties, physiological distress, and school phobia (Thomas et al. 2016). Typically-developing youth are often asked to self-report their bullying experiences, but children with ASD or ADHD may have difficulty self-reporting or recognizing bullying (Adams et al. 2014). Therefore, researchers frequently rely on parent or teacher report to examine bullying in children with disabilities. However, bullying often occurs outside the presence of adults (Hebron et al. 2015) and adult and child reports can vary (Kloosterman et al. 2013). As such, school refusal behavior may be a 'red flag' for identification

of bullied youth, especially for children with ASD or ADHD (Vanderbilt and Augustyn 2010).

Symptoms of ASD or ADHD may increase risk for bullying victimization. In ASD, related difficulties include social communication deficits and repetitive behaviors (Kloosterman et al. 2013). In ADHD, externalizing behaviors and emotion dysregulation are associated with victimization (Taylor et al. 2010). Children with ASD and co-occurring ADHD are more likely to be bullied or have behavior problems than children with ASD or ADHD alone (Zablotsky et al. 2014). ADHD symptoms may moderate risk in ASD such that children with ASD alone are not at greater risk for bullying (Montes and Halterman 2007).

Approximately 28–35% of children have ever refused to attend school (Kearney and Spear 2014), with estimates up to 53% in ASD (Munkhaugen et al. 2017). Children with ASD or ADHD are at particular risk for school absenteeism, extended disengagement, and dropout (Preece and Howley 2018; Ochi et al. 2020) and having multiple developmental disabilities multiplies likelihood for chronic absenteeism (Black and Zablotsky 2018). School refusal is concerning as it can jeopardize academic and social-emotional development and increase risk of extended school absence or premature dropout (Munkhaugen et al. 2017).

Bullying victimization is one of the leading causes of school refusal (Havik et al. 2015); students who are bullied

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may be up to six times more likely to avoid school than students who are not bullied (Vidourek et al. 2016). School refusal is considered to be a coping mechanism for children who experience bullying victimization (Bitsika and Sharpley 2014). Individual characteristics, such as externalizing behavior problems and reduced social motivation are related to increased likelihood of bullying and school refusal (Karande 2018; Munkhaugen et al. 2017). Demographic factors, such as older age, male gender, and non-Caucasian race are also related to increased likelihood of bullying (Sreckovic et al. 2014; Iossi Silva et al. 2013). School factors for bullying victimization and school refusal include peer conflict, lack of teacher support, and an unsafe or unpredictable school environment (Havik et al. 2014, 2015). Spending more time in a general education classroom (as opposed to a special education classroom) is also related to increased likelihood of bullying victimization for youth with ASD (Zablotsky et al. 2014). In contrast, effective classroom management and greater classroom support have been shown to reduce bullying and mitigate school refusal (Havik et al. 2015).

Although research has examined the prevalence of school refusal due to bullying in youth with ASD or ADHD, the impact of co-occurring ASD + ADHD is not yet understood. The aims of this study are to (1) examine the influence of ASD and ADHD diagnoses on likelihood of school refusal due to bullying and (2) explore the impact of child characteristics (i.e., behavior problems and communication ability), demographic variables, and school factors on school refusal behavior. It is hypothesized that children with ASD + ADHD will more frequently refuse school due to bullying compared to children with no diagnosis or ASD alone. Increased school refusal due to bullying is also hypothesized for youth who are male, of non-Caucasian race, or have behavior problems, given the increased risk for bullying in these groups. Finally, we hypothesize greater classroom support will be related to decreased school refusal frequency.

## Methods

### Participants

Participants were 97 parents of 154 children (ages 4–16) who were at least 18 years old and had internet access. Children were grouped according to parent-reported diagnoses: ASD ( $n=36$ ), ADHD ( $n=16$ ), ASD + ADHD ( $n=31$ ), other diagnosis (i.e., anxiety disorders, mood disorders, disruptive behavior disorders, learning disorders, language/communication disorders, sensory/auditory processing disorders;  $n=15$ ), and no diagnosis ( $n=56$ ). By parent report, some children with ASD and/or ADHD also had co-occurring “other diagnoses” (see Table 1). Across groups, the average

child age was 10.2 ( $SD=3.4$ ). Many children were male (65%) and White (74%). There was no significant difference among diagnostic groups in child age ( $F(4,149)=0.81$ ,  $p=0.52$ ) or child race ( $F(4,149)=1.80$ ,  $p=0.13$ ). There was a significant difference among diagnostic groups in child gender ( $F(4,149)=3.05$ ,  $p=.02$ ), which was primarily driven by the ASD + ADHD group being less likely to be female compared to the no diagnosis group ( $p=.03$ ). Most children attended public school (76%) in a general education classroom (73%). Some children had a 1:1 aide in school at least part of the day (22%) or a current behavior support plan (BSP; 31%). Parents reported that most ASD diagnoses were made by a psychologist (50%) or pediatrician (31%) with the remaining receiving a diagnosis from a psychiatrist (13%) or other professional (6%). On average, children were diagnosed with ASD at 5.6 years old ( $SD=2.7$ ; range 1.5–13 years old) and received other diagnoses at 7.3 years old ( $SD=3.1$ ; range 2–16 years old). For the 41 ASD participants with available data, 93% scored above the recommended cutoff of 76 on the Autism Spectrum Quotient at the time of study participation (AQ;  $M=103.07$ ,  $SD=15.92$ ; Auyeung et al. 2008). AQ data was not available for all participants (see Procedure, below). Participants were recruited by distributing flyers to school districts, advocacy and parent groups, clinical organizations, social media pages, university listservs, the research lab website, and community boards of local businesses. See Table 1 for participant demographics and Table 2 for additional characteristics included in our analyses.

### Materials and Procedure

Study participation occurred online within a larger study investigating perceptions of bullying (Morton et al. 2019). Parents reported the frequency and recency of their child’s school refusal due to bullying by answering the question: ‘Has your child ever refused school due to bullying’ using a four-point Likert scale: ‘has never happened,’ ‘has happened in the past but not this year,’ ‘has happened this school year,’ and ‘happens at least once per month.’ This single-item report of bullying is similar to methodology used in prior bullying research with children with ASD and ADHD (Montes and Halterman 2007). Parents also answered questions about child diagnosis, demographics, and school factors (i.e., school and classroom type, 1:1 aide at school, BSP). Children’s social understanding was assessed using two dichotomous questions: ‘Does your child understand nonliteral phrases or sarcasm (e.g., “It’s raining cats and dogs” or “that’s a piece of cake”)?’ and ‘Can your child take another person’s perspective (e.g., understand why another child is mad at him/her)?’ Children’s communication ability was assessed by asking ‘How does your child usually communicate with others?’ (speaking in

**Table 1** Participant demographics

|                                   | Parent ( <i>n</i> =95) | Child                    |                     |                      |                          |                          |                       |
|-----------------------------------|------------------------|--------------------------|---------------------|----------------------|--------------------------|--------------------------|-----------------------|
|                                   |                        | Overall ( <i>n</i> =154) | ASD ( <i>n</i> =36) | ADHD ( <i>n</i> =16) | ASD+ADHD ( <i>n</i> =31) | Other Dx ( <i>n</i> =15) | No Dx ( <i>n</i> =56) |
| Female                            | 89 (92%)               | 53 (35%)                 | 9 (25%)             | 6 (38%)              | 5 (16%)                  | 7 (47%)                  | 27 (48%)              |
| Age M(SD)                         | 40.3 (7.7)             | 10.2 (3.4)               | 10.4 (3.5)          | 11.0 (3.3)           | 10.6 (2.7)               | 9.8 (2.6)                | 9.6 (3.8)             |
| <b>Race</b>                       |                        |                          |                     |                      |                          |                          |                       |
| American Indian/<br>Alaska Native | 1 (1%)                 | 3 (2%)                   | 0 (0%)              | 0 (0%)               | 0 (0%)                   | 0 (0%)                   | 3 (5%)                |
| Asian/Pacific Islander            | 2 (2%)                 | 0 (0%)                   | 0 (0%)              | 0 (0%)               | 0 (0%)                   | 0 (0%)                   | 0 (0%)                |
| Black/African American            | 0 (0%)                 | 2 (1%)                   | 0 (0%)              | 1 (6%)               | 1 (3%)                   | 0 (0%)                   | 0 (0%)                |
| Hispanic                          | 15 (16%)               | 23 (15%)                 | 3 (8%)              | 1 (6%)               | 5 (16%)                  | 3 (20%)                  | 11 (20%)              |
| White Caucasian                   | 72 (74%)               | 114 (74%)                | 29 (81%)            | 13 (81%)             | 21 (68%)                 | 11 (73%)                 | 40 (71%)              |
| Other                             | 7 (7%)                 | 12 (8%)                  | 4 (11%)             | 1 (6%)               | 4 (13%)                  | 1 (7%)                   | 2 (4%)                |
| <b>Other diagnoses</b>            |                        |                          |                     |                      |                          |                          |                       |
| Anxiety disorders                 | n/a                    | 60 (39%)                 | 11 (31%)            | 9 (56%)              | 25 (81%)                 | 15 (100%)                | 0 (0%)                |
| Mood disorders                    | n/a                    | 33 (21%)                 | 8 (22%)             | 5 (31%)              | 20 (65%)                 | 8 (53%)                  | 0 (0%)                |
| Mood disorders                    | n/a                    | 11 (7%)                  | 1 (3%)              | 4 (25%)              | 6 (19%)                  | 4 (27%)                  | 0 (0%)                |
| Disruptive behavior disorders     | n/a                    | 10 (6%)                  | 2 (6%)              | 5 (31%)              | 3 (10%)                  | 1 (7%)                   | 0 (0%)                |
| Speech/communication              | n/a                    | 7 (5%)                   | 3 (8%)              | 3 (19%)              | 1 (3%)                   | 4 (27%)                  | 0 (0%)                |
| Learning disabilities             | n/a                    | 6 (4%)                   | 1 (3%)              | 1 (6%)               | 4 (13%)                  | 1 (7%)                   | 0 (0%)                |
| Auditory/sensory processing       | n/a                    | 8 (5%)                   | 4 (19%)             | 0 (0%)               | 4 (13%)                  | 3 (20%)                  | 0 (0%)                |
| <b>Parent education</b>           |                        |                          |                     |                      |                          |                          |                       |
| High school or less               | 15 (15%)               | n/a                      | n/a                 | n/a                  | n/a                      | n/a                      | n/a                   |
| Some college/associate degree     | 27 (28%)               | n/a                      | n/a                 | n/a                  | n/a                      | n/a                      | n/a                   |
| 4 Year/bachelor's degree          | 18 (19%)               | n/a                      | n/a                 | n/a                  | n/a                      | n/a                      | n/a                   |
| Graduate work or degree           | 37 (38%)               | n/a                      | n/a                 | n/a                  | n/a                      | n/a                      | n/a                   |

*sentences; speaking in phrases; speaking in single words; making sounds; sign language; picture exchange; alternative communication system).*

Parents were also asked about their child's diagnoses of ASD, 'Has your child ever been diagnosed with an Autism Spectrum Disorder (e.g., Autism, High-Functioning Autism, Asperger's Syndrome, Pervasive Developmental Disorder (PDD), ASD)?' and other diagnoses, 'Has your child been diagnosed with any other mental health disorder(s) (e.g., Attention Deficit-Hyperactivity Disorder, Learning Disabilities, Intellectual Disability, Schizophrenia, Anxiety, Social Anxiety, Depression, etc.)?' Parents who indicated their child had been diagnosed with ASD were asked who determined their child's ASD diagnosis (i.e., physician/pediatrician, psychiatrist, psychologist, I don't know, or other) and at what age their child received the diagnosis. Parents who indicated their child had received other diagnoses were asked to specify

which diagnoses were given and at what age the diagnosis was received. Parent report has been found to provide accurate and useful information on ASD and ADHD diagnoses (National Center for Health Statistics 2015). This parent-report methodology parallels that used in previous research with children with ASD and ADHD (e.g., Russell et al. 2014; Black and Zablotzky 2018). Finally, parents of children who reported an ASD diagnosis were asked to complete the Autism Spectrum Quotient (AQ) as a measure of ASD symptom severity (Auyeung et al. 2008). Parents of 41 children (61% of the ASD sample) chose to complete the AQ. Upon survey completion, participants were given the option to enter their contact information into a separate survey for a remuneration drawing for one of five, \$50 gift cards. Participants with children with ASD who completed the AQ were told they would be entered into the gift card drawing twice.

**Table 2** School refusal occurrence

|                                | Overall<br>( <i>n</i> = 154) | 1. ASD<br>( <i>n</i> = 36) | 2. ADHD<br>( <i>n</i> = 16) | 3. ASD<br>+ ADHD<br>( <i>n</i> = 31) | 4. OtherDx<br>( <i>n</i> = 15) | 5. No Dx<br>( <i>n</i> = 56) | F     | <i>p</i> | Sig. contrasts   |
|--------------------------------|------------------------------|----------------------------|-----------------------------|--------------------------------------|--------------------------------|------------------------------|-------|----------|------------------|
| <b>School refusal</b>          |                              |                            |                             |                                      |                                |                              |       |          |                  |
| Monthly                        | 18 (12%)                     | 3 (8%)                     | 4 (25%)                     | 8 (26%)                              | 2 (13%)                        | 1 (2%)                       | 3.87  | < .01    | 5 < 3            |
| School year <sup>a</sup>       | 34 (22%)                     | 5 (14%)                    | 5 (31%)                     | 12 (39%)                             | 4 (27%)                        | 8 (14%)                      | 2.40  | 0.05     | None             |
| Lifetime <sup>a</sup>          | 54 (35%)                     | 10 (28%)                   | 8 (50%)                     | 21 (68%)                             | 5 (33%)                        | 10 (18%)                     | 6.96  | < .001   | 1,5 < 3          |
| <b>School factors</b>          |                              |                            |                             |                                      |                                |                              |       |          |                  |
| BSP                            | 47 (31%)                     | 20 (56%)                   | 4 (25%)                     | 19 (62%)                             | 4 (27%)                        | 0 (0%)                       | 17.33 | < .001   | 2,4,5 < 3; 5 < 1 |
| 1:1 aide                       | 34 (22%)                     | 16 (44%)                   | 3 (19%)                     | 14 (45%)                             | 1 (7%)                         | 0 (0%)                       | 11.69 | < .001   | 4,5 < 1,3; 2 < 1 |
| Gen. Ed.<br>classroom          | 111 (73%)                    | 18 (50%)                   | 12 (75%)                    | 17 (55%)                             | 12 (80%)                       | 52 (95%)                     | 8.25  | < .001   | 1,3 < 5          |
| <b>Child functioning</b>       |                              |                            |                             |                                      |                                |                              |       |          |                  |
| Understands<br>sarcasm         | 96 (62%)                     | 10 (28%)                   | 9 (56%)                     | 12 (39%)                             | 13 (87%)                       | 52 (93%)                     | 19.18 | < .001   | 2 < 5; 1,3 < 4,5 |
| Perspective<br>taking          | 87 (56%)                     | 10 (28%)                   | 8 (50%)                     | 9 (29%)                              | 10 (67%)                       | 50 (89%)                     | 17.06 | < .001   | 1,3 < 4,5        |
| Sentence<br>communi-<br>cation | 132 (86%)                    | 28 (78%)                   | 14 (88%)                    | 23 (74%)                             | 12 (80%)                       | 55 (98%)                     | 3.01  | < .05    | 3 < 5            |
| Behavior<br>problems           | 99 (65%)                     | 28 (80%)                   | 11 (67%)                    | 31 (100%)                            | 11 (73%)                       | 18 (33%)                     | 15.93 | < .001   | 5 < 1,2,3,4      |

<sup>a</sup>Cumulative sum

## Data Analysis

Data were analyzed using SPSS version 25 and Stata version 15. Analysis of variance (ANOVA) with Bonferroni correction was used to examine the effect of diagnosis on lifetime school refusal due to bullying (Aim 1). A multilevel model was considered to examine predictors of school refusal frequency (Aim 2), as some children were siblings. A model accounting for variance within families was not an improvement over the linear model ( $\chi^2(1) = 0.03$ ,  $p = 0.43$ , intraclass correlation (ICC) = 0.025); an ordinal logistic regression was selected for parsimony. A model-building approach was used by entering sets of predictors to test hypotheses. Models were assessed for improved fit beyond the prior by comparing the  $-2$  log likelihood with the Chi square statistic. Percent variance explained by each model was interpreted from the pseudo  $R^2$  statistic. Child grade was the only continuous variable to be modeled; skewness and kurtosis assumptions were met so transformations were not conducted. Collinearity assumptions were met via the absolute value of the correlations among all predictor variables being less than 0.551, which is below the recommended cutoff of  $|r| < 0.7$  (Dormann et al. 2013).

## Results

Overall, 35% of parents reported their child had ever refused school due to bullying. There was a significant difference across groups in lifetime school refusal due to bullying ( $F(4,149) = 5.66$ ,  $p < .001$ ). Post-hoc comparison with Bonferroni correction revealed children with ASD + ADHD were most likely to have ever refused school due to bullying (68%) compared to children with ASD (28%) or no diagnosis (18%; see Table 2). Group comparisons for school and child functioning variables are also provided in Table 2.

An ordinal logistic regression was conducted to examine the impact of demographic and school factors on school refusal frequency. Child diagnosis (Model 1) predicted 7.15% of variance in school refusal frequency ( $\chi^2(4) = 22.72$ ,  $p < .001$ ). Children with ASD + ADHD and ADHD alone were 7.58 times (95% Confidence Interval (CI): 2.99, 19.24) and 4.81 times (95% CI: 1.51, 15.32) more likely to refuse school more frequently compared to children without any diagnosis, respectively. An ASD diagnosis (without ADHD) or other diagnosis did not impact school refusal frequency due to bullying

compared to children with no diagnosis. Child demographics were entered next (Model 2). Gender, race, and grade in school were each unrelated to school refusal frequency but were retained in the model due to a priori hypotheses. Due to limited sample size for many race categories (see Table 1), child race was entered as a binary variable (Caucasian/Non-Caucasian). Child demographic variables explained an additional 1.78% of variance in school refusal likelihood. This set of variables did not significantly improve model fit ( $\chi^2(3) = 5.67$ ,  $p = 0.13$ ) but was retained in the model due to a priori hypotheses and literature precedence. School factors of a 1:1 aide, general education placement, and having a BSP were then added (Model 3). These variables significantly improved model fit compared to Model 2 ( $\chi^2(3) = 8.11$ ,  $p = .04$ ) and explained an additional 2.56% of outcome variance. Within Model 3, youth with a BSP were 3.35 times more likely to refuse school due to bullying more frequently (95% CI: 1.31, 8.56) compared to youth without a BSP. The increased frequency of school refusal due to bullying remained significant for youth with diagnoses of ADHD (odds ratio (OR): 3.54, 95% CI: 1.00, 12.56) and ASD + ADHD (OR: 4.85, 95% CI: 1.50, 15.71). Having a 1:1 aide or placement in a general education classroom did not predict significant variance; however, all school factor variables were retained due to a priori hypotheses. Given the paucity of literature on school refusal in children with ASD or ADHD, the impact of child functioning level was also explored (Model 4). Children's ability to use sarcasm, take another's perspective, and communicate in sentences did not explain significant variance in school refusal frequency and thus were not retained in the model. However, including parent-reported behavior problems significantly improved model fit ( $\chi^2(1) = 8.30$ ,  $p < .01$ ), explaining an additional 2.61% of variance in school refusal frequency due to bullying.

The final model predicted 14.11% of variance in school refusal frequency due to bullying (see Table 3). This model was an improvement over the model with just child diagnoses ( $\chi^2(6) = 22.08$ ,  $p = 0.001$ ,  $\Delta AIC = -10.08$ ). Higher school refusal frequency was related to children's parent-reported behavior problems (OR: 4.49, 95% CI: 1.56, 12.73) and having a BSP (OR: 3.21, 95% CI: 1.22, 8.44). Having a 1:1 aide predicted lower frequency of school refusal due to bullying (OR: 0.36, 95% CI: 0.14, 0.95). Within the final model, older child grade emerged as a significant predictor of more frequent school refusal frequency due to bullying (OR: 1.15, 95% CI: 1.01, 1.30), whereas the impact of an ADHD diagnosis or co-occurring ASD + ADHD were no longer significant (ADHD OR: 2.41, 95% CI: 0.65, 8.89; ASD + ADHD OR: 2.13; CI: 0.59, 7.72).

**Table 3** Predictors of greater school refusal frequency due to bullying

|                          | OR          | SE          | t            | p              | 95% CI             |
|--------------------------|-------------|-------------|--------------|----------------|--------------------|
| 1. Diagnosis             |             |             |              |                |                    |
| ASD + ADHD               | 2.13        | 1.40        | 1.15         | 0.25           | 0.59, 7.72         |
| ADHD                     | 2.41        | 1.60        | 1.32         | 0.19           | 0.65, 8.89         |
| Other Dx                 | 1.19        | 0.84        | 0.24         | 0.81           | 0.29, 4.77         |
| ASD                      | 0.44        | 0.32        | -1.13        | 0.26           | 0.11, 1.81         |
| 2. Demographics          |             |             |              |                |                    |
| Female                   | 0.55        | 0.24        | -1.37        | 0.17           | 0.24, 1.29         |
| Caucasian                | 2.19        | 1.00        | 1.73         | 0.08           | 0.90, 5.34         |
| <b>Grade</b>             | <b>1.15</b> | <b>0.07</b> | <b>2.17</b>  | <b>0.03</b>    | <b>1.01, 1.30</b>  |
| 3. School factors        |             |             |              |                |                    |
| <b>BSP</b>               | <b>3.21</b> | <b>1.58</b> | <b>2.36</b>  | <b>0.02</b>    | <b>1.22, 8.44</b>  |
| <b>1:1 aide</b>          | <b>0.36</b> | <b>0.18</b> | <b>-2.06</b> | <b>0.04</b>    | <b>0.14, 0.95</b>  |
| Gen. Ed. classroom       | 1.01        | 0.42        | 0.03         | 0.98           | 0.44, 2.30         |
| 4. Exploratory variable  |             |             |              |                |                    |
| <b>Behavior problems</b> | <b>4.45</b> | <b>2.39</b> | <b>2.78</b>  | <b>&lt;.01</b> | <b>1.56, 12.73</b> |

Significant predictors ( $p < .05$ ) indicated in bold

## Discussion

This study examined the influence of ASD and ADHD diagnoses, child characteristics, demographic variables, and school factors on likelihood of school refusal due to bullying. As predicted, the highest rate of lifetime school refusal due to bullying was found for children with co-occurring ASD + ADHD. Our study supports research that ADHD produces greater risk for bullying (Winters et al. 2018) and moderates the increased risk for bullying in ASD (Montes and Halterman 2007). Children with ASD + ADHD may be particularly vulnerable to, or have difficulty managing, bullying victimization. These findings also align with Black and Zablotzky (2018) that multiple co-occurring developmental disabilities increases risk for school absenteeism. There was no difference in the 'other diagnosis' group from the 'no diagnosis' group with regards to lifetime school refusal prevalence. Future research should examine the influence of other common ASD comorbidities (e.g., anxiety disorders, mood disorders) on bullying likelihood, as they may play an important role in children's school refusal behavior. The lifetime prevalence of school refusal in children with no diagnosis or ASD alone (17–28%) was similar to prior estimates (Kearney and Spear 2014; Havik et al. 2015; Kurita 1991). The prevalence of school refusal among children with no diagnosis is noteworthy and provides evidence for school refusal as a growing issue with the potential for serious consequences for all children (Sobba 2019).

Although children with ASD are at increased risk for bullying compared to non-ASD peers (Hwang et al. 2018), an ASD diagnosis alone did not predict greater frequency of school refusal due to bullying within the ordinal



regression model. These findings suggest that children with ASD may not be at greater risk for bullying after accounting for symptoms of ADHD. It is also plausible that limitations in recognizing or communicating bullying experiences in children with ASD influenced parent report, such that parents were not aware that victimization was the reason for their child's school refusal. However, there were no statistical differences between the groups of youth with ASD, ADHD, or ASD + ADHD in parent report of their child's ability to understand sarcasm, take others' perspective, or communicate in sentences.

Having a 1:1 aide predicted lower frequency of school refusal due to bullying, which is consistent with research that lack of classroom support or individualized attention increases school refusal (Havik et al. 2014, 2015). Our findings also support research that externalizing behaviors are associated with bullying (Sreckovic et al. 2014), and indicate behavior problems increase likelihood for school refusal due to bullying. After behavior problems and BSP were entered into the model, child diagnosis no longer predicted frequency of school refusal. High rates of comorbidity between ADHD and disruptive behavior disorders (i.e., Oppositional Defiant Disorder, Conduct Disorder) presents the possibility that children with ADHD in this sample may also engage in disruptive behaviors (Hudec and Mikami 2018). Visual inspection of the prevalence of parent-reported disruptive behavior disorders in our sample suggests low rates of co-occurrence in the ASD + ADHD and ASD samples (6% and 10%, respectively), and somewhat higher co-occurrence in the ADHD sample (31%). Regardless of the explanation, our findings extend prior research by suggesting that behavior problems and school refusal behavior may each be warning signs for bullying victimization (Vanderbilt and Augustyn 2010). Older child age was also related to more frequent school refusal due to bullying. This finding supports research that older age is related to greater bullying victimization in children with and without ASD, (Sreckovic et al. 2014) and adds that older age may predict more frequent school refusal due to bullying. Finally, our hypothesis of the relation between demographic variables (gender and race) and school refusal was not supported, despite their relation to victimization (Zablotsky et al. 2014). Social communication abilities (i.e., perspective-taking, understanding sarcasm, speaking in sentences) were also unrelated to school refusal. This contrasts with research that social impairment is related to school refusal in ASD (Munkhaugen et al. 2017) and children with limited communication abilities are more vulnerable to bullying (Hwang et al. 2018). It may be the case that the impact of child functioning on school refusal due to bullying is better accounted for by other variables within our multivariate analysis (e.g.,

behavior problems). Additional research is needed to clarify these relationships.

## Limitations

The primary limitation is the use of parent-report to determine child diagnoses. Clinical elevation on the AQ supports parent-reported diagnoses of ASD for this group. Our parent-report methodology is similar to that used in previous ASD and ADHD research (Russell et al. 2014; Petrou et al. 2018; Black and Zablotsky 2018) and there is evidence for convergent validity between diagnoses of ADHD via parent report and within medical records (Holbrook et al. 2017; Visser et al. 2013). Even so, we acknowledge parent-reported diagnoses may be less reliable than clinician-reported diagnoses and there may be variability in diagnostic considerations across disciplines. Another limitation is that certain variables (i.e., perspective-taking, understanding sarcasm, presence of behavior problems) and the association between school refusal and bullying were measured with one question. A more comprehensive assessment of child functioning may clarify relations among social motivation, communication abilities, and school refusal due to bullying. Finally, the sample may have been underpowered to detect smaller effects. Post hoc power analysis revealed that, based on the variance explained in the model (pseudo  $R^2=0.1411$ ), our sample was adequately powered to detect the impact of variables with odds ratios  $\leq 0.57$  and  $\geq 1.75$  (Erdfelder et al. 1996). Thus, other variables in our model may predict school refusal due to bullying.

## Implications

To the authors' knowledge, this is the first study investigating the influence of co-occurring ASD + ADHD diagnoses on likelihood of school refusal due to bullying. The emergence of problem behavior as a risk factor suggests that school attendance of children with externalizing behaviors should be monitored. Likewise, 1:1 aides and individualized attention in the classroom may support school engagement and protect against bullying. Future studies should identify youth who are bullied but do not refuse school. A better understanding of coping strategies employed by these children may help identify intervention targets for managing bullying. Our findings suggest school refusal due to bullying is a notable concern, especially for children with ASD + ADHD or behavior problems. School refusal behavior and externalizing behavior problems warrant future research and clinical consideration as a marker of distress for children who may not otherwise communicate being bullied.

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## Compliance with Ethical Standards

**Conflict of interest** On behalf of all authors, the corresponding author states that there is no conflict of interest.

**Ethical Approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the Binghamton University Institutional Review Board (IRB#3844-16) and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Informed Consent** Informed consent was obtained from all participants includes in the study.

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