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## Prevalence and Correlates of Bullying Involvement among Adolescents with an Autism Spectrum Disorder

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### Abstract

**Objectives**—Produce nationally representative estimates for rates of bullying involvement among adolescents with an autism spectrum disorder, compare population estimates to adolescents with other developmental disabilities, and identify social ecological correlates of bullying involvement

**Design**—Nationally representative surveys from 2001

**Setting**—United States

**Participants**—Parents of adolescents with an autism spectrum disorder, principals of the schools they attended, and staff members most familiar with their school programs

**Main Exposure**—Autism spectrum disorders Outcomes Measures: Bullying involvement (parent report of victimization, perpetration, and victimization/perpetration within the last school year)

**Results**—The prevalence rates of bullying involvement for adolescents with an autism spectrum disorder were 46.3% (victimization), 14.8% (perpetration), and 8.9% (victimization/perpetration). Victimization was related to having a non-Hispanic ethnic identity, attention-deficit/hyperactivity disorder, lower social skills, some form of conversational ability, and more classes in general education. Correlates of perpetration included being White, having attention-deficit/hyperactivity disorder, and getting together with friends at least once a week. Victimization/perpetration was associated with being White, non-Hispanic ethnicity, attention-deficit/hyperactivity disorder, and getting together with friends at least once a week

**Conclusions**—School-based bullying interventions need to target the core deficits of autism (conversational ability, social skills) and comorbid conditions (attention-deficit/hyperactivity disorder). Future bullying interventions also need to address the higher rates of victimization that occur in general education settings by increasing social integration into protective peer groups and increasing the empathy and social skills of typically developing students toward their peers with an autism spectrum disorder.

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Bullying is a relational problem involving repetitive, negative actions directed toward a student, and characterized by a power imbalance—physical, social, cognitive, between the

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victim and perpetrator.<sup>1</sup> Bullying involvement encompasses three aspects of this relational problem: victimization, perpetration, and victimization/perpetration (i.e., students who perpetrate and are victimized).<sup>1</sup> Adolescents with developmental disabilities have higher rates of victimization (19-94% vs. 12-41%) and perpetration (16-83% vs. 10-44%) compared to typically developing peers.<sup>2-8</sup> The prevalence of victimization/perpetration (i.e., bully/victim) for typically developing adolescents is 6.8%, but, at present, comparable estimates are unavailable for adolescents with developmental disabilities.<sup>8</sup> Bullying involvement is associated with (a) higher levels of depression, anxiety, and loneliness and (b) lower levels of academic performance and school commitment.<sup>8-10</sup> The US Department of Health and Human Services has made bullying prevention a national priority through its Healthy People 2020 initiative, which aims to increase school safety and the adoption of anti-bullying policies over the coming decade.<sup>11</sup>

Relatively little research exists that examines the prevalence and correlates of bullying involvement among adolescents with an autism spectrum disorder (ASD). This gap is concerning as adolescents with an ASD may be uniquely vulnerable to this form of aggression given the social and relational problems that are hallmarks of their condition.<sup>12,13</sup> To examine this possibility and contextualize findings, prevalence estimates of bullying involvement are needed for adolescents with an ASD and their peers with impairments in some of the developmental areas affected by an ASD (e.g., intellectual, speech, and learning). This area of study has important public health ramifications since larger numbers of adolescents are being identified as having an ASD with each passing year and the number of adolescents served in the autism special category more than doubled from 2004 to 2010.<sup>15</sup>

Prevalence rates of bullying involvement for adolescents with an ASD vary by type of involvement and informant: victimization (7-94%) and perpetration (15-46%).<sup>4,16,17</sup> Prior studies have not reported rates of victimization/perpetration for this population. Mothers reported 94% of their children with Asperger's disorder experienced some form of victimization within the previous year.<sup>4</sup> Teachers reported the highest rates of bullying involvement (victimization: 30%; perpetration: 46%) for adolescents with an ASD in comparison to self (victimization: 17%; perpetration: 19%) and peer-reports (victimization: 7%; perpetration: 15%).<sup>17</sup>

Communication problems, fewer friendships, and lower income were found to be significant correlates of bullying involvement among adolescents with an ASD.<sup>16,17</sup> Attention-deficit/hyperactivity disorder (ADHD) was found to be a significant correlate of perpetration.<sup>18</sup> Among a nationally representative sample, parent-reports indicated adolescents with an ASD and ADHD (59.8%) perpetrate at a higher rate in comparison those with only an ASD (28.4%).<sup>18</sup> ADHD is also a risk factor for victimization and victimization/perpetration among typically developing adolescents.<sup>19,20</sup> The relationship of ADHD to rates of victimization and victimization/perpetration remains largely unexplored with adolescents with an ASD.

With one exception, previous studies were not nationally representative as the data were gathered through international websites or from the Netherlands and Canada.<sup>4,16-18</sup> The study that used a nationally representative U.S. sample, however, only examined perpetration.<sup>18</sup> Other generalizability limitations include samples comprised primarily of adolescents with Asperger's disorder or drawn from special schools that only serve adolescents with an ASD.<sup>4,17</sup>

This study addresses these gaps by using a nationally representative U.S. sample of adolescents with an ASD to investigate the following aims: (a) to identify the prevalence of

bullying involvement, (b) to compare prevalence rates of bullying involvement to adolescents with developmental disabilities that overlap with the core deficits of autism spectrum disorders, (c) to identify the social ecological correlates of bullying involvement. This study examines all three aspects of bullying involvement and their potential correlates: gender, age, race, ethnicity, income, ADHD, social skills, conversational ability, interactions with friends, and classroom placement. This study contributes to a growing foundation of evidence that will inform school-based anti-bullying efforts and allow practitioners to address important questions from concerned parents regarding factors that may influence their children's bullying involvement.

## Methods

### Study Sample

The National Longitudinal Transition Study 2 (NLTS2) was a 10-year, 5-wave prospective study of adolescents receiving special education services conducted by SRI International for the U.S. Department of Education. The sampling plan was designed to produce nationally representative estimates that generalize to all students receiving special education services in 7<sup>th</sup> through 12<sup>th</sup> grades or in ungraded programs and were ages 13 through 16 on December 1, 2000. NLTS2 used a multistage stratified random sampling procedure and resulted in the identification of 1100 sample-eligible students in the autism category during wave 1.

Three instruments from NLTS2—parent interviews, the Student's School Program Survey (SSPS), and School Characteristics Survey (SCS)—were used for this analysis. Unweighted sample size numbers were rounded to the nearest ten as required by the data use agreement with the U.S. Department of Education. This study was approved as exempt by Washington University's Institutional Review Board. Detailed information on the sample design and weighting procedure has been previously published.<sup>21</sup>

Adolescents were selected from the official, special education enrollment-reporting category of autism. Adolescents were counted once in a primary disability category and were not designated into multiple disability categories. Schools do not necessarily use standardized Diagnostic and Statistical Manual of Mental Disorder IV Revised (DSM-IV) criteria to assign the label of autism.<sup>22</sup> Based on recent U.S. epidemiological surveillance data, 99% of adolescents served under the autism educational designation also meet DSM-IV criteria for an ASD.<sup>23,24</sup> Some adolescents, however, who meet the DSM-IV criteria for an ASD may be served under another special education disability category.

### Data Collection Procedures

Parent interviews were conducted in English (97%) and Spanish (3%). Parents who were unable to be reached by telephone were mailed a self-administered questionnaire (3%). Data were collected from 920 parents of students in the autism category (83.5% response rate). The SSPS was mailed to a data collection coordinator with instructions to give it to the school staff person most familiar with each student's school program (580 completed; 52.5% response rate). The SCS was mailed to principals to gather information on student body demographics and other school characteristics (830 completed; 75.2% response rate).

### Measures and Variables

The study included three dependent measures of bullying involvement: victimization, perpetration, and victimization/perpetration. Parents were asked if the adolescent had ever had any of the following experiences during the 2000-2001 school year: (a) "Has [ADOLESCENT] been bullied or picked on by other students or made to do things like give them money, either at school or on the way to or from school?", (b) "Has [ADOLESCENT]

been teased or called names at school?”, and (c) “Has [ADOLESCENT] bullied or picked on other students?”. The first two questions assessed the experience of victimization and were collapsed into one overall dichotomous indicator. The accepted definition of bullying encompasses the experience of verbal forms of victimization often specifically described as teasing and/or name-calling. To examine the prevalence of bullying involvement across its full continuum, six variables were constructed: any victimization; any perpetration; only victimization; only perpetration; victimization/perpetration; and no bullying involvement.

Although the sample did not include a typically developing comparison group, prevalence rates of bullying involvement for adolescents with an ASD were compared to groups who exhibit difficulties that often occur in autism: mental retardation (MR; intellectual impairment), speech-language impairment (SI; communication problems), and learning disability (LD; academic impairment). Although the designation of MR is normally avoided, it was used to be consistent with special education legislative definitions.

Age, gender, race, ethnicity, ADHD, income, social skills, and conversational ability of the adolescent were measured using parent report. A social skills scale was created by summing four 3-category (never, sometimes, very often) parent-report questions ( $\alpha=.73$ ): joined group activities without being told, made friends easily, seemed confident in social situations, and started conversations rather than waiting for others to initiate. The social skills scale was recoded into four categories (very low, low, medium, high) with roughly equivalent group sizes to report stratified rates of bullying involvement. Conversational ability was measured on a four-point ordinal scale (converses as well as other children to does not carry on a conversation at all) using the following question: “How well does {he/she} carry on a conversation?” The SSPS provided information to determine the percentage of classes in general education. Frequency of friendship interaction was measured by dichotomizing the average number of days per week parents reported their child got together with friends outside of school: (1) never to less than once per week and (2) one to seven days per week. Friendship interaction was dichotomized to facilitate interpretation of the multivariate models, as the near absence of friendship interaction is a common reality for the majority of adolescents with an ASD.<sup>25</sup>

## Data Analysis

Univariate percentage distributions for the independent variables and the stratified rates of the dependent variables for adolescents with an ASD were examined. Prevalence estimates for bullying involvement were compared across adolescents with an ASD and from three other disability categories. Bivariate logistic regression was used to identify significant differences between these groups. Three multivariate logistic regression models estimated the correlates of victimization, perpetration, and victimization/perpetration among adolescents with an ASD. Multiple imputation with chained equations was performed using IVEware to create 50 data sets with no missing values.<sup>26,27</sup> The multiply imputed data were analyzed using Stata 11, which combines estimates using well-established procedures.<sup>28</sup> All adolescents who were not in school at wave 1 were excluded, yielding a final sub-sample size of 900. All estimates were weighted to the population level and variances were adjusted in accordance with the complex sampling design. Therefore, unweighted sub-sample sizes were not reported alongside weighted point estimates.

## Results

Table 1 reports demographics and stratified rates of victimization, perpetration, and victimization/perpetration. Based on parent report for the current school year, 46.3% of adolescents experienced victimization, 14.8% engaged in perpetration, and 8.9% experienced victimization/perpetration. The sample had a male:female ratio of 6.5:1. This

ratio is within the range found in prior research.<sup>12,29</sup> Examining the different permutations of bullying involvement (Table 2), adolescents with an ASD had significantly higher rates of engaging in only perpetration compared to adolescents in the other three disability categories. Rates of any perpetration for adolescents with an ASD were significantly higher than those with SI. Adolescents with an ASD had significantly lower rates of any victimization and victimization/perpetration compared to adolescents with MR. Rates of no bullying involvement were significantly higher for adolescents with an ASD compared to those with MR.

In the multivariate model of victimization (Table 3), Hispanic adolescents had significantly lower adjusted odds of victimization compared to non-Hispanic adolescents (OR=0.5). Adolescents with ADHD had significantly higher adjusted odds of victimization compared to adolescents without ADHD (OR=1.7). Better social skills were associated with significantly lower adjusted odds of victimization (OR=0.9). Compared to adolescents with no conversational ability, those with higher abilities had a greater adjusted odds of victimization (OR=3.0 to 6.1). Adolescents who had 75% or more of their classes in general education had significantly higher adjusted odds of victimization compared to adolescents who had 25% or fewer of their classes in general education (OR=2.8).

A second multivariate model examined the correlates of perpetration. African American adolescents had a significantly lower adjusted odds of perpetration compared to White adolescents (OR=0.5). Adolescents with ADHD had significantly higher adjusted odds of perpetration compared to those without ADHD (OR=2.1). Adolescents who got together with friends at least one time per week had higher adjusted odds of perpetration compared to those with less frequent contact (OR=1.9).

A third logistic regression examined the correlates of victimization/perpetration. Hispanic adolescents had lower adjusted odds of victimization/perpetration compared to non-Hispanic adolescents (OR=0.3). African American adolescents had a significantly lower adjusted odds ratio of victimization/perpetration compared to their White counterparts (OR=0.4). Adolescents with ADHD had significantly higher adjusted odds of victimization/perpetration compared to those without ADHD (OR=2.6). Adolescents who got together with friends at least once per week had a significantly higher adjusted odds ratio of victimization/perpetration compared to those with less frequent contact with friends (OR=2.2).

## Comment

This study examined the prevalence and correlates of bullying involvement using a large national sample. The victimization rate for adolescents with an ASD (46.3%) was substantially higher than the national prevalence estimates for the general adolescent population (10.6%).<sup>8</sup> The rate of perpetration (14.8%) and victimization/perpetration (8.9%), however, were roughly equivalent to national estimates found among typically developing adolescents (perpetration: 13%; victimization/perpetration: 6.8%).<sup>8</sup> High prevalence rates of victimization were found for adolescents with an ASD, MR, SI, and LD. Adolescents with MR, however, were significantly more likely to experience victimization compared to the other three groups. Adolescents with an ASD were significantly more likely to engage exclusively in perpetration compared to the other three groups. Tailored anti-bullying programs are needed to address the unique needs of these vulnerable adolescents given their social, communication, and academic impairments.

Hispanic adolescents with an ASD were significantly less likely to experience victimization and victimization/perpetration compared to their non-Hispanic counterparts. African

American adolescents with an ASD were significantly less likely to engage in perpetration and victimization/perpetration in comparison to White adolescents. Prior studies with typically developing adolescents have also found lower rates of bullying involvement for minority youth.<sup>30</sup> Prior research suggests these racial/ethnic differences may be due to variations in how bullying is defined and measured.<sup>30</sup> Minority adolescents underreport victimization in comparison to their White counterparts when using definition-based single-item measures versus multi-item behavior-based measures of bullying.<sup>30</sup> Further research is needed to address variations in the definition and measurement of bullying involvement across racially and ethnically diverse samples.

Consistent with prior research, adolescents with greater social skills were significantly less likely to experience victimization.<sup>31</sup> Conversational ability was also a significant correlate for victimization. Compared to adolescents with no conversational ability, adolescents with some level of conversational ability were significantly more likely to experience victimization. Adolescents with no conversational ability may be institutionally protected (e.g., lower teacher-student classroom ratios) or school staff are not informing parents about their child's bullying involvement. Conversational ability is a multidimensional construct (e.g., clear speech, appropriate gestures and expressions, responsiveness to questions and changes in topic) and adolescents with an observable disability are often victimized at a higher rate.<sup>32,33</sup> Even for the majority of adolescents with no trouble conversing, they may still possess noticeable differences in their conversational abilities compared to typically developing peers, placing them at greater risk for victimization.<sup>32</sup>

Adolescents who have the majority of their classes in general education were significantly more likely to experience victimization compared to those in segregated settings. This finding contradicts previous research, which found adolescents in segregated classrooms reported significantly more victimization compared to their peers in inclusive classrooms.<sup>34,35</sup> The integration of students with and without disabilities into inclusive classroom settings has been conceptualized as a protective factor, because of the greater likelihood of developing social skills through behavioral modeling, increasing acceptance and social participation, and reducing negative stereotypes.<sup>3,31</sup> If adolescents with a developmental disability, however, are not fully integrated into peer groups, inclusion may increase social isolation and worsen rates of victimization.<sup>3,31</sup> This study suggests schools need to examine their existing inclusive practices, and adopt strategies that educate students about autism spectrum disorders and explicitly target inclusion of these students into protective peer groups.<sup>3,5</sup>

Adolescents who got together with friends at least once a week were significantly more likely to experience perpetration and victimization/perpetration. These findings may be partially explained by the increased social opportunity these adolescents had to experience these forms of bullying involvement in comparison to their counterparts who were almost completely isolated from friends. This study did not find a significant relationship between the frequency of getting together with friends and victimization. Prior research indicates friendships are an important protective factor in reducing victimization among all adolescents.<sup>34,36,37</sup> A possible explanation for this non-significant finding may relate to the simplicity of this dichotomous measure and its inability to account for other important dimensions such as friendship quality and support.

Adolescents with an ASD and ADHD were significantly more likely to experience victimization, perpetration, and victimization/perpetration compared to those with only an ASD. This study supports previous research that found an association between ADHD and perpetration among adolescents with an ASD.<sup>18</sup> Future studies should continue to include

ADHD as an important predictor for bullying involvement, while anti-bullying programs should focus their intervention efforts on the needs of this vulnerable subgroup.

This study has some limitations. Bullying involvement was not defined for the respondents and may have led to reporting bias. Bullying involvement was measured using dichotomous indicators, precluding the assessment of frequency and duration. The study also lacked multiple informants to measure bullying involvement. Parent report may underestimate prevalence rates of bullying involvement compared to self-report measures, because parents may be unaware of the full extent of bullying involvement.<sup>38,39</sup>

Bullying has garnered an increasing amount of public attention in the U.S. with the majority of states adopting anti-bullying legislation.<sup>35</sup> Universal, bullying prevention programs (e.g., Olweus Bullying Prevention Program) are considered the gold standard for reducing bullying in schools, but these programs were not developed to meet the needs of adolescents with an ASD.<sup>40</sup> Future interventions should incorporate content that addresses the core deficits of adolescents with an ASD, which limits their verbal ability to report bullying incidents. Schools should incorporate strategies that address conversational difficulties and the unique challenges of those with comorbid conditions. Inclusive classrooms need to increase the social integration of adolescents with an ASD into protective peer groups, while also enhancing the empathy and social skills of typically developing students toward their peers with an ASD and other developmental disabilities.

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**Table 1**

Univariate percentage distributions of independent variables and stratified rates of dependent variables among adolescents with an autism spectrum disorder [95% C.I.]

Variables	Distribution	Percentage Rates Of Dependent Variables		
		Victimization	Perpetration	Victimization/ Perpetration
Overall Percentages	-	46.3 [40.2, 52.5]	14.8 [11.7, 18.5]	8.9 [6.6, 12.0]
Sex				
Male	84.5 [81.6, 87.1]	46.2 [39.9, 52.5]	14.3 [11.1, 18.3]	8.7 [0.6, 11.7]
Female	15.5 [12.9, 18.4]	46.9 [35.7, 58.4]	17.1 [9.8, 28.2]	10.1 [4.2, 22.2]
Age				
13	6.9 [5.2, 9.3]	51.1 [39.1, 62.9]	15.1 [7.6, 27.9]	9.2 [4.0, 19.5]
14	25.5 [21.4, 30.1]	46.5 [35.1, 58.2]	14.8 [9.5, 22.3]	9.8 [5.7, 16.2]
15	23.4 [20.3, 26.7]	48.4 [40.4, 56.5]	13.1 [8.8, 19.2]	8.6 [5.4, 13.2]
16	25.9 [22.2, 30.1]	46.4 [36.7, 56.4]	17.2 [10.6, 26.7]	7.7 [4.3, 13.1]
17	18.3 [15.1, 21.9]	41.3 [29.7, 53.9]	13.2 [6.2, 25.6]	10 [4.0, 22.5]
Hispanic				
No	89.0 [83.7, 92.7]	48.3 [42.5, 54.2]	15.1 [11.9, 19.0]	9.6 [7.1, 12.9]
Yes	11.0 [7.3, 16.3]	29.9 [20.3, 41.6]	11.8 [6.0, 22.0]	3.2 [1.4, 7.2]
Race				
White	65.2 [59.5, 70.4]	50.5 [43.1, 57.8]	16.1 [12.1, 21.0]	10.4 [7.4, 14.4]
African-American	22.4 [17.6, 28.0]	35.9 [28.1, 44.6]	9.7 [5.9, 15.5]	4.3 [1.9, 9.3]
Other, Mixed	12.4 [9.5, 16.1]	43.1 [30.9, 56.1]	17.0 [8.9, 29.8]	9.6 [4.2, 20.1]
Parent Household Income				
\$25,000 or Less	24.0 [18.2, 30.8]	42.5 [33.8, 51.6]	14.5 [8.6, 23.4]	6.4 [3.4, 11.6]
\$25,001- \$50,000	30.6 [23.1, 39.0]	46.8 [37.0, 56.8]	16.8 [11.5, 23.7]	9.9 [6.3, 15.2]
\$50,001-\$75,000	22.3 [15.6, 30.4]	44.5 [34.3, 55.3]	14.9 [9.3, 23.2]	10.9 [6.1, 18.7]
Over \$75,000	23.2 [18.8, 28.2]	51.4 [40.5, 62.1]	12.1 [6.6, 20.9]	8.3 [3.9, 17.0]
ADHD				

Variables	Distribution	Percentage Rates Of Dependent Variables		
		Victimization	Perpetration	Victimization/ Perpetration
No	65.6 [60.9, 70.0]	41.4 [34.8, 48.4]	11.5 [8.1, 16.1]	6.1 [4.9, 9.4]
Yes	34.4 [30.0, 39.1]	55.6 [46.7, 64.1]	20.9 [15.4, 27.7]	14.4 [10.2, 19.9]
<b>Social Skills</b>				
Very Low	45.8 [41.5, 50.3]	45.4 [36.9, 54.2]	15.1 [11.1, 20.2]	8.8 [5.5, 13.8]
Low	32.6 [28.6, 37.0]	49.8 [41.9, 57.7]	15.2 [10.1, 22.3]	8.5 [5.3, 13.1]
Medium	14.7 [12.2, 17.7]	51.0 [40.5, 61.4]	13.6 [8.3, 21.3]	11.3 [6.7, 18.3]
High	6.8 [4.8, 9.6]	25.5 [12.8, 44.1]	12.8 [4.3, 32.2]	6.6 [1.6, 23.1]
<b>Conversation Ability</b>				
Does Not Converse	17.3 [13.0, 22.6]	19.9 [11.7, 31.7]	19.3 [11.5, 30.5]	4.4 [1.4, 12.0]
Lots Of Trouble	37.9 [33.9, 42.1]	43.1 [35.0, 51.6]	13.9 [9.5, 19.9]	8.5 [5.1, 13.9]
Little Trouble	31.3 [27.3, 35.7]	63.1 [54.7, 70.9]	13.7 [9.7, 18.9]	12.2 [8.4, 17.3]
No Trouble	13.5 [10.7, 16.8]	49.7 [37.3, 62.1]	13.8 [7.4, 24.2]	8.4 [4.0, 16.7]
<b>Gets Together With Friends</b>				
Never - < 1 day p/wk	74.2 [70.2, 77.9]	45.1 [38.6, 51.8]	13.0 [10.1, 16.4]	7.4 [5.3, 10.3]
1-7 days p/wk	25.8 [22.1, 29.8]	49.7 [39.7, 59.7]	19.9 [13.0, 29.3]	13.2 [7.9, 21.1]
<b>% Classes In General Ed.</b>				
0-25%	56.8 [51.0, 62.5]	36.2 [28.9, 44.2]	16.3 [11.9, 22.0]	8.2 [5.2, 12.5]
26-50%	23.4 [19.0, 28.3]	52.3 [40.6, 63.8]	13.6 [7.9, 22.1]	9.7 [4.8, 18.0]
51%-75%	8.6 [6.0, 12.0]	64.8 [44.8, 81.0]	18.4 [8.0, 35.5]	15.7 [6.7, 31.4]
76-100%	11.2 [8.4, 14.9]	70.9 [57.8, 81.3]	6.3 [2.1, 17.2]	6.1 [2.0, 16.8]

Source: National Longitudinal Transition Study 2, Wave 1. Number of multiply imputed data sets = 50. Weighted to population levels. Variances adjusted for sampling method.

**Table 2**

Rates of bullying involvement (percentages) compared among groups, tests are for significant differences between each comparison group and the autism spectrum disorder group

	ASD	LD	SI	MR
	Percent [95% Confidence Interval]			
Any Victimization	46.3 [40.2, 52.5]	48.8 [45.0, 52.6]	47.0 [42.8, 51.2]	56.7 <sup>**</sup> [52.7, 60.6]
Any Perpetration	14.8 [11.7, 18.5]	14.0 [11.2, 17.3]	9.4 <sup>*</sup> [6.9, 12.5]	17.8 [15.0, 20.9]
Victimization/Perpetration	8.9 [6.6, 12.0]	11.4 [9.0, 14.4]	7.5 [5.3, 10.4]	15.5 <sup>**</sup> [13.1, 18.2]
Only Victimization	37.4 [32.2, 42.8]	37.4 [33.7, 41.2]	39.5 [35.7, 43.5]	41.2 [37.2, 45.4]
Only Perpetration	5.8 [3.8, 8.8]	2.6 <sup>*</sup> [1.5, 4.2]	1.9 <sup>**</sup> [1.1, 3.3]	2.3 <sup>*</sup> [1.3, 4.0]
No Bullying Involvement	47.9 [41.8, 54.1]	48.6 [44.9, 52.4]	51.1 [46.9, 55.3]	41.0 <sup>*</sup> [37.1, 45.0]

\* p < .05,

\*\* p < .01,

\*\*\* p < .001

Source: National Longitudinal Transition Study 2, wave 1. Number of multiply imputed data sets = 50. Weighted to population levels. Variances adjusted for sampling method.

**Table 3**

Logistic regression model of bullying involvement among adolescents with an ASD [odds ratios and 95% C.I.]

Covariate	Victimization	Perpetration	Victimization/ Perpetration
Sex			
Male	1	1	1
Female	1.3 [0.8, 2.0]	1.3 [0.6, 2.6]	1.4 [0.5, 4.0]
Age	0.9 [0.8, 1.1]	1 [0.8, 1.2]	1 [0.7, 1.3]
Hispanic			
No	1	1	1
Yes	0.5* [0.3, 0.8]	0.6 [0.2, 1.5]	0.3* [0.1, 0.9]
Race			
White	1	1	1
African-American	0.6 [0.4, 1.0]	0.5* [0.2, 0.9]	0.4* [0.1, 0.9]
Other, Mixed	1 [0.6, 1.7]	1.2 [0.5, 2.8]	1.3 [0.5, 3.5]
Parent Household Income			
\$25,000 Or Less	1	1	1
\$25,001- \$50,000	0.8 [0.5, 1.5]	1.3 [0.6, 2.5]	1.4 [0.6, 3.2]
\$50,001-\$75,000	0.6 [0.3, 1.0]	1 [0.4, 2.3]	1.3 [0.5, 3.5]
Over \$75,000	0.7 [0.4, 1.3]	0.8 [0.3, 1.9]	0.9 [0.3, 2.6]
ADHD			
No	1	1	1
Yes	1.7* [1.1, 2.6]	2.1* [1.2, 3.6]	2.6** [1.5, 4.6]
Social Skills	0.9* [0.8, 1.0]	1 [0.8, 1.1]	0.9 [0.8, 1.1]
Conversation Ability			
Does Not Converse	1	1	1
Lots Of Trouble	3.0** [1.5, 5.7]	0.7 [0.3, 1.3]	1.6 [0.3, 7.4]
Little Trouble	6.1*** [2.9, 13.0]	0.7 [0.3, 1.5]	3.1 [0.9, 10.7]
No Trouble	3.6** [1.5, 8.6]	0.6 [0.2, 1.7]	2 [0.6, 7.1]

Covariate	Victimization	Perpetration	Victimization/ Perpetration
Gets Together With Friends			
0<1 Day P/Week	1	1	1
1-7 Days P/Week	1.2 [0.7, 2.1]	1.9* [1.0, 3.6]	2.2* [1.0, 4.9]
% Classes In Gen. Ed.			
0-25%	1	1	1
26-50%	1.7 [0.9, 3.1]	0.8 [0.4, 1.7]	1 [0.4, 2.5]
51%-75%	2.4 [0.9, 6.7]	1.2 [0.4, 3.7]	1.6 [0.5, 5.1]
76-100%	2.8** [1.3, 5.7]	0.3 [0.1, 1.0]	0.4 [0.1, 1.5]

\*  
p < .05,

\*\*  
p < .01,

\*\*\*  
p < .001

Source: National Longitudinal Transition Study 2, wave 1. Number of multiply imputed data sets = 50. Weighted to population levels. Variances adjusted for sampling method.