

# Bullying Involvement and Autism Spectrum Disorders

## *Prevalence and Correlates of Bullying Involvement Among Adolescents With an Autism Spectrum Disorder*

Paul R. Sterzing, PhD, MSSW; Paul T. Shattuck, PhD; Sarah C. Narendorf, PhD, MSW; Mary Wagner, PhD; Benjamin P. Cooper, MPH

**Objectives:** To produce nationally representative estimates for rates of bullying involvement among adolescents with an autism spectrum disorder (ASD), to compare population estimates with adolescents who have other developmental disabilities, and to identify social ecological correlates of bullying involvement.

**Design:** Nationally representative surveys from 2001.

**Setting:** United States.

**Participants:** Parents of adolescents with an ASD, principals of the schools they attended, and staff members most familiar with their school programs.

**Main Exposure:** Autism spectrum disorders.

**Main Outcome Measures:** Parent report of victimization, perpetration, and victimization/perpetration within the past school year.

**Results:** The prevalence rates of bullying involvement for adolescents with an ASD were 46.3% for victimization, 14.8% for perpetration, and 8.9% for victimization/

perpetration. Victimization was related to having a non-Hispanic ethnicity, 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, having 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 ASD (conversational ability and social skills) and comorbid conditions (eg, 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 ASD.

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**Author Affiliations:** George Warren Brown School of Social Work, Washington University, St Louis, Missouri (Drs Sterzing, Shattuck, Narendorf, and Cooper); and SRI International, Menlo Park, California (Dr Wagner). Dr Sterzing is now affiliated with the School of Social Welfare, University of California, Berkeley; Dr Narendorf, with the Graduate College of Social Work, University of Houston, Houston, Texas.

**B**ULLYING IS A RELATIONAL problem involving repetitive, negative actions directed toward a peer and is characterized by a power imbalance—physical, social, or cognitive—between the victim and perpetrator.<sup>1</sup> Bullying involvement encompasses the following 3 aspects of this relational problem: victimization, perpetration, and victimization/perpetration (ie, those 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 with typically developing peers.<sup>2-8</sup> The prevalence of victimization/perpetration 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 (1) higher levels of depression, anxiety, and loneliness and (2) 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 antibullying policies during the coming decade.<sup>11</sup>

Relatively little research examines the prevalence and correlates of bullying involvement among adolescents with an autism spectrum disorder (ASD). This gap is concerning because 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 (eg, intellectual, speech, and learning). This area of study has important public health ramifications because 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>14,15</sup>

Prevalence rates of bullying involvement for adolescents with an ASD vary by type of involvement and informant, with a range of 7% to 94% for victimization and 15% to 46% for perpetration.<sup>4,16,17</sup> Prior studies have not reported rates of victimization/perpetration for this population. According to reports by their mothers, 94% of children with Asperger syndrome 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 compared with self-reports (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 perpetrate at a higher rate (59.8%) compared with adolescents with an ASD only (28.4%).<sup>18</sup> Attention-deficit/hyperactivity disorder 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 among adolescents with an ASD.

With one exception, previous studies were not nationally representative because 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 US sample, however, only examined perpetration.<sup>18</sup> Other generalizability limitations include samples consisting primarily of adolescents with Asperger syndrome 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 US sample of adolescents with an ASD to investigate the following aims: (1) to identify the prevalence of bullying involvement, (2) to compare prevalence rates of bullying involvement with adolescents with developmental disabilities that overlap with the core deficits of ASD, and (3) to identify the social ecological correlates of bullying involvement. This study examines all 3 aspects of bullying involvement and their potential correlates, including sex, 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 antibullying 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 was a 10-year, 5-wave prospective study of adolescents receiving special education services and was conducted by SRI International for the US Department of Education. The sampling plan was designed to produce nationally representative estimates that generalize to all students receiving special education services in the 7th through 12th grades or in ungraded programs who were ages 13 through 16 years on December 1, 2000. The National Longitudinal Transition Study 2 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 the National Longitudinal Transition Study 2—parent interviews, the Student's School Program Survey, and the School Characteristics Survey—were used for this analysis. Unweighted sample size numbers were rounded to the nearest 10 as required by the data use agreement with the US Department of Education. This study was approved as exempt by the Washington University 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 Disorders* (Fourth Edition) (*DSM-IV*) criteria to assign the label of autism.<sup>22</sup> Based on recent US 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 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 (97.5%) and Spanish (2.5%). Parents who were unable to be reached by telephone were mailed a self-administered questionnaire (2.6%). Data were collected from 920 parents of students in the autism category (83.6% response rate). The Student's School Program Survey 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; 52.7% response rate). The School Characteristics Survey was mailed to principals to gather information on student body demographics and other school characteristics (830 completed; 75.4% response rate).

### MEASURES AND VARIABLES

The study included 3 dependent measures of bullying involvement: victimization, perpetration, and victimization/perpetration. Parents were asked whether the adolescent had ever had any of the following experiences during the 2000-2001 school year:

1. "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?"
2. "Has [ADOLESCENT] been teased or called names at school?"

3. "Has [ADOLESCENT] bullied or picked on other students?"

The first 2 questions assessed the experience of victimization and were collapsed into 1 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, the following 6 variables were constructed: any victimization, any perpetration, only victimization, only perpetration, victimization/perpetration, and no involvement.

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

Age, sex, race, ethnicity, ADHD, income level, social skills, and conversational ability of the adolescent were measured using parent report. A social skills scale was created by summing the following 3-category (never, sometimes, and very often) parent-report questions ( $\alpha = .73$ ): (1) joined group activities without being told, (2) made friends easily, (3) seemed confident in social situations, and (4) started conversations rather than waiting for others to initiate. The social skills scale was recoded into 4 categories (very low, low, medium, and high) with roughly equivalent group sizes to report stratified rates of bullying involvement. Conversational ability was measured on a 4-point ordinal scale (from converses as well as other children to does not converse at all) using the following question: "How well does [he/she] carry on a conversation?" The Student's School Program Survey 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 that parents reported their child got together with friends outside of school as less than once per week (includes never) and 1 to 7 days per week. Friendship interaction was dichotomized to facilitate interpretation of the multivariate models because the near absence of friendship interaction is a common reality for most adolescents with an ASD.<sup>25</sup>

## DATA ANALYSIS

We examined univariate percentage distributions for the independent variables and the stratified rates of the dependent variables for adolescents with an ASD. Prevalence estimates for bullying involvement were compared across adolescents with an ASD and from 3 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<sup>26</sup> was performed using IVEware<sup>27</sup> to create 50 data sets with no missing values. The multiply imputed data were analyzed using commercially available software (Stata, version 11; StataCorp), 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 subsample size of 900. All estimates were weighted to the population level, and variances were adjusted in accordance with the complex sampling design. Therefore, unweighted subsample 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 to female ratio of 6.5:1. This ratio is within the range found in prior research.<sup>12,29</sup> When we examined the different permutations of bullying involvement (**Table 2**), adolescents with an ASD had significantly higher rates of engaging in only perpetration compared with adolescents in the other 3 disability categories. Rates of any perpetration for adolescents with an ASD were significantly higher than those with speech/language impairment. Adolescents with an ASD had significantly lower rates of any victimization and victimization/perpetration compared with adolescents with MR. Rates of no bullying involvement were significantly higher for adolescents with an ASD compared with those with MR.

In the multivariate model of victimization (**Table 3**), Hispanic adolescents had significantly lower adjusted odds of victimization compared with non-Hispanic adolescents (odds ratio [OR], 0.5). Adolescents with ADHD had significantly higher adjusted odds of victimization compared with adolescents without ADHD (OR, 1.7). Better social skills were associated with significantly lower adjusted odds of victimization (OR, 0.9). Compared with adolescents with no conversational ability, those with higher abilities had greater adjusted odds of victimization (OR, 3.0-6.1). Adolescents who had 76% or more of their classes in general education had significantly higher adjusted odds of victimization compared with 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 with white adolescents (OR, 0.5). Adolescents with ADHD had significantly higher adjusted odds of perpetration compared with those without ADHD (OR, 2.1). Adolescents who got together with friends at least once per week had higher adjusted odds of perpetration compared with 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 with non-Hispanic adolescents (OR, 0.3). African American adolescents had significantly lower adjusted odds of victimization/perpetration compared with their white counterparts (OR, 0.4). Adolescents with ADHD had significantly higher adjusted odds of victimization/perpetration compared with those without ADHD (OR, 2.6). Adolescents who got together with friends at least once per week had significantly higher adjusted odds of victimization/perpetration compared with those with less frequent contact with friends (OR, 2.2).

**Table 1. Univariate Percentage Distributions of Independent Variables and Stratified Rates of Dependent Variables Among Adolescents With an Autism Spectrum Disorder<sup>a</sup>**

Variables	Distribution	Rates of Dependent Variables, % (95% CI)		
		Victimization	Perpetration	Victimization/Perpetration
Overall percentage	...	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, y				
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)	10.0 (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 annual household income, \$				
≤25 000	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)
>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				
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)
Social skills				
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)
Conversational ability				
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)
Gets together with friends, d/wk				
<1 <sup>b</sup>	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	25.8 (22.1-29.8)	49.7 (39.7-59.7)	19.9 (13.0-29.3)	13.2 (7.9-21.1)
Classes in general education, %				
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)

Abbreviations: ADHD, attention-deficit/hyperactivity disorder; ellipses, not applicable.

<sup>a</sup>From the National Longitudinal Transition Study 2, wave 1. Includes 50 multiply imputed data sets. Percentages are weighted to population levels; overall percentages might not total 100. Variances are adjusted for sampling method.

<sup>b</sup>Includes never.

## 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 rates 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 victimiza-

tion were found for adolescents with an ASD, MR, speech/language impairment, and learning deficiency. Adolescents with MR, however, were significantly more likely to experience victimization compared with the other 3 groups. Adolescents with an ASD were significantly more likely to engage exclusively in perpetration compared with the other 3 groups. Tailored antibullying 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

**Table 2. Rates of Bullying Involvement Among Groups<sup>a</sup>**

Group	Rates of Involvement, % (95% CI)			
	ASD	LD	SI	MR
Any victimization	46.3 (40.2-52.5)	48.8 (45.0-52.6)	47.0 (42.8-51.2)	56.7 (52.7-60.6) <sup>b</sup>
Any perpetration	14.8 (11.7-18.5)	14.0 (11.2-17.3)	9.4 (6.9-12.5) <sup>c</sup>	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 (13.1-18.2) <sup>b</sup>
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 (1.5-4.2) <sup>c</sup>	1.9 (1.1-3.3) <sup>b</sup>	2.3 (1.3-4.0) <sup>c</sup>
No bullying involvement	47.9 (41.8-54.1)	48.6 (44.9-52.4)	51.1 (46.9-55.3)	41.0 (37.1-45.0) <sup>c</sup>

Abbreviations: ASD, autism spectrum disorder; LD, learning disability; MR, mental retardation; SI, speech/language impairment.

<sup>a</sup>From the National Longitudinal Transition Study 2, wave 1. Includes 50 multiply imputed data sets. Percentages are weighted to population levels. Variances are adjusted for sampling method. Tests are for significant differences between each comparison group and the ASD group.

<sup>b</sup> $P < .01$ .

<sup>c</sup> $P < .05$ .

**Table 3. Logistic Regression Model of Bullying Involvement Among Adolescents With an Autism Spectrum Disorder<sup>a</sup>**

Covariate	OR (95% CI)		
	Victimization	Perpetration	Victimization/Perpetration
Sex			
Male	1 [Reference]	1 [Reference]	1 [Reference]
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 (0.8-1.2)	1.0 (0.7-1.3)
Hispanic			
No	1 [Reference]	1 [Reference]	1 [Reference]
Yes	0.5 (0.3-0.8) <sup>b</sup>	0.6 (0.2-1.5)	0.3 (0.1-0.9) <sup>b</sup>
Race			
White	1 [Reference]	1 [Reference]	1 [Reference]
African American	0.6 (0.4-1.0)	0.5 (0.2-0.9) <sup>b</sup>	0.4 (0.1-0.9) <sup>b</sup>
Other, mixed	1.0 (0.6-1.7)	1.2 (0.5-2.8)	1.3 (0.5-3.5)
Parent annual household income, \$			
≤25 000	1 [Reference]	1 [Reference]	1 [Reference]
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 (0.4-2.3)	1.3 (0.5-3.5)
>75 000	0.7 (0.4-1.3)	0.8 (0.3-1.9)	0.9 (0.3-2.6)
ADHD			
No	1 [Reference]	1 [Reference]	1 [Reference]
Yes	1.7 (1.1-2.6) <sup>b</sup>	2.1 (1.2-3.6) <sup>b</sup>	2.6 (1.5-4.6) <sup>c</sup>
Social skills	0.9 (0.8-1.0) <sup>b</sup>	1.0 (0.8-1.1)	0.9 (0.8-1.1)
Conversational ability			
Does not converse	1 [Reference]	1 [Reference]	1 [Reference]
Lots of trouble	3.0 (1.5-5.7) <sup>c</sup>	0.7 (0.3-1.3)	1.6 (0.3-7.4)
Little trouble	6.1 (2.9-13.0) <sup>d</sup>	0.7 (0.3-1.5)	3.1 (0.9-10.7)
No trouble	3.6 (1.5-8.6) <sup>c</sup>	0.6 (0.2-1.7)	2.0 (0.6-7.1)
Gets together with friends, d/wk			
<1 <sup>e</sup>	1 [Reference]	1 [Reference]	1 [Reference]
1-7	1.2 (0.7-2.1)	1.9 (1.0-3.6) <sup>b</sup>	2.2 (1.0-4.9) <sup>b</sup>
Classes in general education, %			
0-25	1 [Reference]	1 [Reference]	1 [Reference]
26-50	1.7 (0.9-3.1)	0.8 (0.4-1.7)	1.0 (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) <sup>c</sup>	0.3 (0.1-1.0)	0.4 (0.1-1.5)

Abbreviations: ADHD, attention-deficit/hyperactivity disorder; OR, odds ratio.

<sup>a</sup>From the National Longitudinal Transition Study 2, wave 1. Includes 50 multiply imputed data sets. Data are weighted to population levels. Variances are adjusted for sampling method.

<sup>b</sup> $P < .05$ .

<sup>c</sup> $P < .01$ .

<sup>d</sup> $P < .001$ .

<sup>e</sup>Includes never.

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

perpetration and victimization/perpetration compared with 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 compared with their white counterparts when using definition-based single-item measures vs multiple-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 with 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 (eg, lower teacher-student classroom ratios), or school staff are not informing parents about their child's bullying involvement. Conversational ability is a multidimensional construct (eg, 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 most adolescents with no trouble conversing may still possess noticeable differences in their conversational abilities compared with typically developing peers, placing them at greater risk for victimization.<sup>32</sup>

Adolescents who had most of their classes in general education were significantly more likely to experience victimization compared with those in segregated settings. This finding contradicts previous research, which found that adolescents in segregated classrooms reported significantly more victimization compared with 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> However, if adolescents with a developmental disability 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 ASD 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 compared with 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 nonsignificant 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 with 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, whereas antibullying 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 with self-reported 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 United States, with most states adopting antibullying legislation.<sup>35</sup> Universal bullying prevention programs (eg, the Olweus Bullying Prevention Program) are considered the criterion 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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**Correspondence:** Paul R. Sterzing, PhD, MSSW, School of Social Welfare, University of California, Berkeley, 120 Haviland Hall, Berkeley, CA 94720-7400 (sterzing@berkeley.edu).

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## REFERENCES

1. Olweus D. Bully/victims problems among school-children: long-term consequences and an effective intervention program. In: Hodgins S, ed. *Mental Disorder and Crime*. Thousand Oaks, CA: Sage Publications; 1993:317-349.
2. Doren B, Bullis M, Benz MR. Predictors of victimization experiences of adolescents with disabilities in transition. *Except Child*. 1996;63(1):7-18.
3. Rose CA, Espelage DL, Monda-Amaya LE. Bullying and victimization rates among students in general and special education: a comparative analysis. *Educ Psychol*. 2009;29(7):761-776. doi:10.1080/01443410903254864.
4. Little L. Middle-class mothers' perceptions of peer and sibling victimization among children with Asperger's syndrome and nonverbal learning disorders. *Issues Compr Pediatr Nurs*. 2002;25(1):43-57. doi:10.1080/014608602753504847.
5. Whitney I, Smith PK, Thompson D. Bullying and children with special educational needs. In: Smith PK, Sharp S, eds. *School Bullying: Insights and Perspectives*. London, England: Routledge; 1994:213-240.
6. Kuhne M, Wiener J. Stability of social status of children with and without learning disabilities. *Learn Disabil Q*. 2000;23(1):64-75. doi:10.2307/1511100.
7. Dinkes R, Cataldi EF, Kena G, Baum K. Indicators of school crime and safety: NCES 2007-003/NCJ214262. Washington, DC: US Departments of Education and Justice; 2006. <http://bjs.ojp.usdoj.gov/content/pub/ascii/scs06.txt>. Accessed October 23, 2011.
8. Nansel TR, Overpeck M, Pilla RS, Ruan WJ, Simons-Morton B, Scheidt P. Bullying behaviors among US youth: prevalence and association with psychosocial adjustment. *JAMA*. 2001;285(16):2094-2100. doi:10.1001/jama.285.16.2094.
9. Hawker DSJ, Boulton MJ. Twenty years' research on peer victimization and psychosocial maladjustment: a meta-analytic review of cross-sectional studies. *J Child Psychol Psychiatry*. 2000;41(4):441-455. doi:10.1111/1469-7610.00629.
10. Poteat VP, Espelage DL. Predicting psychosocial consequences of homophobic victimization in middle school students. *J Early Adolesc*. 2007;27(2):175-191. doi:10.1177/0272431606294839.
11. US Department of Health and Human Services. Proposed Healthy People 2020 objectives: developing Healthy People 2020. <http://www.healthypeople.gov/hp2020/objectives/TopicAreas.aspx>. Accessed January 5, 2011.
12. Johnson CP, Myers SM; American Academy of Pediatrics Council on Children With Disabilities. Identification and evaluation of children with autism spectrum disorders. *Pediatrics*. 2007;120(5):1183-1215. doi:10.1542/peds.2007-2361.
13. Myers SM, Johnson CP; American Academy of Pediatrics Council on Children With Disabilities. Management of children with autism spectrum disorders. *Pediatrics*. 2007;120(5):1162-1182. doi:10.1542/peds.2007-2362.
14. Shattuck PT, Wagner M, Narendorf S, Sterzing P, Hensley M. Post-high school service use among young adults with an autism spectrum disorder. *Arch Pediatr Adolesc Med*. 2011;165(2):141-146. doi:10.1001/archpediatrics.2010.279.
15. US Department of Education, Office of Special Education Programs, Data Analysis System. Part B Child Count Report Year: 2004-2010 State: US and Outlying Areas. [https://www.ideadata.org/DACAnalyticTool/Intro\\_2.asp](https://www.ideadata.org/DACAnalyticTool/Intro_2.asp). Accessed October 23, 2011.
16. Cappadocia MC, Weiss JA, Pepler D. Bullying experiences among children and youth with autism spectrum disorders. *J Autism Dev Disord*. 2012;42(2):266-277. doi:10.1007/s10803-011-1241-x.
17. van Roekel E, Scholte RHJ, Didden R. Bullying among adolescents with autism spectrum disorders: prevalence and perception. *J Autism Dev Disord*. 2010;40(1):63-73. doi:10.1007/s10803-009-0832-2.
18. Montes G, Halterman JS. Bullying among children with autism and the influence of comorbidity with ADHD: a population-based study. *Ambul Pediatr*. 2007;7(3):253-257. doi:10.1016/j.ambp.2007.02.003.
19. Unnever JD, Cornell DG. Bullying, self-control, and ADHD. *J Interpers Violence*. 2003;18:129-147. doi:10.1177/0886260502238731.
20. Schwartz D, Proctor LJ, Chien DH. The aggressive victim of bullying: emotional and behavioral dysregulation as a pathway to victimization by peers. In: Juvonen J, Graham S, eds. *Peer Harassment in School: The Plight of the Vulnerable and Victimized*. New York, NY: Guilford Press; 2001:147-174.
21. Wagner M, Kutash K, Duchnowski AJ, Epstein MH. The Special Education Elementary Longitudinal Study and the National Longitudinal Transition Study: study designs and implications for children and adolescent with emotional disturbance. *J Emot Behav Disord*. 2005;13(1):25-41. doi:10.1177/10634266050130010301.
22. MacFarlane JR, Kanaya T. What does it mean to be autistic? interstate variation in special education criteria for autism services. *J Child Fam Stud*. 2009;18:662-669. doi:10.1007/s10826-009-9268-8.
23. Bertrand J, Mars A, Boyle C, Bove F, Yeargin-Allsopp M, Decoufle P. Prevalence of autism in a United States population: the Brick Township, New Jersey, investigation. *Pediatrics*. 2001;108(5):1155-1161. doi:10.1542/peds.108.5.1155.
24. Yeargin-Allsopp M, Rice C, Karapurkar T, Doernberg N, Boyle C, Murphy C. Prevalence of autism in a US metropolitan area. *JAMA*. 2003;289(1):49-55. doi:10.1001/jama.289.1.49.
25. Shattuck PT, Orsmond GI, Wagner M, Cooper BP. Participation in social activities among adolescents with an autism spectrum disorder. *PLoS One*. 2011;6(11):e27176. doi:10.1371/journal.pone.0027176.1001.
26. Raghunathan TE, Lepkowski JM, Van Hoewyk J, Solenberger P. A multivariate technique for multiply imputing missing values using a sequence of regression models. *Surv Methodol*. 2001;27(1):85-95.
27. *IVeare: Imputation and Variance Estimation Software* [computer program]. Version 0.1. Ann Arbor: Survey Methodology Program, Survey Research Center, Institute for Social Research, University of Michigan; 2002.
28. Rubin DB. *Multiple Imputation for Nonresponse in Surveys*. New York, NY: John Wiley & Sons; 1987.
29. Autism and Developmental Disabilities Monitoring Network Surveillance Year 2006 Principal Investigators; Centers for Disease Control and Prevention (CDC). Prevalence of autism spectrum disorders: Autism and Developmental Disabilities Monitoring Network, United States, 2006. *MMWR Surveill Summ*. 2009;58(10):1-20.
30. Sawyer AL, Bradshaw CP, O'Brennan LM. Examining ethnic, gender, and developmental differences in the way children report being a victim of "bullying" on self-report measures. *J Adolesc Health*. 2008;43(2):106-114. doi:10.1016/j.jadohealth.2007.12.011.
31. Martlew M, Hodson J. Children with mild learning difficulties in an integrated and in a special school: comparisons of behaviour, teasing and teachers' attitudes. *Br J Educ Psychol*. 1991;61(pt 3):355-372. doi:10.1111/j.2044-8279.1991.tb00992.x.
32. Capps L, Kehres J, Sigman M. Conversational abilities among children with autism and children with developmental delays. *Autism*. 1998;2(4):325-344. doi:10.1177/1362361398024002.
33. Dawkins JL. Bullying, physical disability and the paediatric patient. *Dev Med Child Neurol*. 1996;38(7):603-612. doi:10.1111/j.1469-8749.1996.tb12125.x.
34. O'Moore AM, Hillery B. Bullying in Dublin schools. *Ir J Psychol*. 1989;10:426-441.
35. Rose CA, Monda-Amaya LE, Espelage DL. Bullying perpetration and victimization in special education: a review of the literature. *Remedial Spec Educ*. 2011;32(2):114-130. doi:10.1177/0741932510361247.
36. Hodges EVE, Malone MJ, Perry DG. Individual risk and social risk as interacting determinants of victimization in the peer group. *Dev Psychol*. 1997;33(6):1032-1039. doi:10.1037/0012-1649.33.6.1032.
37. Whitney I, Nabuzoka D, Smith PK. Bullying in schools: mainstream and special needs. *Support Learn*. 1992;7(1):3-7. doi:10.1111/j.1467-9604.1992.tb00445.x.
38. Stockdale MS, Hangaduambo S, Duys D, Larson K, Sarvela PD. Rural elementary students', parents' and teachers' perceptions of bullying. *Am J Health Behav*. 2002;26(4):266-277.
39. Holt MK, Kantor GK, Finkelhor D. Parent/child concordance about bullying involvement and family characteristics related to bullying and peer victimization. *J Sch Violence*. 2009;8:42-63. doi:10.1080/15388220802067813.
40. Hahn R, Fuqua-Whitley D, Wethington H, et al; Task Force on Community Preventive Services. Effectiveness of universal school-based programs to prevent violent and aggressive behavior: a systematic review. *Am J Prev Med*. 2007;33(2)(suppl):S114-S129. doi:10.1016/j.amepre.2007.04.012.