

# *Bullying, Self-Control, and ADHD*

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*We investigated the influence of low self-control and Attention-Deficit Hyperactivity Disorder (ADHD) on bullying and bully victimization in a sample of 1,315 middle-school students using a school survey. Students who reported taking medication for ADHD were at increased risk for bullying as well as victimization by bullies. The correlation between ADHD status and bullying could be explained by low self-control, a construct theorized by Gottfredson and Hirschi to be the most important determinant of criminality. In contrast, the correlation between ADHD status and bullying victimization was independent of self-control. Subsequent analyses found that self-control influenced bullying victimization through interactions with student gender and measures of physical size and strength. These findings identify low self-control and ADHD as potential risk factors for bullying and victimization and have implications for research on self-control in young adolescents.*

*Keywords: school bullying; ADHD; low self-control; bully victims*

***Bullying is a pervasive problem*** in American schools, particularly middle schools. According to the National Household Education Survey, approximately 12% of middle-school students report being victimized repeatedly by bullies (Nolin, Davies, & Chandler, 1996). A more recent nationally representative study using a World Health Organization survey (Nansel et al., 2001) reported that nearly 30% of students in grades 6 through 10 reported moderate or frequent involvement in bullying, with the highest rates of bullying among students in grades 6 through 8. Bullying is usually defined to include repeated behaviors by a student or group of students to demean, threaten, or physically injure a weaker student (Olweus, Limber, & Mihalic, 1999; Smith & Brain, 2000).

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Historically, bullying often has been minimized or overlooked as a serious problem (Olweus et al., 1999). However, in recent years, the impact of bullying victimization on children's mental health has been recognized (Batsche & Knoff, 1994; Kumpulainen, Rasanen, & Puura, 2001; Olweus et al., 1999). Victims of bullying suffer from anxiety and depression, impaired concentration, poor self-esteem, and avoidant behavior (Austin & Joseph, 1996; Brockenbrough & Cornell, 2000; Greenbaum, 1987; Kochenderfer & Ladd, 1996; Olweus, 1993). Victims of bullying experience acute feelings of rejection and loneliness and, in extreme cases, are at risk for suicide (O'Moore, 2000).

In addition, there are long-term consequences associated with bullying and being victimized. Olweus (1994) concluded that bullying is part of a more general antisocial and rule-breaking behavior pattern. Bullies are more likely than other students to engage in vandalism, shoplifting, truancy, and drug use and are at great risk for future criminality (Olweus et al., 1999). Swedish follow-up studies (Olweus, 1993) found that 60% of boys identified as bullies in grades 6 through 9 were subsequently convicted of at least one crime by age 24, compared to 10% of other boys. Bullies were 3 to 4 times more likely than were other boys to have three or more convictions (Olweus, 1993). In contrast, victims of bullying had an average or below-average rate of criminal conviction. However, Olweus (1993) reported that young adolescents abused by peers report elevated depression and low self-esteem 10 years later.

### **Attention-Deficit Hyperactivity Disorder**

Attention-Deficit Hyperactivity Disorder (ADHD) is the most common neurobehavioral disorder of childhood and is among the most prevalent chronic health conditions affecting school-aged children (Barkley, 1998; Homer et al., 2000). The core symptoms of ADHD include inattention, hyperactivity, and impulsivity. When impairment criteria based on the Diagnostic and Statistical Manual (DSM) are used, prevalence rates for ADHD in the general population of children and young adolescents range from 4% to 12%, with higher rates for urban areas, boys, and those from low SES backgrounds (Barbarese et al., 2002; Brown et al., 2001; Pineda et al., 1999; Wender, 2002).

Research shows that there has been a several-fold increase in prescriptions for stimulant medication among children during the past decade (Jensen et al., 1999). In addition, there are significant regional variations in the amounts of stimulants prescribed by physicians; surveys among primary care pediatricians and family physicians reveal wide variations in practice patterns about

diagnostic criteria and methods (Homer et al., 2000). Nevertheless, recent research indicates that only .2% of participants in a population-based birth cohort study with no evidence of ADHD were treated with a stimulant medication (Barbarese et al., 2002). These findings suggest that although there may be variation in the threshold for diagnosis of ADHD, children prescribed medication for ADHD do exhibit behavioral symptoms consistent with ADHD.

We hypothesize that children with ADHD frequently have behavioral symptoms (Barkley, 1998; Brown et al., 2001) that could increase the risk of involvement in bullying as either aggressors or victims. Because many children with ADHD exhibit problems with aggression and have a relatively high incidence of comorbid Conduct Disorder (25%) and Oppositional Defiant Disorder (33%) (Brown et al., 2001), they may be likely to engage in bullying behaviors. Other symptoms that might increase the likelihood of victimization include poor social skills, anxiety, depression, and low self-esteem (Barkley, 1998; Brown et al., 2001).

A study of second-grade children in Finland (Kumpulainen et al., 2001) found that attention deficit disorder was the most common mental disorder among both bullies and victims (although oppositional/conduct disorder was slightly more common than attention deficit disorder among children identified as both bullies and victims). Olweus (1994) identified impulsivity as a common characteristic of bullies; however, studies have not directly examined how the presence of ADHD might be associated with bullying or victimization experiences. A link between ADHD and bullying would have important implications for interventions to reduce bullying, as well as suggest a potential adverse complication for children with ADHD.

### **Self-Control**

Impulsivity is an important psychological correlate of both ADHD (Barkley, 1998) and bullying (Olweus, 1993). Researchers in crime and delinquency also consider a similar psychological construct of impulsivity, poor self-control, to be a correlate of deviant behavior. According to Gottfredson and Hirschi's (1990) general theory of crime, poor self-control is the most important and pervasive individual trait associated with criminal behavior. Persons with low self-control are hypothesized to manifest six characteristics: They are impulsive, self-centered, and short-tempered, and they choose simple tasks over complex ones, enjoy taking risks, and prefer physical activities over mental exertion. Grasmick, Tittle, Bursik, and Arneklev (1993) developed a scale to measure self-control that has been widely used to test Gottfredson and Hirschi's theory. Studies have supported

the reliability, factor structure, and external validity of this measure and its relation to criminal behavior and other self-serving, reckless behaviors (Piquero, MacIntosh, & Hickman, 2000; Pratt & Cullen, 2000).

Given that both low self-control and bullying are associated with antisocial behavior, it seems reasonable to examine the link between them. Bullies are likely to manifest low self-control because their behavior is impulsive, inappropriately aggressive, and involves taking advantage of others. Further, bullies disregard the hurt they cause to their victims and are not inhibited by the potential for being punished for their actions. Few studies have tested the relationship between self-control and bullying or between self-control and being victimized. Haynie et al. (2001) found that middle-school bullies scored lower on a seven-item self-control scale than did victims or comparison students.

In addition to ADHD and self-control, research suggests that several physical characteristics might also play a role in bullying behavior. Bullies are typically characterized as larger, stronger students who take advantage of smaller, weaker students, although research on physical characteristics of bullies and victims has produced mixed findings. Olweus (1978, 1994) found no consistent association between victimization and 14 physical characteristics (e.g., hair color, wear glasses), including weight, but did find that male bullies tend to be physically stronger than their classmates. Consistent with Olweus's findings, Hodges, Malone, and Perry (1997) found that being weak and having weak friends significantly enhanced a student's likelihood of being victimized.

In this study, we were interested in the characteristics of both bullies and victims of bullying and wanted to distinguish correlates of bullying from correlates of victimization. More specifically, we investigated whether bullies and victims of bullying reported higher rates of ADHD and lower self-control than did other students. In our causal model, ADHD is placed prior to self-control; ADHD is regarded as a condition that is present at birth or becomes manifest very early in childhood (Barkley, 1998), whereas low self-control is theorized by Gottfredson and Hirschi (1990) to result from deficiencies in child-rearing practices. Therefore, ADHD in our model is an exogenous factor that potentially influences self-control (Rowe & Osgood, 1984). We also considered the potential influence of physical (height, weight, and strength) and demographic (age, gender, socioeconomic status) characteristics of the students. We consider these factors as exogenous to the model. Our major research questions were as follows:

1. What is the relationship between ADHD and self-control, controlling for the physical and demographic characteristics of the students?

2. What are the relationships among ADHD, self-control, bullying, and being bullied, holding constant the physical and demographic characteristics of the students? Does self-control mediate the relationships between ADHD and bullying and being bullied, controlling for the physical and demographic characteristics of the students?
3. Do the physical and demographic characteristics of the students influence bullying and being bullied, controlling for the influence of ADHD and self-control?

## METHOD

### Sample

The sample was drawn from the six public middle schools that serve the city of Roanoke, Virginia, a metropolitan area with a diverse population of nearly 100,000 inhabitants. The six middle schools served a total enrollment of 3,038 students in grades six, seven, and eight. Approximately 46.5% of the middle-school student population was non-White, 52% received a free or reduced cost breakfast or lunch at school, and 50% were male.

All middle-school students in attendance on the day of the survey were eligible for the study,<sup>1</sup> and 2,472 students completed the survey (81% response rate). School administrators sent an opt-out letter to all parents/guardians before the administration of the survey. Forty-two declined to participate in the survey. The students who completed the survey closely matched the total population of middle-school students.

### Student Survey

Teachers administered an anonymous survey in classrooms during the fall of 2000. The survey included measures of bullying behavior, bullying victimization, self-control, ADHD status, and personal characteristics such as age, weight, and height. Scores for bullying, victimization, self-control, weight, and height were converted to standard scores.

To measure bullying behavior and victimization, we adapted the survey instrument designed by Olweus that has been used in several other studies (Pepler, Craig, Ziegler, & Charach, 1993). The survey presented students with a standard definition of bullying, followed by nine questions developed by Olweus to measure different types of bullying behaviors. Students could respond that they had not been bullied, or had been bullied only once or twice, 2 or 3 times a month, about once a week, or several times a week. Responses

to the nine items were summed into a Bully Victimization scale with an alpha coefficient of .86.

A second set of nine questions, worded parallel to the victimization questions, asked students if they had engaged in the bullying of other students. Responses to these questions were summed into a Bullying scale with an alpha coefficient of .84.

We defined ADHD status by asking students, "Have you ever taken medication for being hyperactive (Attention-Deficit Hyperactivity Disorder)?" It was not possible for us to confirm an ADHD diagnosis by examining school or medical records because our survey was anonymous and confidential. Because we were limited to student self-reports of medication use, our measure must be regarded as only a likely indicator of ADHD. Epidemiological researchers have also relied on survey questions about ADHD medication status to measure its prevalence (Rowland et al., 2002). Fourteen percent of the students reported that they have taken medication for ADHD. This percentage is similar to rates generated from community samples when impairment criteria are not reported, 16%, and slightly higher than the prevalence rates of 4% to 12% in the general population of 6- to 12-year-olds when impairment criteria are reported (Brown et al., 2001).

We measured the student's level of self-control using a 22-item version of a scale designed by Grasmick et al. (1993). Their factor analysis of the scale identified a single personality trait that they named self-control. Other research found that the Grasmick et al. self-control scale was reliable and valid across different types of samples and was predictive across a range of criminal or deviant behavior (LaGrange & Silverman, 1999; Piquero & Rosay, 1998). The alpha coefficient for the low self-control scale was .89 in our sample.

To examine the credibility of the student self-report of ADHD medication use, we looked at the relationship between ADHD medication status and the self-control scale. Students reporting ADHD medication use had lower self-control ( $M = -.41$ ,  $SD = 1.02$ ) than other students ( $M = .102$ ,  $SD = .97$ ),  $t(1315) = 43.5$ ,  $p < .0001$ . The mean self-control score for the 180 students reporting ADHD medication use was at the 67th percentile of self-control scores for the other students.

We also included additional variables that might confound the relationship among ADHD, low self-control, and bullying such as student grade level and gender. As a rough index of socioeconomic status, we identified students who reported receiving a free or reduced cost meal at school and we included a dichotomous variable to identify African American students, the only minority group large enough for statistical analysis.

To investigate whether the physical size of students relative to their peers is a factor in bullying, we asked students to report their weight and height. We included a self-reported measure of physical strength by asking students to respond (*strongly agree*, *agree*, *disagree*, or *strongly disagree*) to the statement, "I feel that I am stronger than most kids my age."

Surveys were carefully screened for complete and accurate information. We deleted 31 surveys in which the students gave the same response to every question on one or more pages, excluding the questions concerning bullying and having been bullied. We also dropped four surveys in which the student reported an unlikely height (more than 6 foot 5 inches) or weight (more than 300 pounds) after confirming with school principals that no students in the school were this large. We replaced students with missing values for weight and height with their corresponding standardized means and we replaced missing values on our measure of the students' perception of their strength with its mean.

Surveys with missing information on the three dependent variables, bullying behavior ( $n = 306$ ), bullying victimization ( $n = 51$ ), and self-control ( $n = 646$ ), were deleted. Missing cases on our dichotomous independent variables were also deleted ( $n = 42$ ). Research indicates that the causal structures underlying bullying, being bullied, and students who both bully and are bullied may be significantly different (e.g., Haynie et al., 2001). We initially intended to examine each of these groups separately. However, just 77 students reported that they bullied and were victimized more than once or twice; we deleted them from the analysis.

Deleting these cases reduced our sample size from 2,437 to 1,315. Nevertheless, the percentage of students who reported ever having taken medication for ADHD changed less than 1.5%, from 15.08% to 13.69%. In addition, after making these corrections, the percentage of students with a 0 score for the unstandardized bully scale changed from 50.54% to 55.44%, and for the unstandardized victimization scale, from 31.31% to 34.37%. The mean of the unstandardized self-control scale changed from 58 to 59. A correlation matrix of the variables included in the analysis is available upon request.

## RESULTS

### Relationship Between Self-Control and ADHD

To examine the relationship between self-control and ADHD, we regressed our self-control scale on ADHD while controlling for the other relevant student characteristics. Results are presented in Table 1. As expected,

**TABLE 1: Determinants of Self-Control**

| <i>Variable</i>                | B    | SE B | $\beta$ |
|--------------------------------|------|------|---------|
| Gender (1 = male)              | -.27 | .05  | -.13*** |
| Received federally funded meal | -.31 | .05  | -.15*** |
| Race (1 = Black)               | -.10 | .05  | -.04    |
| Height                         | -.02 | .03  | -.01    |
| Weight                         | -.01 | .03  | -.01    |
| Relative strength              | .31  | .02  | .28***  |
| Year in school                 | -.00 | .03  | -.00    |
| ADHD                           | -.35 | .07  | -.12*** |

NOTE:  $N = 1315$ .  $R^2 = .19$ \*\*\*. ADHD = Attention-Deficit Hyperactivity Disorder.  
 \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

there was a significant relationship between self-control and ADHD. Students who reported having taken medication for ADHD were more likely to report lower self-control. The ADHD's standardized regression coefficient indicates that a student's self-control score would decrease by .12 standard deviations if he or she reported taking medication. Notably, 12% of the students who reported having taken medication for ADHD also reported that they bullied at least 2 or 3 times a month. Similarly, approximately 34% of the students who reported taking medication also reported being bullied at least 2 or 3 times a month. In contrast, only 8% of the students not taking medication for ADHD reported bullying others at least 2 or 3 times a month and only 22% reported being bullied at least 2 or 3 times a month.

The results presented in Table 1 also show that males and students receiving a free or reduced cost meal reported significantly lower self-control scores and that students who reported that they feel stronger than other kids have low self-control. The variables included in Table 1 accounted for 19% of the variance in the self-control scale.

### **Relationship Between Being Bullied, Self-Control, and ADHD**

To examine the relationship between being bullied, self-control, and ADHD, we regressed the victimization scale on ADHD and the self-control scale while controlling for other student characteristics. These results, presented in Column A of Table 2, show that ADHD was the variable most strongly related to being a victim. Students taking ADHD medication scored on average .13 standard deviations higher than did other students on the victimization scale.



**TABLE 2: Determinants of the Been Bullied and Bully Scales**

| Variable                       | Column A (Been Bullied) |      |         | Column B (Bully) |      |         |
|--------------------------------|-------------------------|------|---------|------------------|------|---------|
|                                | B                       | SE B | $\beta$ | B                | SE B | $\beta$ |
| Gender (1 = male)              | -.04                    | .05  | -.02    | -.06             | .04  | -.03    |
| Received federally funded meal | .07                     | .05  | .03     | .04              | .05  | .02     |
| Race (1 = Black)               | -.13                    | .05  | -.06**  | .13              | .05  | .07**   |
| Height                         | -.02                    | .03  | -.02    | .06              | .02  | .07*    |
| Weight                         | .06                     | .03  | .07*    | .04              | .02  | .05     |
| Relative strength              | .02                     | .03  | .02     | -.09             | .02  | -.09*** |
| Year in school                 | -.04                    | .03  | -.03    | -.05             | .03  | -.00    |
| ADHD                           | .03                     | .07  | .13***  | .09              | .07  | .03     |
| Self-control                   | -.03                    | .02  | -.04    | -.21             | .02  | -.23*** |

NOTE:  $R^2$  for been bullied (Column A) is .03\* and for bully (Column B) is .11\*\*\*.  $N = 1315$ . ADHD = Attention-Deficit Hyperactivity Disorder.

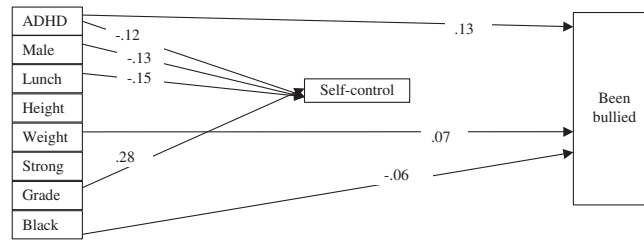
\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

The results presented in Column A also show that heavier students were significantly more likely to be bullied than were other students, but Black students were less likely to be bullied than other students. It is interesting that there was no statistically significant relationship between the self-control scale and being bullied.<sup>2</sup> The variables included in the analysis accounted for 3% of the variance in the victimization scale.

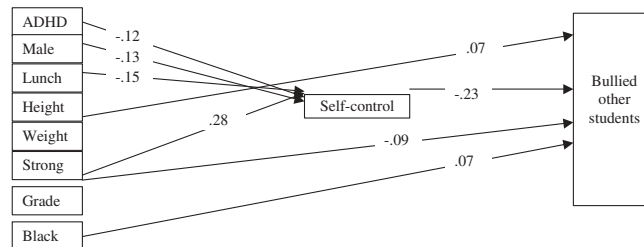
### Relationship Between Bullying, Self-Control, and ADHD

To examine the relationship between bullying, low self-control, and ADHD, we regressed the bullying scale on the self-control scale and ADHD while controlling for other student characteristics. These results are presented in Column B of Table 2. They show that students who reported having taken medication for ADHD were not more likely to bully other students. However, these results also show a relatively strong significant relationship between having low self-control and bullying other students. It is interesting that the standardized regression coefficient for having a low self-control score was more than 2 times larger than any of the other student characteristics. The self-control's standardized regression coefficient indicated that a student's bully scale score would decrease by nearly one fourth of a standard deviation if he or she reported having high levels of self-control.

The results from Column B of Table 2 show also that students who reported that they are taller and stronger than their classmates were more likely to bully other students. Students who identified themselves as African



Path analysis for students who have bullied other students



**Figure 1: Path Analyses for Students Who Have Been Bullied by Other Students and Who Have Bullied Other Students**

American also reported higher rates of bullying others. The variables included in this analysis accounted for 11% of the variance in the bully scale.

**Path Analysis for Victimization**

The path analysis for bully victimization, combining results from Table 1 and Column A of Table 2, is presented in Figure 1. It indicates that students who have taken medication for ADHD had low levels of self-control. However, the results show that low self-control did not enhance a student’s probability of being bullied. Figure 1 shows also that the impact of ADHD on a student’s probability of being bullied was direct. This direct effect, and the absence of any indirect effect, suggests that students have higher probabilities of being bullied because they may have symptoms related to their ADHD that are independent of low self-control. Our results suggest that these other symptoms of ADHD enhance a student’s probability of being bullied even after controlling for the effect of having low self-control.

### **Path Analysis for Bullying**

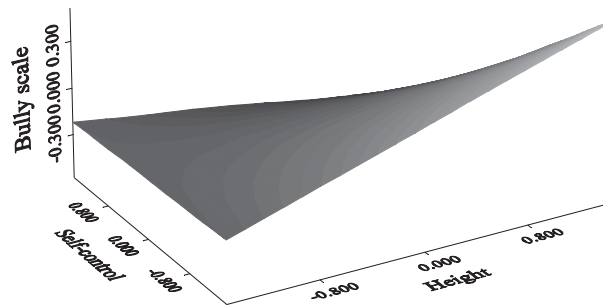
The path analysis for students who bullied other students is presented in Figure 1. It indicates that ADHD did not directly influence a student's probability of bullying other students. However, the absence of this direct effect does not mean that students who reported having taken medication for ADHD were not more likely to bully other students. Students who have taken medication for ADHD had a higher probability of bullying other students because they were more likely to have low self-control, which in turn enhanced a student's probability of bullying other students.

### **Total Effects of ADHD**

One means of investigating how ADHD impacts bullying is to examine the distribution of the total effects of ADHD on the bully and bully victimization scales. The total effect of ADHD on the bully scale was .06 and the total effect of ADHD on the bully victimization scale was .13.<sup>3</sup> It is interesting that the way in which these total effects expressed themselves differed depending on whether we examined the relationship between ADHD and bullying or between ADHD and bully victimization. The path analyses presented in Figure 1 indicate that the self-control scale mediated the total effect of ADHD on the bully scale. However, this was not the case for the total effect of ADHD on the bully victim scale. Ninety-two percent of the influence of ADHD on the bully victim scale was direct ( $.12/.13 = .92$ ) and 8% was mediated by the self-control scale. Thus, students who reported having taken medication for ADHD had a greater probability of bullying other students only because it was associated with lower self-control. However, students who reported medication use had a higher rate of being victims of bullying primarily because of ADHD symptoms or correlates other than low self-control.

### **Interaction Effects**

We examined the data for possible interaction effects. Five interaction terms were significant, one involving ADHD status. Two interaction terms significantly influenced the bully victim scale. The influence of student weight varied as a function of ADHD medication status. Overweight students who have taken ADHD medication were most likely to be bullied, but underweight students who have taken ADHD medication were less likely to be bullied than were underweight students who have not taken ADHD medication.



**Figure 2: Self-Control  $\times$  Height**

The Gender  $\times$  Self-Control interaction term also significantly influenced the bully victim scale. Self-control was positively associated with being a bully victim for boys but negatively associated for girls.

The influence of the self-control scale on the bully scale significantly varied across levels of student characteristics of perceived strength, height, and weight. Students who believe they are stronger than other students and have low levels of self-control were the ones most likely to bully other students. However, among students with high self-control, the hierarchical ordering of the slopes was the opposite, so that students with high self-control who believe they are stronger than other students were less likely to bully than were other high self-control students.

The influence of the self-control scale on the bully scale varied across student height. A surface graph presented in Figure 2 shows that the slope of the regression line between self-control and the bully scale was most negative when students are relatively tall. That is, bullies were most likely to have little self-control and be relatively tall. The steepness of the slope between self-control and the bully scale diminished among shorter students. The influence of the self-control scale on the bully scale also varied across student weight. A surface graph presented in Figure 3 indicates that the slope of the regression line between self-control and the bully scale is most negative when students are relatively heavy. That is, bullies were most likely to have little self-control and be relatively heavy. It shows also that the steepness of the slope between self-control and the bully scale diminished among lighter students. In fact, the impact of self-control on whether students bully was relatively inconsequential for low-weight students.

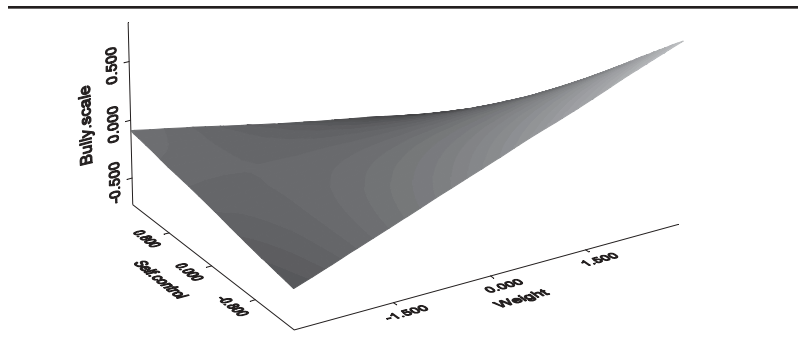


Figure 3: Self-Control  $\times$  Weight

## DISCUSSION

This study contributes to our understanding of psychological factors associated with bullying and bullying victimization. Middle-school students who reported taking medication for ADHD were both more likely to report bullying others and more likely to report being victimized by bullies. Approximately 13% of the students who reported taking ADHD medication reported that they bullied at least two or three times a month, in comparison to 8% among other students. Similarly, 34% of the students who reported taking ADHD medication, in comparison to 22% among other students, reported that bullies victimized them at least 2 or 3 times a month. Notably, the impact of ADHD on being bullied (.13) was twice as large as the effect on bullying (.06).

Although it is consistent with the literature that children with ADHD might engage in inappropriate aggressive behavior toward their peers, it is not as apparent why children with ADHD would be victims of aggression by their classmates. Children with ADHD may suffer from poor peer status or have few friends, making them more vulnerable to the attention of a bully. Some children with ADHD may have poor social skills or engage in inappropriate behavior that elicits aggressive responses in their peers. Anecdotally, one parent of an ADHD child suggested that teachers might treat ADHD children with less respect, inadvertently encouraging similar behavior by their classmates. More generally, the learning problems and discipline difficulties experienced by many ADHD students might identify them as objects of scorn or derision by their peers. We emphasize these factors because social context plays an important role in bullying (Espelage, Bosworth, & Simon, 2000) and because Pellegrini, Bartini, and Brooks (2000) found evidence that peer affil-

iation patterns, but not school environmental factors, were associated with bullying and victimization.

The finding that students with ADHD are at increased risk for being victimized by bullies has implications for the delivery of educational and mental health services to these students and deserves further investigation. Current services in educational settings focus on improving student attention and on-task behavior, with the aim of improving academic achievement and decreasing potentially disruptive behavior in the classroom. However, if children with ADHD are targets of bullying, then intervention efforts should include policies that minimize the interactions between ADHD students and their classmates that lead to their victimization (i.e., the social context of their victimization). Students with ADHD who are being bullied at school may be unresponsive to educational services and interventions that focus only on academic achievement or compliant classroom behavior.

### **Self-Control**

Self-control appears to have a different role for bullies as opposed to victims of bullying. ADHD status was unrelated to bullying after controlling for self-control. In other words, it appeared that students with ADHD were more likely to engage in bullying because of their problems in self-control. Self-control has been linked to a range of delinquent and aggressive behaviors in other studies (Piquero et al., 2000; Pratt & Cullen, 2000), so it is not surprising that students with poor self-control are more likely to bully their classmates. In fact, the impact of self-control on bullying ( $-.23$ ) was notably greater than any other variable examined in this study and accounted for an additional 4% of the variance in bullying behaviors. Although previous studies have demonstrated the influence of low self-control on adult criminality and reckless behavior and, to a lesser extent, adolescent delinquency (Gottfredson & Hirschi, 1990; Pratt & Cullen, 2000), our study suggests that low self-control also plays a role in bullying behavior among middle-school students.

However, low self-control did not appreciably influence the relation between ADHD and being a victim of bullying. To the extent that students with ADHD are targets of bullying, their vulnerability may be associated with correlates of ADHD other than poor self-control. Perhaps students whose ADHD is associated with poor social skills or a lack of supportive peers (Barkley, 1998) are more likely to be victimized by bullying. Another explanation may lie in the interaction between self-control and gender. Among boys, self-control was positively associated with being a victim, but among girls, the relationship was negative. This puzzling finding deserves

more study and may reflect broader differences in the social value placed on conformity versus aggressiveness in boys and girls. We speculate that some boys who are high in self-control could be at risk for bullying victimization because they are not sufficiently assertive or aggressive in their behavior to discourage bullies from targeting them; in other words, for boys, a high degree of conformity and passivity could be a social liability. In contrast, self-control in girls is more consistently regarded as a positive social quality, and those girls who lack self-control could be more likely targets of ridicule or social ostracism.

### **Physical Characteristics Associated With Bullying and Victimization by Bullies**

When it comes to bullying, size matters. Students who report that they are taller and stronger than their peers are more likely to bully others. Weight was not directly associated with bullying, perhaps because weight could be associated with either bullying or victimization; bullies who are taller and stronger than their peers would also weigh more, but some students who are simply overweight might be targets of bullying.

There were significant interactions between self-control and all three physical characteristics of strength, height, and weight. Students with low self-control who perceive themselves to be stronger than their peers are most likely to bully others, but among students with high self-control, perceived strength is not associated with bullying. With regard to height, tall students with low self-control are more likely to bully others, but the relationship between self-control and bullying diminishes among shorter students. The pattern is similar for weight. Self-control has a stronger impact on bullying when students are heavier than their peers. One plausible explanation for these findings is that physical strength, height, and weight do not directly lead to bullying, but they make bullying a more likely outcome among students with low self-control. From another perspective, students who otherwise might be inclined to bully others would be less likely to do so if they were smaller than their classmates.

Bully victimization was not associated with physical strength or height, but it was associated with weight. Overweight students were more likely to be bullied, and students who were both overweight and had ADHD were even more likely to be bullied.

We observed some race differences, although race was not a focus of the study. African American students reported higher rates of bullying others but lower rates of being bullied. In a previous survey of aggressive and high-risk behavior at school, researchers found small racial differences. However,

those differences could be attributed in large part to differential student experiences at school rather than race alone (Marsh & Cornell, 2001).

### **Study Limitations**

We relied on student report of medication use as our indicator of ADHD because our data were gathered through an anonymous self-report survey. Self-report is subject to well-known limitations as a source of diagnostic information, and our sample of ADHD students is limited to students who have been diagnosed and treated for ADHD. We have no information about undiagnosed students with ADHD or about the impact of treatment on the behavior and adjustment of the ADHD sample in our study. Moreover, students differ in the severity of their ADHD condition and whether they have comorbid conditions, so that the effects of mild versus severe ADHD are not discernible in this study.

More generally, our study relied on a single source of information, student self-report, resulting in the potential problem of shared method variance. Future research should replicate our findings using multiple measures of ADHD, including independent psychological diagnoses (where feasible) and direct assessments of attention and behavioral problems. It would be particularly useful for a future study to use independent assessments by peers or teachers to identify bullying and victimization among students known to have ADHD. Nevertheless, it is noteworthy that simply asking students about ADHD medication use identifies students at increased risk for bullying and bullying victimization, and results based on such a limited assessment may underestimate the strength of the relationships we found.

Self-report surveys have well-known limitations because they are susceptible to errors and biases in participant responses. In addition, we had a large amount of missing information because students skipped some survey items. We took a conservative approach of eliminating surveys with any items missing for critical variables such as the scales to measure bullying and bully victimization. However, we examined the effect of this decision by reanalyzing the data with imputed values for all missing items. The reanalyses did not change the pattern of significant findings for the relationships among ADHD, self-control, and the bully and victimization scales.

### **Conclusions**

This study found evidence that students with ADHD are at increased risk for both bullying others and being victimized by bullies. However, the link between ADHD and bullying others can be explained by the more general



relationship between bullying and low self-control. Gottfredson and Hirschi (1990) theorized low self-control to be the critical deficit associated with criminality, and our findings extend the relevance of this construct to bullying in early adolescence. In contrast, self-control did not account for the relationship between ADHD and being victimized by bullies. A combination of factors, including self-control, physical size, and gender, appears to play a role in both bullying and victimization by bullies. Our findings call for further investigation of both ADHD and self-control in understanding bullies and their victims.

### NOTES

1. An alternative school with an enrollment of 50 seventh and eighth graders was excluded from participation in the survey.

2. The relationship between being bullied and low levels of self-control was statistically significant before we deleted the students who both bullied and were bullied. Deleting these students caused the relationship to become statistically insignificant. This suggests that bully-victims may not only exhibit typical patterns of behavior associated with being a victim (Olweus, 1993) but also may have low levels of self-control. Of interest, 24% of students with ADHD were bully/victim at least 2 or 3 times a month; in comparison, 20% of students were bullied at least 2 or 3 times a month, and 21% of students bullied at least 2 or 3 times a month.

3. We generated these total effects by regressing the bully and victimization scales on ADHD without the self-control scale included in the equation while controlling for the effects of the other student characteristics. Both of these coefficients were significant at the .001 level. We also examined the increment in explained variance for the victimization and bullying scales after adding ADHD and self-control while controlling for student characteristics. Student characteristics accounted for .011% of the explained variance in the victimization scale. Including ADHD increased the explained variance from .011 to .028. Adding self-control further increased the explained variance in the victimization scale from .028 to .030. Student characteristics accounted for .066% of the explained variance in the bully scale. Including ADHD increased the explained variance from .066 to .070. Adding self-control further increased the explained variance in the bully scale from .070 to .115.

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