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Associations Between Caregiver Support, Bullying, and Depressive Symptomatology Among Sexual Minority and Heterosexual Girls: Results from the 2008 Boston Youth Survey

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Abstract

Although sexual minority (SM) youth are at an increased risk for being bullied and experiencing depression, it is unclear how caregiver support is interrelated with those variables. Therefore, we sought to assess: (a) the prevalence of nonphysical bullying, depressive symptomatology, and caregiver support among heterosexual and SM girls, (b) the association between caregiver support and bullying in both groups, and (c) whether sexual orientation moderates the interactive effect of caregiver support and bullying on depressive symptoms. Data come from a survey of students in 22 Boston public high schools; 99 of the 832 girls in the analytic sample were SM. We used chi-square statistics to examine group differences, and multiple regression to estimate the association between the caregiver support, sexual orientation, being bullied, and depressive symptomatology. SM girls reported similar levels of caregiver support as heterosexual girls, but reported higher levels of depressive symptomatology. They were also more likely to report nonphysical bullying. Tests for interactions were not statistically significant, suggesting that bullying, caregiver support, and sexual orientation are independently associated with depressive symptomatology.

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Keywords

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Sexual identity formation takes place within multiple social contexts, including peer groups and family systems (Alderson, 2003). Unfortunately, sexual minority adolescents — i.e., those who identify as lesbian, gay, or bisexual, or who have had same-sex sexual experiences or attractions — may experience limited social support within the social contexts of both school and home (Ueno, 2005). Because of others' discomfort with their sexuality and/or nonconforming gender expression, sexual minority adolescents are more likely to be victimized by peers at school (D'Augelli, Grossman, & Starks, 2006; Espelage, Aragon, Birkett, & Koenig, 2008). They are also less likely to receive high levels of support from caregivers, i.e., parents or guardians (Ryan, Huebner, Diaz, & Sanchez, 2009). Despite the importance of family relationships to healthy development, much of the research on sexual minority youth focuses on peer victimization and the school context, and neglects to examine the role of caregiver support and the home environment (Ryan et al., 2009). Therefore, the present study examines the effect of being bullied on depressive symptomatology among sexual minority and heterosexual girls, and explores the role of caregiver support in these associations.

Bullying Among Sexual Minority Youth

A growing body of literature shows that sexual minority youth are more likely than heterosexual youth to be bullied, taunted, and physically assaulted by their peers (Almeida, Johnson, Corliss, Molnar, & Azrael, 2009; Berlan, Corliss, Field, Goodman, & Austin, 2010; Espelage et al., 2008; Ueno, 2005). As an example, researchers using Youth Risk Behavior Surveillance data from Massachusetts and Vermont found that 10% of lesbian/bisexual girls reported being repeatedly assaulted by peers, compared to 1% of heterosexual girls (Bontempo & D'Augelli, 2002). Much of the peer victimization has strong antigay overtones, including sexual orientation-specific slurs (Almeida et al., 2009; Poteat & Espelage, 2005). Although a significant body of research shows that sexual minority youth are more likely to be bullied, there is still much to learn about the nature and dynamics of this bullying. In particular, compared to verbal and physical aggression, much less is known about other types of bullying among sexual minority youth, including sexual harassment, electronic aggression, and indirect or relational aggression (Berlan et al., 2010).

Some researchers have suggested that peers bully sexual minority youth to ensure adherence to normatively gendered standards of behaviors and appearance (Poteat & Espelage, 2005; Tharinger, 2008). In this manner, bullying serves as a way to communicate that heterosexual power and privilege are normal and ideal, and that same-sex intimate relationships are inappropriate (Chesir-Teran & Hughes, 2009). This process isolates sexual minority youth.

Depressive Symptoms

It is well established that sexual minority adolescents have higher rates of depressive symptoms relative to their heterosexual peers (Espelage et al., 2008; Fergusson, Horwood, Ridder, & Beautrais, 2005; Ueno, 2005). The association of minority sexual orientation with negative mental health outcomes is moderated in part by experiences with peer victimization in adolescence, such that antigay bulling is associated with increased emotional distress among sexual minority youth (Almeida et al., 2009; Ueno, 2005). Among sexual minority youth and adolescents in general, being bullied has been associated with depressive symptoms and with major depressive disorder (D'Augelli et al., 2006; Wang, Iannotti, Luk, & Nansel, 2010).

Caregiver Support

Minority sexual orientation, being bullied, and experiencing depressive symptoms are interrelated, and caregiver support is entwined with these factors. Caregiver support is associated with reduced risk for psychopathology (Rohner, 2004) and for being bullied (Wang, Iannotti, & Nansel, 2009). Explanations for the association between caregiver support and bullying are not entirely clear, but may relate to self-esteem and social skills. Research suggests that sexual minority youth receive lower levels of caregiver support relative to their heterosexual peers; this is particularly true for those who have disclosed their orientation or who do not conform to social standards of gender expression (Saewyc et al., 2009; Ueno, 2005). Many parents of sexual minority youth have difficulty accepting their child's sexual minority orientation, and parental rejection is common (D'Augelli et al., 2006; D'Augelli, Hershberger, & Pilkington, 1998; Ryan et al., 2009). Research shows that sexual minority youth who have been exposed to rejecting behaviors from parents are substantially more likely to report depression (Ryan et al., 2009), and that caregiver support is inversely associated with psychological distress among this population (Ueno, 2005). While caregiver support and bullying are associated with among youth generally, the extent to which these associations hold for sexual minority youth is unknown.

Minority Stress Theory

Based on minority stress theory and previous research, we expect that being bullied and receiving low caregiver support will be associated with an increased level of depressive symptoms among sexual minority youth compared to nonsexual minority youth (Meyer, 2003). Minority stress is defined as a chronic form of psychosocial stress experienced by minorities resulting from stigmatization and discrimination (Meyer, 2003). Minority stress theory suggests that the heterosexism and discrimination that sexual minority youth experience in multiple social contexts, including being bullied by peers and receiving low levels of support from caregivers, will increase their risk for depressive symptomatology (Bontempo & D'Augelli, 2002). Antigay bullying is a significant contributor to minority stress for sexual minority youth, thereby increasing their risk for mental health problems.

Overview of the Current Study

The purpose of this article is to examine the associations between sexual orientation, caregiver support, nonphysical bullying, and depressive symptomatology in a school-based sample of Boston youth. The small number of self-reporting sexual minority boys in our sample ($n < 20$) led us to restrict our focus to girls. Exploring nonphysical bullying and depressive symptomatology among adolescent girls is particularly important as they report significantly higher rates of depression than boys (Hankin et al., 1998), and are more likely to report nonphysical bullying (Wang et al., 2009).

First, we investigate differences in the prevalence of multiple types of bullying and levels of caregiver support among heterosexual versus sexual minority girls. Based on the background literature, we expect that sexual minority girls would be more likely than heterosexual girls to experience bullying and less likely to receive high levels of caregiver support. Next, we examine the association between caregiver support and being bullied, with the expectation that higher levels of caregiver support will be associated with lower rates of bullying among sexual minority and heterosexual girls. Third, we examine the independent associations between sexual orientation, caregiver support, and being bullied with depressive symptomatology, hypothesizing that there would be an association between depressive symptomatology and each of the three factors. These objectives set the stage for our fourth and primary objective, which was to examine the extent to which sexual

orientation moderates the interactive effect of being bullied and receiving low caregiver support on depressive symptomatology.

Method

Sample

Data for this study come from the 2008 administration of the Boston Youth Survey (BYS), a biennial paper-and-pencil survey of high school students (9^{th}-12^{th} graders) in Boston Public Schools (Azrael et al., 2009). The BYS 2008 data collection instrument covered a range of topics, including demographic characteristics, health behaviors, use of school and community resources, developmental assets, and risk behaviors; it had a particular emphasis on violence. All 32 eligible public schools within the Boston Public Schools system were invited to participate in the BYS; 22 participated. Schools that were ineligible were those that served adults (i.e., “night school”), students transitioning back to school after incarceration, suspended students, and severely disabled youth.

To generate a random sample of students within the participating schools, the BYS research team generated a numbered list of unique required humanities (i.e., English and History) classes within each school. Then the classes were stratified by grade and selected for survey administration using a random number strategy. Every student within the selected classrooms was invited to participate. Selection of classrooms within schools continued until the total number of students surveyed ranged from 100-125 per school, with an equal distribution of grade levels represented. In the two schools with total enrollments of 100 or fewer students, all classrooms in the school were invited to participate.

Procedure

The self-report questionnaire was administered to students by trained staff between January and April of 2008. Prior to survey administration, passive consent was obtained from students' parents. Staff read a statement on informed assent when they distributed the survey. Students were given 50 minutes to complete the questionnaire. There were 2,725 students enrolled in the classrooms selected for participation and 1,878 completed a questionnaire, yielding a response rate of 68%. Of the 847 students who did not complete a questionnaire, 84% were absent on the day of survey administration ($n = 724$), 12% declined to participate ($n = 99$), and 3% did not have parental consent ($n = 24$).

Measures

Demographics and Sexual Orientation—The BYS inquired about age, race, Hispanic ethnicity, and sexual orientation. To assess the latter, respondents were asked to identify which one of six categories best described themselves: (a) *heterosexual*, (b) *mostly heterosexual*, (c) *bisexual*, (d) *mostly homosexual*, (e) *gay or lesbian*, and (f) *not sure*. This measure has been validated and used with adolescents in several other studies (e.g., Austin, Roberts, Corliss, & Molnar, 2008; Berlan et al., 2010). Girls who indicated that they were mostly heterosexual, bisexual, mostly homosexual, lesbian, or unsure were coded as sexual minority, and those who said they were heterosexual were coded as such.

Bullying—The BYS 2008 contained five questions on types of nonphysical bullying; the items were adapted from an existing 10-item survey (Rigby, 1998). For clarity, an introduction to the items defined bullying and instructed students to focus on peers, rather than siblings or dating partners. As is the case for most behavioral measures of bullying, the items did not reference the presence of a power imbalance between the victim and the perpetrator (Sawyer, Bradshaw, & O'Brennan, 2008). Each of the five items asked whether the young person repeatedly experienced a specific type of bullying in the 30 days preceding

survey administration. The five items asked about: (a) verbal aggression, i.e., having been teased, picked on, or made fun of; (b) electronic aggression, i.e., having been sent mean emails or text messages, or having been the subject of means things posted on the Internet; (c) relational aggression, i.e., having been the subject of rumors or lies; (e) sexual harassment, i.e., having had others make unwanted sexual comments or gestures; and (f) property theft, i.e., having had personal property stolen. An additional composite variable was created to reflect whether a respondent had experienced any of these types of bullying.

Caregiver Support—To assess caregiver support, we used the three items from the Family Communication Subscale (FCS) of the Youth Assets Scale that were included on the BYS instrument (Oman et al., 2002). The items assessed caregiver *understanding* ("An adult in my household tries to understand by point of view"), *warmth* ("An adult in my household tells me that he or she loves me and wants good things for me"), and *openness* ("I can talk to an adult in my household about my problems"). Each was scored on a 4-point Likert scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). Initially, items were summed to create a total score ranging from 4-12, with a higher score indicating a higher level of caregiver support. The continuous measure demonstrated high internal consistency in the full BYS 2008 sample, as indicated by a Cronbach's alpha coefficient of .84. Because the caregiver support measure was positively skewed, we created a binary measure classifying girls who responded either agree or strongly agree to all three items as having "high" caregiver support, and those who responded disagree or strongly disagree or any of the three items as having "low" caregiver support.

Depressive Symptomatology—To assess symptoms of depression, we used an adapted version of the Modified Depression Scale (MDS), which asks respondents to describe the past 30-day frequency of the following five depressive symptoms: sadness, irritability, hopelessness, sleep problems, and concentration difficulties. Items have a 5-point response set that ranged from *never* to *always*. Total scores were derived by summing all items (range = 5 to 25), with higher scores indicating greater levels of depressive symptomatology (Dahlberg, Toal, Swahn, & Behrens, 2005). We conducted mean imputation for those who skipped just one item, and excluded those who skipped two or more items from the analytic sample. The MDS demonstrated high internal consistency in the full BYS 2008 sample, as indicated by a Cronbach's alpha coefficient of .78.

Data Analysis

Initially, we conducted descriptive analyses to characterize the sample and identify whether there were any demographic differences between sexual minority and heterosexual girls. Next, we examined group differences in the prevalence of victimization and level of caregiver support, comparing sexual minority girls to heterosexual girls. We then tested the association between caregiver support and victimization, stratified by sexual orientation. Finally, we examined the bivariate association of depressive symptomatology with: (a) sexual orientation, (b) caregiver support, and (c) peer victimization. We used chi-square statistics to assess the statistical significance of group differences for categorical variables, and linear regression to assess the statistical significance of group differences for continuous variables. In the final series of analyses, we investigated whether sexual orientation moderates the interactive effect of being bullied and receiving low caregiver support on depressive symptomatology by using multiple regression models with 3-way interaction terms.

Results

Of the 1,878 respondents in the full BYS 2008 sample, 983 were girls. The majority were heterosexual (86.9%), with smaller proportions identifying as either mostly heterosexual (3.4%), bisexual (4.8%), mostly homosexual (<1%), or lesbian (1.1%), and 1.6% said they were unsure about their sexual orientation. Twenty-one girls (2.1%) skipped the item on sexual orientation altogether and were eliminated from the analytic sample.

An additional 123 girls were excluded from the analytic sample because they did not answer all three items on caregiver support, and 7 more were excluded because of missing data on bullying or depressive symptoms. This yielded a usable sample 832 girls, 99 of whom were sexual minority (11.9%). About three-quarters of both the heterosexual (74.8%) and sexual minority girls (72.6%) were Black or Hispanic. Because of there were no statistically significant differences in age or race by sexual orientation, we did not adjust for these factors in analyses so as to preserve power.

Bullying, Caregiver Support, and Sexual Orientation

Sexual minority girls were significantly more likely than heterosexual girls to report having experienced any type of bullying in the 30 days preceding survey administration (Table 1). They were significantly more likely than heterosexual girls to report having experienced verbal aggression, relational bullying, and sexual harassment. Among those who had been bullied, 59.4% of sexual minority girls and 51.2 of heterosexual girls experienced two or more types of nonphysical bullying, χ^2 (1, 408) = 1.46, p = .23.

Table 1 also shows that the majority of girls agreed that their caregivers communicated love and warmth, were understanding, and were available to talk about problems. Contrary to expectations, there were no statistically significant differences in level of caregiver support by sexual orientation. However, the proportion of girls who reported agreeing with each of the statement were similar across groups, with the difference in proportions being smaller than 5 units. We did not have sufficient power to detect differences of such a small magnitude. The mean Family Communication Subscale score was 8.5 for sexual minority girls (SD = 2.2) and 2.5 for heterosexual girls (SD = 2.5). Because the minimum detectable difference had to be greater than the absolute value of 0.751, we were unable to assess the statistical significance of the group difference in means.

Being bullied was associated with caregiver support among heterosexual girls, but not among sexual minority girls. Forty-eight percent of heterosexual girls who were bullied reported low caregiver support, compared to 41.1% of those who were not bullied, χ^2 (1, 733) =3.81, p = .05. By contrast, 54.7% of sexual minority girls who were bullied reported low caregiver support, as did 51.4% of those who were not bullied, χ^2 (1, 99) = 0.10, p = .76.

Group Differences in Depressive Symptomatology

In bivariate regression models, we found significantly higher scores on the Modified Depression Scale (MDS) among: (a) sexual minority girls, (b) girls reporting low caregiver support, and (c) girls who experienced any type of bully victimization (see Table 2). In a multiple regression model with three main effects (i.e., caregiver support, bullying, and sexual orientation) and the three two-way interaction terms, none of the interaction terms were found to be significantly associated with depressive symptomatology. In the next model, which included the main effects, the two-way interaction terms, and the three-way interaction terms, none of the interaction terms were statistically significant. Thus, we did not find support for our hypothesis that sexual orientation moderates an interactive effect of caregiver support and bullying on depressive symptomatology. These results suggest that

sexual orientation, caregiver support, and bullying are not differentially associated with depressive symptomatology.

To conduct post-hoc analyses, we created a variable that classified respondents into eight groups based on all possible combinations of the three main factors (i.e., caregiver support, victimization, and sexual orientation). We enter that variable into a one-way ANOVA model predicting depressive symptomatology and found a statistically significant overall group difference (see Table 3). Heterosexual girls who were not bullied and who reported high caregiver support had the lowest MDS scores, whereas sexual minority girls who were bullied and who reported low caregiver support had the highest MDS scores.

Discussion

To learn about how the experiences of sexual minority girls in the school and home environments affect them, we set out to examine associations among bullying, caregiver support, and depressive symptoms among adolescent girls, using data from a school-based survey of Boston youth. Our results show that, compared to heterosexual girls, sexual minority girls were equally likely to receive high levels of caregiver support, and were more likely to report nonphysical bullying. We also found that bullying, low caregiver support and sexual minority orientation were independently associated with higher levels of depression symptomatology. This study builds on existing research by examining caregiver support in addition to peer victimization and by using a representative school-based sample of youth who were not selected on the basis of their minority sexual orientation (Corliss, Cochran, & Mays, 2008).

Bullying and Caregiver Support

As expected, we found that sexual minority girls were significantly more likely than heterosexual girls to report that they had experienced any type of bullying. Specifically, they were more likely to report being a victim of verbal aggression, relational aggression, and sexual harassment. Sexual minority girls may be more likely to experience bullying because of their peers' responses to their sexual orientation and/or gender expression (Almeida et al., 2009; D'Augelli et al., 2006). Unfortunately, the survey we used did not include an item on youths' perceptions of whether they had been victimized because of their sexual orientation.

Sexual minority girls were as likely as heterosexual girls to report electronic victimization, which is an important topic for school personnel and violence prevention specialists (Agatson, Kowalski, & Limber, 2007; David-Ferdon & Hertz, 2009). Because it involves e-mail and the Internet, it is difficult for school personnel to monitor and observe. Our findings suggest that electronic media should be investigated as a channel for antigay bullying.

Notably, the prevalence of overall bullying in this sample — 64% for sexual minority girls and 47% for heterosexual girls — is higher than other prevalence estimates. Data from the 2009 Boston Youth Risk Behavior Survey indicated that about 21% of girls in Grades 9-12 experienced bullying (Centers for Disease Control and Prevention, 2010). However, because our prevalence estimates for specific types of bullying — including relational, electronic, and verbal — are similar to national estimates (David-Ferdon & Hertz, 2009; Wang et al., 2009), it is likely that the discrepancy in estimates is due to differences in measurement, including the fact that our study specifically asked about different types of bullying in separate survey items.

The literature suggests that there are significant stressors in the relationships of sexual minority youth with their parents (Ryan et al., 2009; Savin-Williams, 1998). Given this

background, we were surprised to find that there were no statistically significant differences in levels of caregiver support reported by sexual minority and heterosexual girls. One other study similarly found modest but statistically significant differences in closeness with parents among heterosexual versus sexual minority youth (Ueno, 2005). As there were no items about disclosure of sexual orientation, our findings could reflect that sexual minority girls were receiving high levels of support from parents because they were not open with them about their orientation. Importantly, if a young person anticipates that a parent will react negatively upon hearing about his or her sexuality, he or she is less likely to disclose; thereby preserving the parental relationship (D'Augelli, Grossman, & Starks, 2005). By contrast, young people who sense that their parents would be supportive of them may be more likely to disclose, thereby fostering a closer relationship.

An additional explanation for the lack of an association between caregiver support and sexual orientation relates to the fact that the setting for this study was Boston, Massachusetts, a politically liberal city in a state that has legalized gay marriage. Caregivers of youth in our study may be more accepting of their children's sexual minority orientation than caregivers in other locations. Future research should assess caregiver support and the extent to which it varies by whether and to whom sexual minority youth are open about their orientation.

Based on the literature demonstrating an inverse association between caregiver support and being bullied (Wang et al., 2009), we hypothesized that these two factors would be associated for sexual minority and heterosexual girls. There are several explanations for this association, all with the underlying rationale that patterns established in relationships with caregivers likely affect peer relationships (Holt, Kantor, & Finkelhor, 2009). Our findings confirmed this association for heterosexual girls, but not for sexual minority girls; this may suggest that family factors play less of a role in bullying for sexual minority youth than for heterosexual youth. However, as this study is among the first to examine bullying and caregiver support among sexual minority youth, further research is warranted.

Depressive Symptomatology

As expected, low caregiver support, peer victimization, and sexual minority orientation were associated with higher levels of depressive symptomatology. Results of the regression models that included two- and three-way interaction terms were not statistically significant, indicating that caregiver support, sexual orientation, and bullying are independently associated with depressive symptomatology. The lack of an association could also be due to limited power. In post-hoc analyses, we found that sexual minority girls who were bullied and who had low caregiver had the highest levels of depressive symptomatology.

Study Limitations

A main limitation to these findings is the fact that the sample size is relatively small. Given that we did not have sufficient numbers to detect group differences in some of the analyses, it is essential to replicate this work with a larger population. Given the sample size, we combined all of the sexual minority orientations into one category, which prevented us from examining differences between girls who identify as lesbian, mostly heterosexual, bisexual, or mostly homosexual. Recent research shows that the prevalence of bully victimization among girls varies by sexual minority orientation, with lesbian girls reporting higher levels of bullying than bisexual girls (Berlan et al., 2010). Sample size and lack of representation is a problem common to research on sexual minority youth. Learning more about how bullying affects lesbian, gay, or bisexual youth will require that school violence research studies consistently inquire about sexual orientation.

Conclusions and Implications

This article contributes to the literature by showing that sexual minority and heterosexual girls who are bullied and girls who experience limited social support from caregivers are more likely to have higher levels of depressive symptomatology. In examining the effects of bullying, it is therefore important to consider experiences in multiple developmental contexts, including the family. The fact that we found a substantially higher prevalence of bullying victimization among sexual minority girls is consistent with existing literature and underscores the importance of antibullying program and policies that specifically attend to bullying of sexual minority youth. Schools might also consider holding activities for parents of sexual minority youth to support them and help them to best support their children.

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Table 1

Patterns of Bullying and Caregiver Support Among Girls, by Sexual Orientation

	Sexual Minority (*n* = 99)		Heterosexual (*n* = 733)		Chi-square Results	
	%	(*n*)	%	(*n*)	χ^2	*p*
Types of Bullying						
Verbal	29.3%	(29)	17.8%	(130)	7.49	< .01
Electronic	13.1%	(13)	7.8%	(57)	3.23	.07
Relational	37.4%	(37)	26.4%	(193)	5.28	.02
Sexual harassment	31.3%	(31)	21.2%	(155)	5.16	.02
Property theft	16.2%	(16)	14.2%	(104)	0.28	.60
Composite – any type of bullying	64.7%	(64)	47.2%	(346)	10.62	< .01
Caregiver Support						
Caregiver communicates love and warmth [a]	85.9%	(85)	86.4%	(633)	0.02	.89
Can talk openly with caregiver about problems[a]	57.6%	(57)	61.1%	(448)	0.46	.50
Caregiver tries to understand child's point of view [a]	63.6%	(63)	69.0%	(506)	1.17	.28
Composite – high caregiver support [b]	46.4%	(46)	55.3%	(407)	2.89	.09

[a]Value represents those who responded *strongly agree* or *agree* to the item.

[b]Represents those who reported *agree* or *strongly agree* to all three items on the Family Communication Subscale.

Table 2

Association of Sexual Orientation, Caregiver Support, and Bullying with Modified Depression Scale (MDS) Scores

	Modified Depression Scale		ANOVA Results	
	M	***SD***	***F* (1, 820)**	***p***
Sexual Orientation			12.98	<.001
Sexual minority	15.8	4.1		
Heterosexual	14.2	4.1		
Caregiver Support			56.12	<.001
Low	15.5	4.1		
High	13.4	4.0		
Bullying			41.78	<.001
Any	15.3	3.9		
None	13.5	4.2		

Note. A higher MDS score indicates a higher level of depressive symptomatology, scores range from 5-25. Cronbach's alpha = .77.

Table 3

Mean Scores on the Modified Depression Scale by Sexual Orientation, Victimization, and Caregiver Support (CS)

	Sexual Minority				Heterosexual			
	Bullied (*n*)		Not Bullied (*n*)		Bullied (*n*)		Not Bullied (*n*)	
MDS	Low CS[a] (34)	High CS[b] (28)	Low CS[c] (18)	High CS[d] (17)	Low CS[e] (165)	High CS[f] (175)	Low CS[g] (158)	High CS[h] (226)
M	16.5	16.0	15.3	14.5	16.1	14.2	14.7	12.4
SD	3.4	3.4	5.3	4.8	4.2	3.5	3.9	4.0

Note. One-way ANOVA on MDS score by group, $F(7,824)$ 15.34, $p < .001$. A post-hoc Tukey HSD test indicated statistically significant pairwise differences in mean MDS scores between the following groups: h < a-g; f < a, e; g <a, e, where $p < .05$.