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The Impact of School Connectedness and Teacher Support on Depressive Symptoms in Adolescents: A Multilevel Analysis

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Abstract

Using data from Waves I and II of the National Longitudinal Study of Adolescent Health (Add Health), this study examined the association between school connectedness and teacher support and depressive symptoms in a weighted sample of 11,852 adolescents from 132 schools. To account for the nested data, multilevel regression was utilized. The results indicated higher school connectedness and getting along with teachers were significantly associated with fewer depressive symptoms. Findings offer implications for school social work practice and future research. Suggestions for future research are described and strategies to enhance school connectedness and teacher support are discussed.

Keywords

school connectedness; teacher support; depressive symptoms; adolescents

Introduction

Depression is a debilitating condition that is increasingly recognized among youth, with nearly a third of adolescents experiencing a depressive episode by age 19 (Lewinsohn, Rohde, & Seeley, 1998). Adolescent depression may be prevented or ameliorated by strong relationships (i.e., warmth, communication, support) with significant others (e.g., family, peers, school) (Hall-Lande, Eisenberg, Christenson, & Neumark-Sztainer, 2007). Indeed, depression may be prevented by strong connections to schools and relationships with teachers (Murray & Pianta, 2007).

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Literature Review

School Connectedness and Depressive Symptoms

School connectedness, the extent to which students feel personally accepted, respected, included, cared for, close to, and supported by others in the school environment, (Goodenow, 1993; Libbey, 2004; Weiss, Cunningham, Lewis, & Clark, 2005) has been associated with depressive symptoms in preadolescents (Ross, Shochet, & Bellaire, 2010) and adolescents (Jacobson & Rowe, 1999; Shochet, Dadd, Ham, & Montague, 2006). In a study examining adolescents from Grades 7 to 12, Resnick et al. (1997) found that school connectedness was negatively correlated with emotional distress (including depression items). Further, in a cross-sectional study, Anderman (2002) found students' higher levels of school connectedness were related to lower levels of depression. Additionally, prospective studies have demonstrated that lower levels of school connectedness may be predictive of future depressive symptoms (Kuperminc, Leadbetter, and Blatt, 2001; Shochet et al, 2006). For example, Kuperminc, Leadbetter, and Blatt (2001) examined the relationship between perceptions of the school social climate (i.e., fairness, student interpersonal relationships, order and discipline, etc.) and internalizing symptoms (e.g., anxious-depressed subscales) in middle school students. They found that perceptions of the school social climate accounted for 2% of the variance in internalizing problems at 1 year follow up after controlling for prior internalizing symptoms and demographic variables (e.g., income) (Kuperminc et al., 2001). Others have linked school connectedness to a full measure of depressive symptoms. For instance, Jacobson and Rowe (1999) associated school connectedness to the Center for Epidemiological Studies Depression Scale (CES-D). They found correlations of .35 for boys and .37 for girls between school connectedness and adolescent depressive symptoms. While the correlations are modest, the relationship between school connectedness and depression is worth investigation.

Teacher Support and Depressive Symptoms

Teacher support, the “extent to which teachers are supportive, responsive, and committed to students' well-being,” (Wang, 2009, p. 242) has also been associated with depressive symptoms. Although few studies have specifically investigated the relationship between teacher support and depressive symptoms in adolescents, the available studies suggest an association between teacher support and depressive symptoms. For example, Reddy, Rhodes, and Mulhall (2003) followed early adolescents from grades sixth through eighth and found that students who reported the greatest declines in teacher-student relationship quality also had the greatest increases in depression. In contrast, students who reported increasing levels of teacher support during this same period had corresponding decreases in depression and increases in self-esteem (Reddy, Rhodes, & Mulhall, 2003). Further, Way, Reddy, and Rhodes (2007) and Wang (2009) both found that teacher support predicted lower depressive symptoms in adolescents. Therefore, the available evidence suggests a relationship between teacher support and depression among adolescents.

A recent systematic review found evidence that both school connectedness and teacher support predict future emotional health among adolescents (Kidger, Araya, Donovan, & Gunnell, 2012). However, few studies have used rigorous methods to examine the

relationship between school connectedness and teacher support and depressive symptoms (Kidger et al., 2012). To address this gap, the current study examined the association between school connectedness and depressive symptoms and teacher support and depressive symptoms in adolescents in the United States controlling for prior depressive symptoms and using multilevel modeling to account for the nested data.

Further, because youth experience and react to contexts in different ways depending on individual characteristics (Kuperminc et al., 2001), the current study considered group differences in the association between school connectedness and teacher support and adolescent depressive symptoms particularly for racial and sexual minority youth. Prior research suggests that racial minority youth perceive a more negative school climate compared to their white peers (Watkins & Aber, 2009) and have weaker relationships with teachers (Olsson, 2009). Moreover, gay, lesbian, bisexual, and transgender (GLBT) youth are at increased risk for bullying at school (Goodenow, Szalacha, & Westheimer, 2006) and lower perceptions of school connectedness (Kosciw, Greytak, Diaz, & Bartkiewicz, 2010). Such experiences among minority youth may create emotional distress. Therefore, research is necessary to understand group differences in the association between school connectedness and teacher support and adolescent depressive symptoms.

Methods

The current study entailed a secondary data analysis of the National Longitudinal Study on Adolescent Health (Add Health), a comprehensive, nationally representative, school-based study of United States adolescents in grades 7 through 12. Add Health was a longitudinal study with four waves of data collection. This study used Wave I and Wave II data and was approved by The Ohio State University Institutional Review Board. Please refer to Harris (2005, 2009) for details on the Add Health sampling design and data collection.

Sample

The current study examined data from 11,852 adolescents from 132 schools, who participated in Waves I and II of the Add Health data collection, were assigned sampling weights, and had complete responses on key study variables. Data from a small percentage of respondents with missing data were excluded as were 1,349 adolescents who were not in school at the time of the Wave II in-home interview, usually because they had graduated ($n=461$; 3% of total sample) or dropped out of school ($n=470$; 2.7% of sample). Despite the loss of cases, the representativeness of the data is retained, based on a less than one point difference in Wave II mean depression scores before and after list wise deletion. The number of missing responses for depression at Wave II was $n=69$ ($< 1\%$).

Measures

Control variables—All demographic variables were self-reported. Age, computed by subtracting students' birth date from the date of the Wave II interview, ranged from 11-21 years old. Student grade was 7th, 8th, 9th, 10th, 11th or 12th grade, later dummy coded into two categories, 7th and 8th grade and 9th through 12th grade. Gender was male or female (male=0). Race was Non-Hispanic white, Hispanic, Black or African American, Asian or

Pacific Islander, American Indian or Native American, and other, later dummy coded into two categories, racial minority and majority (yes=0). Youth who reported either a same sex attraction, having a same-sex romantic relationship or a same-sex nonromantic sexual partner were coded “yes” for the variable sexual minority (no=0). Prior depressive symptoms were identified using 19 items from the Center for Epidemiologic Studies-Depression Scale collected at Wave I. Parent-adolescent relationship was operationalized with eight items assessing the adolescent's perceptions of his/her closeness with his/her residential mother and father (e.g., the parental figures who reside in the adolescent's household; e.g., “How close do you feel to your mother/father?”). The items were scored on a 5-point Likert scale with responses from 1 (not at all) to 5 (very much), and from 1 (strongly agree) to 5 (strongly disagree). Four items were reverse coded so a higher score indicated a stronger parent-adolescent relationship. The items had an internal consistency reliability score of $\alpha=.83$.

School connectedness—School connectedness was measured with five items, “I feel close to people at this school,” “I feel like I am part of this school,” “Students at your school are prejudiced,” “I am happy to be at this school,” and “I feel safe in my school.” The five items were scored on a five-point scale ranging from 1 (Strongly Agree) to 5 (Strongly Disagree). Four items were reverse coded so higher scores reflect higher levels of school connectedness. The items were summed to create a composite score and averaged to create an average composite score. These items capture the social belonging dimension of school connectedness. Bollen and Hoyle (1991) developed three of the items. In the study sample, the items had low but acceptable internal consistency reliability of $\alpha=.70$.

Teacher support—Two items were used to measure teacher support. One item asked, “Since school started this year, how often have you had trouble getting along with your teachers?” The response categories ranged from 0 (never) to 4 (every day). Responses to this item were reverse-coded so a higher score indicated a stronger relationship. The second item about teachers asked, “How much do you feel that your teachers care about you?” The five response categories ranged from 1 (not at all) to 5 (very much). These were intended to measure the extent to which respondents perceived themselves as being supported by teachers and have been shown to be conceptually distinct from the school connectedness items (McNeely & Falci, 2004).

Depressive symptoms—Depressive symptoms were captured with 19 items from the Center for Epidemiologic Studies-Depression Scale (CES-D; Radloff, 1977). Example items include, “I was bothered by things that usually don't bother me” and “I felt depressed.” Adolescents' responses were based on how frequently in a 7-day period they experienced a particular symptom. Response categories ranged from 0 (rarely or none of the time; less than 1 day) to 3 (most or all of the time; 5-7 days). Four positively worded items (e.g., “You felt you were just as good as other people”) were reverse scored so a higher number represented greater depressive symptoms. The Add Health study used an investigator-adapted CES-D, with 19 items, rather than the standard 20 items (Crocket, Randall, Shen, Russell, & Driscoll, 2005). The score was calculated by summing the individual item responses, dividing by 19, and multiplying by 20 to ensure comparability with studies using 20-item

CES-D (McDowell & Newell, 1996). Scores ranged from 0 to 57, with higher scores indicating greater depression. The items had a good internal consistency reliability score of $\alpha = .87$.

Data Analysis

In order to obtain unbiased parameter estimates and correct variance estimates for the nested data and complex sampling, the analysis used multilevel linear modeling In Stata 12 (Chantala & Tabor, 2010; Tabachnick & Fidell, 2007).

Results

Descriptive Statistics

Study participant characteristics are illustrated in Table 1. There were 11,852 adolescents in the study sample. The study sample was fairly evenly divided in terms of gender (51.8% female). The sample was diverse in terms of race with 1.7% of the sample being Native American, 7.1% Asian American, 21.3% African American, and 16.1% Hispanic. The majority (62.2%) of the sample was between the ages of 15 and 17. In regards to sexual orientation, 5% reported a same-sex attraction, same-sex romantic relationship, or a same-sex non-romantic relationship.

Means and standard deviations of the variables investigated are shown in Table 2. The mean depression score was 11. Nearly 5% of the study sample reported scores indicative of major depression (CESD ≥ 27), while 19% reported scores suggesting mild depression. ($16 \leq \text{score} < 27$) using cut scores defined in Zich et al. (1990). Given these cut-off scores, the majority (76%) of the sample reported experiencing minimal depressive symptoms. The sample reported mean scores of 3.5 for school connectedness, 4.1 for getting along with teachers, and 3.5 for feeling cared about by teachers. Table 2 also shows the correlations among the continuous variables. Depressive symptoms at Wave II were negatively correlated with school connectedness ($r = -.33$), getting along with teachers ($r = -.20$), and feeling cared about by teachers ($r = -.21$). Higher school connectedness, getting along with teachers, and feeling cared about by teachers corresponded with fewer depressive symptoms.

Building and Testing the Multilevel Model

Bivariate regression analyses were performed for all control and independent variables to screen predictors for significance (Tabachnick & Fidell, 2007). All control and independent variables were significantly associated with depressive symptoms at Wave II so all were retained.

Multilevel Regression

The multilevel analysis itself proceeded in three steps using Stata's xtmixed procedure. First, the intraclass correlation (ICC), or between school variance in depressive symptoms, was examined. The null model indicated that although the majority of variance in depressive symptoms is at the individual level ($B=59.4$, $SE=1.6$), there is significant variation in depressive symptoms at the school-level ($B=1.2$, $SE=.32$) and this school-level variance contributed significantly to the overall variance ($IC=2.0\%$, $p < .001$).

Second, to investigate the extent to which school connectedness and teacher support were associated with depressive symptoms, all predictor variables were entered in the model. With the exceptions of age, grade level, and feeling cared about by teachers; all student-level predictors were significantly associated with depressive symptoms at Wave II.

Next, to determine whether the relationships between the key study variables and depressive symptoms varied for different groups of youth, interaction terms between gender, grade level, race, and sexual orientation and the key study variables were created and entered into separate models. Each model included three variables, the main effects terms (e.g., gender, school connectedness) and the interaction term (e.g., gender * school connectedness).

Three of the interaction terms, school connectedness * racial minority, feeling cared about by teachers * race minority, and feeling cared about by teachers * gender, were significant. The simple slopes, illustrated in Figure 1, show that for both racial minority and majority youth higher school connectedness was associated with fewer depressive symptoms [$B = -3.40(.14)$; $B = -3.82(.12)$, respectively]. The significant interaction between race (minority youth) and school connectedness represents the difference between the slopes for minority and majority youth ($B = .707$, $SE = .33$, $p < .05$). The regression lines for minority youth and majority youth depicted in Figure 1 move slightly away from each other as school connectedness increases, implying that racial minority youth gained less, in terms of fewer depressive symptoms, from school connectedness than did racial majority youth. Similarly in Figure 2, comparing the slopes for racial minority and majority youth [$B = -1.25(.09)$; $B = -2.03(.09)$] reveals that for both groups higher perceptions of feeling cared about by teachers was associated with fewer depressive symptoms but that this relationship was significantly greater for racial majority youth ($B = .691$, $SE = .22$, $p < .01$). Finally, Figure 3 illustrates that higher perceptions of feeling cared about by teachers was associated with fewer depressive symptoms for both males and females [$B = -1.37(.08)$; $B = -2.02(.10)$] and that females gained more from higher perceptions of feeling cared about by teachers ($B = -.483$, $SE = .21$, $p < .05$).

Finally, the interaction terms that were significant at the .05 level were included in the final multilevel model with the variables from Models 1 and 2. The results from the final model showed that being a member of a racial and or sexual minority group were significantly associated with depressive symptoms with coefficients of $B = 1.2$ ($SE = .21$; $p < .001$) and $B = .82$ ($SE = .40$; $p < .05$) respectively. A higher school connectedness score corresponded to fewer depressive symptoms by $B = -1.2$ ($SE = .20$; $p < .001$). Reports of getting along with teachers corresponded to fewer depressive symptoms by $B = -.89$ ($SE = .12$; $p < .001$). The interaction terms were not significant in the final model. Results for the multilevel models are depicted in Table 3.

Discussion

This study examined the association between school connectedness and depression and teacher support and depression in adolescents. The bivariate analyses demonstrated a modest correlation between higher school connectedness and teacher support and fewer depressive symptoms. Additionally, being female, a member of a racial minority, or a sexual minority,

having prior depressive symptoms, and poor parent relationships were significantly associated with more reported depressive symptoms. These findings are consistent with prior research on risk factors for depressive symptoms (Franko et al., 2005; Hatzenbuehler, McLaughlin, & Nolen-Hoeksema, 2008; Lewinsohn, Rohde, & Seeley, 1998; Roberts & Chen, 1995).

When individual characteristics were accounted for in the multilevel model, both school connectedness and getting along with the teacher were significantly associated with depressive symptoms, important contributions to the current literature. Higher school connectedness was associated with fewer depressive symptoms advancing the evidence of school connectedness as a correlate and potential predictor of adolescent depressive symptoms (Anderman, 2002; Frydenberg, Care, Freeman, & Chan, 2009; Resnick et al., 1997; Shochet et al., 2006). The finding adds to the current literature by relating school connectedness to a full, validated measure of depressive symptoms and accounting for prior depressive symptoms. Perceptions of getting along with teachers were associated with fewer depressive symptoms offering preliminary support for the impact of a positive student-teacher relationship on adolescent depression (Reddy et al., 2003; Way et al., 2007). This finding should be interpreted cautiously given the measurement was limited. However, similar results have been found in studies using stronger measures of teacher support. For example, Reddy and colleagues (2003) used a version of the teacher support sub-scale of the Classroom Environment Scale and found that increases in teacher support corresponded with decreases in depressive symptoms.

This study also examined whether the relationship between the key study variables and depressive symptoms varied for different groups of youth. The relationship between school connectedness and depressive symptoms did significantly vary for racial majority and minority youth. For both racial majority and minority youth higher school connectedness and perceptions of feeling cared about by teachers was associated with fewer depressive symptoms. However, for majority youth, higher school connectedness and perceptions of feeling cared about by teachers corresponded to fewer depressive symptoms compared to minority youth. While school connectedness and feeling cared about by teachers appears to offer a protective effect against depressive symptoms for both racial minority and majority youth, these positive school experiences have a particularly protective effect for racial majority youth. Further research is needed to better understand why this might be the case. However, the available research suggests that racial minority youth are at an increased risk to experience a more negative school climate (e.g., harsher disciplinary practices, discrimination) than their racial majority peers (Losen, 2011; Wong, Eccles, & Sameroff, 2003). Such negative experiences could ultimately result in lower school connectedness and teacher support scores, which in turn, might correspond with a weaker impact on reducing depressive symptoms.

Additionally, higher perceptions of feeling cared about by teachers corresponded with fewer reported depressive symptoms for females compared to males. These relationships may be particularly important in preventing depressive symptoms among female adolescents. This finding is congruent with past research that supports the critical role positive relationships play in improving depressed mood among adolescent females (Jacobson & Rowe, 1999).

Limitations

A number of limitations should be considered when interpreting the study findings. First, although a significant relationship was detected between getting along with teachers and depressive symptoms, student-teacher relationships may be captured with other measures not available for this study. The teacher support measures used in this study were limited to perceptions of emotional support, however other types of support (e.g., instrumental) may also be relevant. The relationship between teacher support and depressive symptoms may have been even stronger with a more reliable measure of teacher support (Rubin & Babbie, 2008). Similarly, the school connectedness measure primarily measured the dimension of social belonging, but not other dimensions of school connectedness such as engagement. Second, the study employed a cross sectional design; therefore causation cannot be inferred. Although significant associations were detected, one cannot conclude that the independent variables caused depressive symptoms. This ambiguity of the direction of causality is a possible threat to the internal validity of the study; therefore caution must be used in asserting the relationship between the study variables and depressive symptoms. Third, the Add Health study is school-based. Youth who drop out of school or are suspended or expelled may be more likely to be depressed; however, they were not eligible for inclusion in the current study. Other limitations included a limited number of items measuring school connectedness and teacher support, solely self-reported data, and the use of secondary data. Despite the limitations, important implications can be made for future research and practice.

Research Implications

Further investigation into the relationship between teacher support and depressive symptoms is warranted using a more valid and reliable measure of teacher support such as the teacher support subscale of the Child and Adolescent Social Support Scale (CASSS; Malecki, Demaray, & Elliot, 2000). This subscale measures four types of social support including emotional, instrumental, appraisal, and informational (Malecki et al, 2000). Further, qualitative research may be needed to identify the common themes students associate with a positive student teacher relationship to inform the development of future teacher support measures. Additionally, future research may also use a more valid and reliable measure of school connectedness such as the 18-item Psychological Sense of School Membership Scale (PSSM, Goodenow, 1993). Also, it is plausible that the effect of teacher support on depressive symptoms might be mediated by school connectedness suggesting an area for future investigation (CDC, 2009). Further, given the small percentage of participants with mild or major depression, it is possible that the study variables were predicting degrees of non-depression. Future research could perform additional analyses with depression as a categorical outcome variable (e.g., no, mild, and major depression). Finally, future research should further investigate the relationship between school connectedness and student-teacher relationships and depressive symptoms among vulnerable youth, particularly female and racial minority youth, as a greater understanding of how and in what ways these relationships impact the mental health of vulnerable populations is warranted.

Practice Implications

The practice implications should be tempered by the small percent of variance in depression accounted for, the degree to which the sample included depressed youth, and the limitations of the design (e.g., measurement). Tentative suggestions could be made for school social workers to consider that school connectedness and getting along with teachers may be associated with depression for many youth. Because the causality or direction of effect among these variables cannot be shown in the present study, school social workers should consider that students who do not get along with teachers and who seem to feel disconnected from school may need to be assessed for depression; conversely, interventions may need to be implemented to enhance school connectedness and improve student-teacher relationships.

To accomplish the latter, school social workers may work one-on-one with students, small groups, teachers, parents, and the overall school environment (Frey & Dupper, 2005; Kelly et al., 2010). For example, school social workers may provide professional development to teachers on giving students positive feedback and praise, which are key strategies to foster teacher-student relationships (Center for Disease Control and Prevention (CDC), 2009; Murray & Pianta, 2007). Also, professional development on effective classroom management and teaching methods (e.g., lesson plans tailored to diverse learning styles, clearly described lesson goals, encouraging open, respectful communication) may also be warranted as these factors influence the overall learning environment and school connectedness (CDC, 2009). At the same time, school social workers may also work with adolescents in a social skills group to enhance their interpersonal skills, which are particularly critical for youth with depressive symptoms. Social and emotional skills such as interpersonal skills are necessary for students to be actively engaged in school (CDC, 2009).

School social workers may also engage large groups to promote change in the school environment. For example, they may advocate for school policies that promote school connectedness (Frey & Dupper, 2005; McNeely, Nonnemaker, & Blum, 2002; Whitlock, 2006). Such policies include respecting diversity, encouraging student input, tolerant disciplinary policies, and small class sizes (CDC, 2009; McNeely, Nonnemaker, & Blum, 2002; Whitlock, 2006). Engaging parents in adolescent's academic and school life may also promote school connectedness. Parent engagement may be fostered through establishing regular meetings to discuss the child's academic performance and achievements, offering classes to enhance parents' skills (e.g., English as a second language), and reducing barriers (e.g., transportation) to parent involvement (CDC, 2009). Further, trusting and caring relationships among school staff, parents, students, and communities may also foster school connectedness (CDC, 2009, p. 9). These relationships may be developed through a variety of methods such as creating learning experiences for students to work with adults (e.g., internships, service learning), encouraging staff to greet students by name, and opening the school building to families and community members outside of school hours for recreation and health promotion programs (CDC, 2009, p. 15). Employing such strategies in the school setting may ultimately have a positive impact on school connectedness and subsequently youth mental health.

Conclusion

Overall, this study demonstrated an association between higher school connectedness and getting along with teachers and fewer depressive symptoms in adolescents. The results offer implications for future research in this area as well as practice. In particular, future research on the relationship between teacher support and depressive symptoms is warranted, particularly among racial minority youth. Ultimately, school connectedness and teacher support may represent potential opportunities to develop and implement efforts to support adolescent mental health within the school context.

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Highlights

- We examine the relationship between school experiences and depressive symptoms.
- School connectedness was associated with fewer depressive symptoms.
- Getting along with teachers was associated with fewer depressive symptoms.
- The association varied for racial minority youth and females.

Figure 1. The Relationship between School Connectedness and CES Depression Scale Score by Race

Figure 2. The Relationship between Perceptions of Feeling Cared about by Teachers and CES Depression Scale Score by Race

Figure 3. The Relationship between Perceptions of Caring by Teachers and CES Depression Scale Score by Gender

Table 1
Sample Characteristics (N=11,852)

Characteristic	N	%
<i>Sex</i>		
Male	5,718	48.2
Female	6,134	51.8
<i>Age</i>		
11-14	2,272	19.2
15-17	7,374	62.2
18 and older	2,206	18.6
<i>Grade^a</i>		
7 th -8 th	2,003	17.3
9 th -12 th	9,531	82.6
<i>Race^b</i>		
White/Non-Hispanic	6,254	52.7
Hispanic	1,911	16.1
African-American	2,527	21.3
Asian	843	7.1
Native American	207	1.7
<i>Sexual Orientation</i>		
Sexual Minority	585	5
Heterosexual	11,267	95

^aN=318 (2.6%) participants attended high school without grade levels or were considered beyond high school.

^bN=110 participants (<1%) identified race as "other"

Table 2
Descriptive Statistics and Correlations Among Study Variables

Variable	M	SD	1	2	3	4	5	6
1. Depression Score Wave II	11.0	7.7	1.000					
2. Depression Score Wave I	11.1	7.6	0.5953	1.000				
3. Parent-Adolescent Relationship	4.3	0.5	-0.371	-0.2548	1.000			
4. School Connectedness	3.5	0.7	-.3329	-0.2766	0.2423	1.000		
5. Get Along with Teachers	4.1	.91	-0.2033	-0.1467	0.1260	0.2333	1.000	
6. Feel Teachers Care About You	3.5	1.0	-0.2159	-0.1609	0.2203	0.3727	0.3065	1.0

Note: N=11,852 Ranges of possible scores for each study variable are as follows: depression (0-57), parent-adolescent relationship (1-5), school connectedness (1-5), getting along with teachers (0-4), and feeling cared about by teachers (1-5). For depression higher scores indicate a greater number of depressive symptoms. For all other variables, high scores indicate a stronger relationship.

Table 3
Predictors of Depression Score Using the Wave II In-Home Survey with Multilevel
Weights^{a,b}

	Model 1	Model 2	Model 3
Fixed effects	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)
Intercept	11.2 (.16)	19.9	11.0
Gender (Female)		.91 **.17)	.92 **.17)
Grade		-.29(.24)	-.29(.24)
Age		.11(.07)	.11(.07)
Sexual Minority		.83 *.40)	.82 *.40)
Racial Minority		1.2 **.21)	1.2 **.21)
Parent-Adolescent		-1.8 **.18)	-1.8 **.18)
Relationship			
Prior Depressive Symptoms		.50 **.01)	.50 **.01)
School Connectedness		-1.2 **.14)	-1.2 **.20)
Getting Along with Teachers		-.89 **.12)	-.89 **.12)
Feeling Cared About by Teachers		-.18(.10)	.17(.16)
School Connectedness x Racial Minority			-.07(.33)
Feeling Cared About by Teachers x Racial Minority			.15(.20)
Feeling Cared About by Teachers x Gender			-.17(.18)
Random effects	Variance Component (SE)	Variance Component (SE)	Variance Component (SE)
Level 1	1.2(.32)	.34(.13)	.34(.13)
Level 2	59.4 (1.6)	34.0(1.2)	34.0(1.2)
Model Summary			
AIC	586060.5	527025.7	527003
BIC	586090.6	527121.3	527120.7
Intra-class correlation	0.2		

* p < .05;

** p < .001

Note: N=11,852

^a Multilevel weights were computed to account for the unequal probability of sampling at both the individual and school-level. Please see Chantala, Blanchette, & Suchindran (2011) for more information.

^b Prior to the analysis, the variables were checked for multicollinearity. Multicollinearity was an issue when the interaction terms were entered in the model. Therefore, school connectedness, feeling cared about by teachers, and getting along with teachers were grand mean centered (Tabachnick & Fidell, 2007). Following centering, the Variance Inflation Factor (VIF), a numerical indicator of multicollinearity, reduced from 20.9 to 1.9 (Cohen, Cohen, West, & Aiken, 2003).