Trajectories of School Connectedness Across the Middle School Years: Examining the Roles of Adolescents’ Internalizing and Externalizing Problems

Alexandra Loukas¹, Jessica Duncan Cance¹, and Milena Batanova¹

Abstract
Students become increasingly disconnected from their schools across the middle school years, but little is known about the factors contributing to changes in school connectedness. This study examined the time-invariant and time-varying roles of depressive symptoms and externalizing problems in trajectories of student-perceived school connectedness across the middle school years. Three yearly waves of data were collected from 296 students beginning in the sixth grade. Hierarchical linear modeling results indicated that school connectedness declined across time. Initial levels of adjustment problems at school entry were concurrently associated with lower levels of connectedness. Initial levels of externalizing problems did not account for rate of decline, but elevated levels of externalizing problems across the middle school years were associated with lower concurrent levels of connectedness. Surprisingly, initial levels of depressive symptoms predicted a slower rate of decline in connectedness for boys. Findings highlight

¹University of Texas at Austin, USA

Corresponding Author:
Alexandra Loukas, Department of Kinesiology and Health Education, The University of Texas at Austin, 1 University Station D3700, Austin, TX 78712, USA.
Email: alexandra.loukas@austin.utexas.edu
the detrimental associations between adjustment problems and school connectedness.

**Keywords**
externalizing problems, growth models, early adolescence, internalizing problems, school connectedness

Early adolescents face an array of developmental changes, including the transition from elementary school to an oftentimes larger, more departmentalized, and less personal middle school environment (Roeser, Eccles, & Sameroff, 2000). Unfortunately, the transition to middle school does not always match the developmental needs of early adolescents, whose desire for mutual decision-making and close interpersonal relationships with non-parent adults and peers increasingly intensifies (Roeser et al., 2000). According to the stage–environment fit model (Eccles & Midgley, 1989), mismatches between the school environment and adolescent developmental needs can lead to motivational problems, which in turn may contribute to poor school connectedness (Eccles & Roeser, 2011). In fact, studies indicate that during the middle school years, students become increasingly disconnected from their schools (Simons-Morton & Chen, 2009; Wang & Dishion, 2012; Way, Reddy, & Rhodes, 2007).

Despite a general downward trend, students vary in their level of connectedness to the middle school and not all students show decrements in connectedness (Simons-Morton & Chen, 2009; Wang & Dishion, 2012). Yet, much of the existing research examines mean changes in school connectedness across two time points and only a handful of studies examine intraindividual change in trajectories of school connectedness across the middle school period. Moreover, whereas most studies examine the contributions of school connectedness to adolescents’ adjustment problems (e.g., Anderman, 2002; Brookmeyer, Fanti, & Henrich, 2006), few examine the role of adolescents’ adjustment problems in their perceptions of school connectedness. The current study examined trajectories of student-perceived school connectedness across the middle school years, and assessed the impact of early adolescents’ depressive symptoms, one of most commonly occurring types of internalizing problems (Kessler, Petukhova, Sampson, Zaslavsky, & Wittchen, 2012), and externalizing problems on school connectedness trajectories.
Although there is no clearly accepted definition of school connectedness, the construct captures the interpersonal and affective elements of students’ school experiences (Libbey, 2004), and generally reflects students’ feelings of belonging to and closeness with others at their school (Resnick et al., 1997). Given the broad meanings ascribed to school connectedness, terms such as school belonging, school bonding, school climate, and school engagement are often used interchangeably with school connectedness (see Libbey, 2004, for review). According to social development theory (Catalano, Kosterman, Hawkins, Newcomb, & Abbott, 1996), school connectedness develops as a result of a process that begins with the student’s perception of opportunities for involvement in the social environment. If the student interacts successfully in the school with teachers and peers, and if meaningful rewards are gained from the interaction, then a connection to the school develops.

Adolescents who enter middle school with elevated levels of adjustment problems may be at a disadvantage in developing a connection to the school because they are more likely than their peers to report conflictual relationships with teachers (Doumen et al., 2008) and be rejected by peers (Pedersen, Vitaro, Barker, & Borge, 2007). Transactional models of development (Sameroff, 2000) further support this framework, as they recognize the reciprocal associations between adolescents and the environments with which they interact. Thus, adolescents who enter the sixth grade with elevated levels of adjustment problems may be more likely than their peers to show lower concurrent levels of school connectedness, which in turn may contribute to further elevations in adjustment problems (Loukas, Ripperger-Suhler, & Horton, 2009). These transactional associations may occur across the middle school years such that adolescents with elevated levels of depressive symptoms and externalizing problems may show a faster rate of decline in school connectedness than those with lower levels of adjustment problems.

In addition to the role of initial levels of students’ adjustment problems on entry into middle school, it is important to examine how change in depressive symptoms and externalizing problems may contribute to change in school connectedness across time. Similar to school connectedness, adjustment problems are likely to change across the middle school years (Way et al., 2007), which may concurrently impact students’ perceptions of connectedness to their school. According to the snares hypothesis, “ensnaring” or vulnerability factors interfere with a normative behavior that is observed in the population (see Hussong, Curran, Moffitt, Caspi, & Carrig, 2004; Moffitt, 1993). Based on this hypothesis, it is likely that changes in adjustment would
elicited concurrent reactions from an adolescent’s school environment, including peers and teachers, which may alter the expected developmental trajectory of school connectedness.

Only a handful of studies have examined the associations between developmental trajectories of students’ adjustment problems and perceptions of the school environment (e.g., Simons-Morton & Chen, 2009; Wang & Dishion, 2012; Way et al., 2007). Results from these studies indicate that the variability in the rate of decline of school connectedness can be accounted for by changes in adolescents’ adjustment problems. Using latent growth curve models and following a group of students from sixth to ninth grades, Simons-Morton and Chen (2009) found that growth in students’ school engagement (based on students’ reports of their motivation to do well in school) was negatively associated with growth in conduct problems. Wang and Dishion (2012) found that the rate of change in four indices of school climate (students’ perceptions of academic support, school behavior management, teacher social support, and peer social support) assessed across the middle school years was negatively associated with rate of change in teacher-rated problem behaviors, which comprised students’ classroom misbehaviors and involvement in delinquency. Similarly, Way and her colleagues (2007) reported that trajectories of middle school students’ reports of school climate (assessed by teacher support, peer support, opportunity for student autonomy, and clarity and consistency of school rules) were associated with trajectories of depressive symptoms, behavior problems, and self-esteem.

Together, the existing studies advance our understanding of how change in adjustment problems is associated with change in school-related outcomes. However, only one study (Way et al., 2007) assessed the role of internalizing problems in school connectedness trajectories and none examined if initial levels of adjustment problems at school entry impact the rate of change in school connectedness trajectories. In the current study, early adolescents’ depressive symptoms and externalizing problems were examined as time-invariant (i.e., assessed at middle school entry, Grade 6) and time-varying covariates as they relate to middle school students’ school connectedness trajectories. The current study also examined if there were gender differences in initial levels of school connectedness, in the rate of change in school connectedness, or in the role of early adolescents’ adjustment problems in their school connectedness trajectories.

A number of studies indicate that compared with boys, girls report being more connected to their school (Loukas, Ripperger-Suhler, & Herrera, 2012; Simons-Morton, Crump, Haynie, & Saylor, 1999). A higher level of connectedness may result because girls adopt more connection-oriented goals than boys, and as such are more invested in interpersonal relationships at school.
(see Rose & Rudolph, 2006, for review). Although we might also expect girls to report a slower rate of decline in level of connectedness (due to their connection-oriented goals), the limited evidence regarding gender differences and change in school connectedness is mixed. Whereas some studies indicate that the rate of decline in school connectedness is consistent across girls and boys (Wang & Dishion, 2012), others indicate that the rate of decline is faster for girls (Simons-Morton & Chen, 2009). Moreover, because problems with interpersonal relationships tend to be more strongly associated with girls’ than boys’ outcomes (Rose & Rudolph, 2006), it is likely that gender would moderate the relationship between adolescent adjustment problems and school connectedness. However, the only study to examine gender as a moderator found that the association between adolescents’ problem behaviors and only one (i.e., peer support) of four indices of school climate was slightly stronger for girls than boys (Wang & Dishion, 2012). Given the limited and conflicting findings, further research is needed to investigate the role of gender as a moderator of the associations between early adolescents’ adjustment problems and trajectories of school connectedness across the middle school years.

In summary, the current study extended existing research by examining the time-invariant and time-varying impact of early adolescents’ depressive symptoms and externalizing problems on intraindividual change in student-perceived school connectedness from the sixth to eighth grades. Based on theory and research, we hypothesized that the average school connectedness trajectory would decline across time, and elevated levels of depressive symptoms and externalizing problems at middle school entry would be associated with lower levels of school connectedness at middle school entry and a faster rate of decline across time. We also expected that above and beyond the associations of depressive symptoms and externalizing problems at school entry, increases in depressive symptoms and externalizing symptoms across time would be associated with concurrent decreases in school connectedness. Finally, we hypothesized that girls would report higher mean levels of school connectedness at all three grades than boys. We also examined gender differences in the rate of change in school connectedness and in the associations between the adjustment problems and school connectedness trajectories, but did not have any a priori hypotheses regarding gender as a moderator because of conflicting findings.

**Method**

Participants were 296 10- to 14-year-old students attending two middle schools and involved in a three-wave panel study. Each wave was separated
by 1 year. At Wave 1, students were in the sixth grade \((M_{\text{age}} = 11.69; SD = .76)\). At Wave 2, students were in the seventh grade \((M_{\text{age}} = 12.30; SD = .49)\) and at Wave 3, in the eighth grade \((M_{\text{age}} = 13.25; SD = .44)\). About half (50.3%) of the students were female; 74% were European American, 17.6% were Latino, 3.4% were African American, and the remainder reported another race/ethnicity.

**Procedure**

At Wave 1, active parental consent was obtained from 76% \((n = 884)\) of all sixth- and seventh-grade students attending all three middle schools in a suburban school district in central Texas. Because the goal of this study was to examine change in school connectedness across the middle school years, only data from students who were in the sixth grade cohort at Wave 1 \((n = 475)\) were considered for this study. However, 179 of the 475 sixth graders, all of which were at one school, were not allowed to participate at subsequent waves because of standardized testing demands. As a result, data from 296 students were used for the present study. Of the 296 students, 57% participated at all three waves of the study, 15% participated at two waves, and 28% only at one wave. A questionnaire consisting of 161 items at Wave 1 and 160 items at Waves 2 and 3 was group-administered in one 40-minute homeroom class. A member of the research team read each question aloud to students to maintain compliance and to control for varying levels of reading comprehension.

**Measures**

**School connectedness.** Five items from the National Longitudinal Study of Adolescent Health (see Anderman, 2002; McNeely, Nonnemaker, & Blum, 2002) were used to assess level of connectedness to the school at Waves 1, 2, and 3. Students responded to items such as “I feel close to people at this school” and “I feel like I am part of this school.” The five items were scored on a 5-point scale ranging from 1 (strongly agree) to 5 (strongly disagree). Items were reverse coded and averaged so that higher scores reflect higher levels of school connectedness. These five items have been shown to have acceptable reliability and to be predictive of lower levels of a variety of adjustment problems (Anderman, 2002; McNeely et al., 2002). The internal consistency reliability (coefficient alpha) of the five items for Waves 1 to 3 ranged from .75 to .82.

**Depressive symptoms.** The 27-item Children’s Depression Inventory (CDI; Kovaes, 1992) was used to measure adolescent depressive symptoms at
Waves 1, 2, and 3. The CDI is appropriate for children ranging in age from 7 to 17 and assesses the cognitive and somatic aspects of depression. Adolescents are presented with 27 sets of three-response alternatives and asked to pick the one that best described them in the past 2 weeks. One item regarding suicidal ideation was not included in the present study at the request of the school principals. The final score was based on the average of the remaining 26 items. Each item was scored on a scale ranging from 0 to 2, with higher scores reflecting more depressive symptoms. The CDI distinguishes between adolescents with major depression and those with no depression diagnosis, and has excellent internal consistency reliability (Craighead, Curry, & Ilardi, 1995). The internal consistency reliability (coefficient alpha) of this measure for Waves 1 to 3 ranged from .89 to .92.

**Externalizing problems.** The self-report form of the 25-item Strengths and Difficulties Questionnaire (SDQ; Goodman, Meltzer, & Bailey, 1998) was used to assess adolescents’ externalizing problems at Waves 1, 2, and 3. The SDQ is a brief behavioral screening questionnaire designed to assess conduct problems, prosocial behaviors, emotional symptoms, hyperactivity, and peer problems among 11- to 16-year-old youth. For the purposes of this study and based on research conducted by Ruchkin, Jones, Vermeiren, and Schwab-Stone (2008), seven items were used to assess externalizing problems. The seven items were drawn from the Conduct Problems (four items) and Hyperactivity (three items) subscales (e.g., “I fight a lot. I can make other people do what I want.” “I am easily distracted, I find it difficult to concentrate”). Each item was scored on a scale ranging from 1 (not true) to 3 (certainly true) and averaged so that higher scores reflect more externalizing problems. Similar to previous research (Ruchkin et al., 2008), the internal consistency reliability (coefficient alpha) of the externalizing problems scale for Waves 1 to 3 ranged from .66 to .68.

**Attrition Analyses**

Attrition analyses were first conducted to determine if the sixth-grade students whose data were not included in this study because they could not participate in Waves 2 or 3 due to standardized testing demands (n = 179) varied from those students whose data were included (n = 296) on the three Wave 1 variables. One one-way analysis of variance (ANOVA) indicated that there were no differences between the two groups on any of the three Wave 1 variables of depressive symptoms, $F(1, 472) = 1.56, p = .21$; externalizing problems, $F(1, 472) = 0.46, p = .50$; or school connectedness, $F(1, 472) = .13, p = .72$. A second set of analyses was then conducted using data only from the 296 students included in this study to determine if those participating in all
three waves differed from those participating in either one or two waves on the same Wave 1 variables. One one-way ANOVA indicated that although there were no differences between the two groups on Wave 1 externalizing problems, $F(1, 295) = 3.13, p = .08$, students participating in all three waves reported fewer Wave 1 depressive symptoms, $F(1, 295) = 9.30, p < .01$, and higher levels of Wave 1 school connectedness, $F(1, 295) = 6.93, p < .01$, than students participating in only one or two waves.

**Results**

Pearson correlations and descriptive statistics for all study variables are presented in Table 1. There were negative concurrent associations between types of adjustment problems and school connectedness at all three waves. Baseline levels of adjustment problems, assessed in grade six, were also negatively associated with Wave 2 (Grade 7) and Wave 3 (Grade 8) school connectedness. Cross-time correlations for school connectedness were large ($r > .50$) for the Wave 1 to Wave 2 and Wave 2 to Wave 3 associations and medium ($r > .30$) for the Wave 1 to Wave 3 association (Cohen & Cohen, 1975).

**Unconditional Model**

Study hypotheses were tested using growth curve modeling with the Hierarchical Linear Modeling (HLM) Program, Version 6.08 (Raudenbush, Bryk, & Congdon, 1994-2009). Growth curve modeling is ideal because it allows for the examination of individual variability around the mean trajectory of school connectedness, along with the predictors of this individual variability. Because HLM allows for a varying number of observations across participants by using restricted maximum likelihood estimation, data from all 296 participants were used in the present study. An unconditional model (without covariates) was examined first to estimate the average level of school connectedness at Wave 1/school entry (i.e., the intercept), average rate of change across time (i.e., the slope), and to determine if there was significant variability around the Wave 1 intercept and the slope (i.e., significant random effects). Results showed that the average level of school connectedness at school entry was 3.86 ($\beta = 3.86, SE = .04, p < .001$) on a scale that ranged from 1 to 5. The average slope was $-0.06 (SE = .03, p < .05)$; thus, average levels of school connectedness declined throughout middle school at a rate of .06 units per year. Moreover, there was significant variation across students in level of school connectedness at school entry, $\chi^2(213, n = 214) = 522.95, p < .001$, and in the rate of decline, $\chi^2(213, n = 214) = 269.15, p < .01$, indicating that the addition of covariates to explain the individual variation around each parameter was appropriate.
Table 1. Descriptive Statistics and Zero-Order Correlations for all Study Variables for Female and Male Middle School Students.

<table>
<thead>
<tr>
<th>Study variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
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<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Wave 1 school connectedness</td>
<td>—</td>
<td>−.33**</td>
<td>−.42**</td>
<td>.51**</td>
<td>−.22*</td>
<td>−.39**</td>
<td>.34**</td>
<td>−.18</td>
<td>−.30***</td>
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<tr>
<td>2. Wave 1 externalizing problems</td>
<td>−.32**</td>
<td>—</td>
<td>.57**</td>
<td>−.22*</td>
<td>.51**</td>
<td>.36**</td>
<td>−.23*</td>
<td>.48**</td>
<td>.30*</td>
</tr>
<tr>
<td>3. Wave 1 depressive symptoms</td>
<td>−.43**</td>
<td>.58**</td>
<td>—</td>
<td>−.28**</td>
<td>.34**</td>
<td>.58**</td>
<td>−.39**</td>
<td>.39**</td>
<td>.47**</td>
</tr>
<tr>
<td>4. Wave 2 school connectedness</td>
<td>.56**</td>
<td>−.25*</td>
<td>−.21*</td>
<td>—</td>
<td>−.23*</td>
<td>−.41**</td>
<td>.53**</td>
<td>−.16</td>
<td>−.21*</td>
</tr>
<tr>
<td>5. Wave 2 externalizing problems</td>
<td>−.29**</td>
<td>.48**</td>
<td>.31**</td>
<td>−.42**</td>
<td>—</td>
<td>.52**</td>
<td>−.16</td>
<td>.53**</td>
<td>.40**</td>
</tr>
<tr>
<td>6. Wave 2 depressive symptoms</td>
<td>−.50**</td>
<td>.48**</td>
<td>.68**</td>
<td>−.50**</td>
<td>.54**</td>
<td>—</td>
<td>−.37**</td>
<td>.51**</td>
<td>.68**</td>
</tr>
<tr>
<td>7. Wave 3 school connectedness</td>
<td>.44**</td>
<td>−.10</td>
<td>−.11</td>
<td>.57**</td>
<td>−.36**</td>
<td>−.29*</td>
<td>—</td>
<td>−.31**</td>
<td>−.51**</td>
</tr>
<tr>
<td>8. Wave 3 externalizing problems</td>
<td>−.06</td>
<td>.46**</td>
<td>.36**</td>
<td>−.27*</td>
<td>.57**</td>
<td>.33**</td>
<td>−.34**</td>
<td>—</td>
<td>.53**</td>
</tr>
<tr>
<td>9. Wave 3 depressive symptoms</td>
<td>−.31**</td>
<td>.47**</td>
<td>.59**</td>
<td>−.34**</td>
<td>.50**</td>
<td>.66**</td>
<td>−.36**</td>
<td>.58**</td>
<td>—</td>
</tr>
</tbody>
</table>

Girls’ M (SD)  
4.01 (0.61)  1.47 (0.35)  0.25 (0.29)  3.97 (0.75)  1.39 (0.33)  0.21 (0.25)  3.93 (0.69)  1.39 (0.28)  0.24 (0.24)

Boys’ M (SD)  
3.71 (0.73)  1.57 (0.38)  0.30 (0.31)  3.65 (0.78)  1.53 (0.39)  0.27 (0.28)  3.63 (0.77)  1.55 (0.39)  0.23 (0.24)

Note. Correlations above the diagonal are for females and those below the diagonal are for males. Due to missing data, sample sizes for females vary from 96 to 149 and for males from 77 to 147.

*p < .05. **p < .01.
Time-invariant covariates and school connectedness trajectories

Time-invariant covariates of adolescent gender, Wave 1 depressive symptoms, Wave 1 externalizing problems, and two-way interactions between gender and each type of adjustment problem were introduced in conditional models. These models tested if (a) each type of adjustment problem at school entry was associated with levels of school connectedness at school entry and with the declining trajectory of school connectedness from grade six to grade eight, and (b) the aforementioned associations varied by gender. Analyses were conducted in two steps. In the first step, adolescent gender and both types of adjustment problems were included simultaneously to determine if depressive symptoms and externalizing problems made unique contributions to the intercept and slope, over and above the other form of adjustment problems. In the second step, two two-way interactions, one between gender and depressive symptoms and the other between gender and externalizing problems, were introduced in separate models. Prior to computing interaction terms, depressive symptoms and externalizing problems were grand mean-centered to avoid problems with multicollinearity, and the methods outlined by Aiken and West (1991) were used to probe significant interactions.

Results showed that gender, depressive symptoms, and externalizing problems were all uniquely associated with school connectedness at school entry, but none of the three time-invariant covariates predicted the rate of decline across time (see Table 2). Girls reported higher levels of school connectedness at school entry compared with boys. Also, early adolescents reporting elevated levels of depressive symptoms and/or externalizing problems at school entry reported lower concurrent levels of school connectedness. There was one significant two-way interaction—the gender × depressive symptoms interaction predicted the declining slope (see Table 2). Probing the interaction indicated that depressive symptoms at school entry approached a significant association with the declining school connectedness slope for boys ($\beta = .35, SE = .18, p = .052$), but not for girls ($\beta = −.13, SE = .16, p = .42$).

Although there was no difference between girls and boys in the rate of decline in school connectedness, additional analyses were conducted to determine if gender differences at baseline persisted across Grades 7 and 8. Re-centering the data at Waves 2 and 3 indicated that, similar to results for the Grade 6 intercept, gender was negatively associated with the Grade 7 ($\beta = −.31, SE = .08, p < .001$) and Grade 8 ($\beta = −.31, SE = .10 p < .01$) intercepts. Also similar to the results for the Grade 6 slope, gender was not associated with the slope when the data were centered at Grade 7 ($\beta = −.02, SE = .05, p = .75$) or Grade 8 ($\beta = −.02, SE = .05, p = .75$). While school connectedness declined for girls and boys, girls reported significantly higher levels of school connectedness at all three waves.
A series of analyses were then conducted to assess if adjustment problems at each grade were associated with school connectedness. Results from the unconditional model indicated an overall decline in school connectedness throughout middle school, but at each grade there was significant residual

**Table 2. Hierarchical Linear Models Predicting Level of School Connectedness at School Entry (Grade 6) and Rate of Decline (Slope) From Gender and Early Adolescent Adjustment Problems.**

<table>
<thead>
<tr>
<th></th>
<th>Fixed effects with robust SE</th>
<th>Random effects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Step 1</td>
<td>Step 2</td>
</tr>
<tr>
<td></td>
<td>β</td>
<td>SE</td>
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<tr>
<td>Grade 6 intercept</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>3.98***</td>
<td>.05</td>
</tr>
<tr>
<td>Gender (0 = girl/1 = boy)</td>
<td>-.24***</td>
<td>.07</td>
</tr>
<tr>
<td>Depressive symptoms</td>
<td>-.74***</td>
<td>.17</td>
</tr>
<tr>
<td>Externalizing problems</td>
<td>-.26*</td>
<td>.13</td>
</tr>
<tr>
<td>Gender ×</td>
<td></td>
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<tr>
<td>Depressive symptoms</td>
<td></td>
<td></td>
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<tr>
<td>Externalizing problems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade 6 slope</td>
<td>-.06</td>
<td>.04</td>
</tr>
<tr>
<td>Gender</td>
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<td>.13</td>
<td>.14</td>
</tr>
<tr>
<td>Externalizing problems</td>
<td>.07</td>
<td>.09</td>
</tr>
</tbody>
</table>

Note. Two-way interactions tested in separate models with all main effects included. SE = standard errors.

*aRandom effects are for the model examining the Gender × Depressive symptoms interaction.

*p < .05. **p < .01. ***p < .001.

**Time-Varying Covariates and School Connectedness Trajectories**

A series of analyses were then conducted to assess if adjustment problems at each grade were associated with school connectedness. Results from the unconditional model indicated an overall decline in school connectedness throughout middle school, but at each grade there was significant residual
variance between the observed school connectedness level and the level of school connectedness predicted by the mean curve. Adding adjustment problems as time-varying covariates tested if higher levels of adjustment problems at each grade, independent of initial levels, accounted for some of this residual difference.

Prior to conducting these analyses, we examined if depressive symptoms and externalizing problems showed significant change across the three waves. On average, depressive symptoms showed no change across time ($\beta = -.01; SE = .01, p = .31$), whereas externalizing problems showed a significant decline ($\beta = -.03; SE = .01, p < .05$). The final model, therefore, included the time-invariant covariates of Wave 1 depressive symptoms and gender and the time varying externalizing problems variable (group centered and coded as a fixed effect), predicting the school connectedness intercept (grade six) and slope. For these analyses, it was assumed that the time-varying effect between externalizing problems and school connectedness was equal across the three grades. That is, the amount of residual variance explained by externalizing problems was assumed to be the same in sixth, seventh, and eighth grades. One two-way interaction between gender and time-invariant depressive symptoms and one cross-level interaction between gender and time-varying externalizing problems were subsequently tested to assess if the associations between adjustment problems and school connectedness varied across boys and girls.

Consistent with findings for the original model, time-invariant depressive symptoms and gender were uniquely negatively associated with level of school connectedness at school entry (see Table 3). Although neither covariate predicted the rate of decline in school connectedness across time, the Gender × Depressive symptoms interaction was significantly associated with the declining slope. Probing the interaction indicated that depressive symptoms at school entry were positively associated with the declining school connectedness slope for boys ($\beta = .31, SE = .15, p < .05$), but not for girls ($\beta = -.12, SE = .16, p = .44$). Unexpectedly, boys who entered middle school with elevated levels of depressive symptoms showed a slower rate of decline in school connectedness than boys with lower levels of depressive symptoms (see Figure 1). Regarding the time-varying externalizing problems variable, results indicated that adolescents who had higher externalizing problems across time also had lower levels of school connectedness across time than would be expected from the overall decline in school connectedness across middle school (see Table 2). The cross-level Gender × Externalizing problems interaction was not significant; thus, the time-varying relationship between externalizing problems and school connectedness was similar for boys and girls.
To date, relatively few studies have examined factors that contribute to trajectories of student-perceived school connectedness across the middle school years. The current study extended existing research by showing that early adolescents’ depressive symptoms and externalizing problems play an important role in school connectedness trajectories. Consistent with expectations

<table>
<thead>
<tr>
<th>Fixed effects with robust SE</th>
<th>Step 1</th>
<th>Step 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 6 intercept</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$M$</td>
<td>$3.99^{***}$</td>
<td>$.05$</td>
</tr>
<tr>
<td>Gender ($0 =$ girl/$1 =$ boy)</td>
<td>$-0.27^{**}$</td>
<td>$.07$</td>
</tr>
<tr>
<td>Depressive symptoms</td>
<td>$-0.89^{***}$</td>
<td>$.12$</td>
</tr>
<tr>
<td>Gender $\times$ Depress symptoms</td>
<td>$-0.11$</td>
<td>$.27$</td>
</tr>
<tr>
<td>Grade 6 slope</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$M$</td>
<td>$-0.07^*$</td>
<td>$.04$</td>
</tr>
<tr>
<td>Gender</td>
<td>$-0.00$</td>
<td>$.05$</td>
</tr>
<tr>
<td>Depressive symptoms</td>
<td>$0.12$</td>
<td>$.10$</td>
</tr>
<tr>
<td>Gender $\times$ Depress symptoms</td>
<td>$0.43^*$</td>
<td>$.22$</td>
</tr>
<tr>
<td>Time varying covariate slope</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Externalizing mean</td>
<td>$-0.42^{***}$</td>
<td>$.10$</td>
</tr>
<tr>
<td>Gender</td>
<td>$0.11$</td>
<td>$.20$</td>
</tr>
</tbody>
</table>

Random Effects

<table>
<thead>
<tr>
<th>Variance (df)</th>
<th>$\chi^2$</th>
<th>Variance (df)</th>
<th>$\chi^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 6 intercept</td>
<td>$.18 (211)$</td>
<td>$403.81^{***}$</td>
<td>$.18 (210)$</td>
</tr>
<tr>
<td>Grade 6 slope</td>
<td>$.02 (211)$</td>
<td>$244.40^+$</td>
<td>$.02 (210)$</td>
</tr>
</tbody>
</table>

Note. Gender $\times$ depressive symptoms interaction and cross-level externalizing problems slope $\times$ gender interaction tested in separate models with all main effects included. SE = standard errors.

$^a$Random effects are for the model examining the gender $\times$ depressive symptoms interaction.

$^+p < .08. ^*p < .05. ^{*}*p < .01. ^{***}p < .001.$

**Discussion**

To date, relatively few studies have examined factors that contribute to trajectories of student-perceived school connectedness across the middle school years. The current study extended existing research by showing that early adolescents’ depressive symptoms and externalizing problems play an important role in school connectedness trajectories. Consistent with expectations
and existing research (Simons-Morton & Chen, 2009; Wang & Dishion, 2012; Way et al., 2007), results indicated that student-perceived school connectedness declined across the middle school years. Even though level of externalizing problems at school entry did not account for the rate of decline in school connectedness, elevated levels of externalizing problems across the middle school years were associated with lower concurrent levels of school connectedness. Additional results indicated that compared with their peers, boys who entered middle school with elevated levels of depressive symptoms reported lower concurrent levels of school connectedness at sixth grade and a slower rate of decline across time.

Mismatches between early adolescents’ needs and the middle school environment (see Eccles & Midgley, 1989) may partially explain the declining school connectedness trajectory. At a time when young adolescents strive to establish good quality relationships with peers and non-parent adults, middle schools provide a larger, less personal, and more departmentalized environment than elementary schools (Roeser et al., 2000). The finding that girls reported feeling more connected to their school than boys is consistent with research indicating that in comparison with boys, middle school girls are more engaged in school (Lam et al., 2012) and report more teacher and classmate support (Rueger, Malecki, & Demaray, 2010). However, the higher levels of perceived school connectedness did not prevent girls from feeling increasingly more disconnected across the middle school period, nor did it

Figure 1. Examining the Grade 6 Depressive symptoms × Gender interaction for boys’ school connectedness trajectories.
provide them with an advantage over boys in the rate of decline in school connectedness. Rather, similar to Wang and Dishion (2012), we found that school connectedness declined at the same rate for boys and girls.

Examination of the role of externalizing problems in the developmental trajectories of school connectedness confirmed expectations that early adolescents reporting elevated levels of these adjustment problems at school entry would also report lower concurrent levels of connectedness to the school. Contrary to expectations, Grade 6 externalizing problems did not account for the rate of change in the declining trajectory of school connectedness. The lack of association between students’ externalizing problems assessed at middle school entry and the rate of decline in school connectedness is inconsistent with transactional models of development (Sameroff, 2000) and social development theory (Catalano et al., 1996), which emphasize the active role of the individual in influencing their own subsequent development. Perhaps because externalizing problems also showed change across time, examination of their presence at one time period was not sufficient to explain the declining school connectedness trajectory. Yet, in accordance with the snares hypothesis (Hussong et al., 2004; Moffitt, 1993) and with existing research on developmental trajectories of school engagement and school climate (Simons-Morton & Chen, 2009; Wang & Dishion, 2012; Way et al., 2007), findings indicated that adolescents’ externalizing problems across the middle school period were concurrently negatively associated with school connectedness. Adolescents with elevated levels of externalizing problems throughout middle school may feel more disconnected from their schools because they tend to have negative relationships with teachers (Doumen et al., 2008) and are often rejected by peers (Pedersen et al., 2007). These findings highlight the negative consequences of heightened levels of adjustment problems throughout the middle school years, but also indicate that young adolescents who enter middle school with elevated levels of externalizing problems are not necessarily predestined to becoming progressively less connected to their schools than their peers.

Findings for depressive symptoms were consistent and inconsistent with expectations. Consistent with expectations, adolescents who entered middle school with elevated levels of depressive symptoms reported lower concurrent levels of school connectedness than their peers with lower levels of depressive symptoms. However, baseline depressive symptoms were associated only with the boys’ declining trajectory such that boys who entered middle school with elevated levels of depressive symptoms reported a slower rate of decline in school connectedness than boys with lower levels of depressive symptoms. As shown in Figure 1, the unexpected slower rate of decline may be due to the fact that the average school connectedness trajectory for boys high in depressive symptoms was relatively flat and consistently low.
across time, whereas for boys low in depressive symptoms, the trajectory was declining across time. Thus, despite having different levels of school connectedness at school entry, it appeared that the two groups of boys reported similar levels of school connectedness by eighth grade. Of particular concern is that boys high in depressive symptoms showed consistently low levels of connectedness across the middle school years, indicating that early intervention may be particularly important for this group of boys even prior to entry into middle school.

The present study extended existing research by examining the time-invariant and time-varying effects of depressive symptoms and externalizing problems on developmental trajectories of school connectedness across the middle school years. However, there are some limitations. First, all data were self-reported by adolescents, raising concerns regarding shared method variance and increasing the possibility that reported associations are inflated. Subsequent studies should collect data from other informants, including teachers, parents, and peers. Second, only three waves of data were collected thereby limiting examination to linear trajectories of school connectedness and early adolescents’ adjustment problems. We also assumed that the time-varying effect between adjustment problems and school connectedness was equal across the three grades due to issues of model identification. Additional waves of data collection within the middle school period are needed for a more precise and nuanced examination of changes in the developmental trajectories. Third, 43% of students in the present study were missing at least one wave of data. While restricted maximum likelihood estimation allowed for the use of all data, thereby limiting the bias that can occur from listwise or pairwise deletion, youth who participated at all three waves reported higher levels of school connectedness and fewer depressive symptoms than those who participated in only one or two waves. Caution should therefore be used in generalizing findings to other adolescent populations. Finally, because participants were drawn from only three middle schools, it was not possible to use multilevel modeling techniques to control for variations in early adolescents’ adjustment problems and school connectedness across schools. Studies that sample students from a larger number of schools are needed to determine how such variations at the school level influence individual student outcomes.

Notwithstanding the limitations, the present study extended our understanding of middle school students’ experiences of their school environment by showing that externalizing problems and depressive symptoms play differential roles in the developmental trajectories of school connectedness. Findings also corroborated a large body of research on the negative consequences of the persistence of adjustment problems, indicating that youth with elevated levels of externalizing problems across the middle school period
reported lower concurrent levels of connectedness to their school across time. However, results also showed that early adolescents who entered middle school with elevated levels of externalizing problems were not automatically bound to experiencing progressively lower levels of school connectedness than their peers. Furthermore, although boys who reported low levels of depressive symptoms at middle school entry reported feeling more connected to their school than their male peers with higher levels of depressive symptoms, it appeared that both groups showed similar levels of connectedness by the eighth grade. Thus, early universal intervention programs that aim to prevent the decline of school connectedness among boys, even prior to middle school entry, may be particularly important. Given that school connectedness is targeted as a protective factor in school-based academic and behavioral interventions (e.g., see Committee for Children, 2008), future research determining how to prevent the decline of connectedness across the middle school years is warranted. It would be particularly useful for researchers and practitioners alike to identify resources that facilitate the transition from elementary to middle school so that the presence of adjustment problems and low levels of school connectedness are addressed though effective programming.

Declaration of Conflicting Interest

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References


**Author Biographies**

**Alexandra Loukas** is professor of Health Behavior and Health Education at the University of Texas at Austin. Dr. Loukas’ interests are in adolescent and young adult health, particularly aggression and tobacco use. She examines how factors from multiple ecological levels (e.g., family, school) interact to protect adolescents and young adults from negative health outcomes.
Jessica Duncan Cance is assistant professor of Health Behavior and Health Education at the University of Texas at Austin. Dr. Cance’s interests are in adolescent and young adult health promotion. Specifically, she conducts research focused on how the longitudinal interaction of biological, psychological, and social factors impacts adolescent and young adult health risk behaviors such as substance use and aggression.

Milena Batanova is a doctoral candidate in Health Behavior and Health Education and a Powers Graduate Fellow at the University of Texas at Austin. She studies a variety of individual (e.g., cognitive and affective empathy) and social factors (e.g., school climate and connectedness) relevant to adolescent development, particularly moral development.