The influence of teacher support on student adjustment in the middle school years: A latent growth curve study

RANJINI REDDY,[a] JEAN E. RHODES,[a] AND PETER MULHALL[b]
[a]*University of Massachusetts, Boston; and* [b]*University of Illinois at Urbana–Champaign*

Abstract

The influence of perceived teacher support on trajectories of depression and self-esteem in middle school was examined using multigroup latent growth cross-domain models. A longitudinal sample of 2,585 students was followed from the sixth through the eighth grades. Students' perceptions of teacher support and general self-esteem declined and depressive symptoms increased over the course of middle school. We further found that, for both boys and girls, changes in perceptions of teachers' support reliably predicted changes in both self-esteem and depression. In particular, those students perceiving increasing teacher support showed corresponding decreases in depressive symptoms and increases in self-esteem. Gender differences were found for the initial levels of both perceptions of teacher support and general self-esteem. A competing model was also tested, which gave additional support for pathways of influence from perceptions of teacher support to depression and self-esteem, rather than the reverse. This study underscores the role of teacher support in facilitating students' adjustment to middle school and highlights the importance of using idiographic methodologies in the study of developmental processes. Implications and future directions are discussed.

Middle schools are a crucial developmental context, and teachers play an important role in students' adjustment (Roeser, Eccles, & Sameroff, 1998, 2000). Students have extensive involvement with teachers, who some-times serve as confidants, mentors, and friends (Lynch & Cicchetti, 1992). Despite the importance of student–teacher relationships, middle schools are often structured in ways that impede the formation of close ties. Indeed, the shift from a primary teacher to multiple classroom assignments, larger class sizes, the growing emphasis on standardized testing, and dense curricular demands often translate into fewer opportunities for supportive contact between teachers and students (Lynch & Cicchetti, 1997). Students are likely to vary, however, in the extent to which they can successfully negotiate these challenges to form close relationships with their teachers. In this study, we focused on the role of teacher support in predicting early adolescents' adjustment to middle school. To accommodate for individual variation and developmental changes in student–teacher support, we incorporated modeling techniques that assessed the

effects of perceptions of support from teachers on psychological adjustment as both these variables evolved from the beginning of sixth grade through the end of eighth grade.

Background

The transition to middle school marks an important milestone for the majority of American adolescents. Moving into unfamiliar and often stressful school settings coincides with pubertal changes and the search for identity. For a number of early adolescents, these changes set the stage for declines in academic, behavioral, and emotional adjustment (Cicchetti & Toth, 1998). In particular, researchers have noted reductions in early adolescents' motivation and performance (Eccles & Midgley, 1989; Harter, 1981; Steinberg, 1990), decreases in self-esteem (Seidman, Allen, Aber, Mitchell, & Feinman, 1994; Simmons & Blyth, 1987), and increases in depression, anger, and anxiety (Kazdin, 1993; Roeser & Eccles, 1998). Declines in functioning are not consistent or inevitable, however, and researchers have identified a range of protective factors that may offset adolescents' risk (e.g., Hirsch & Rapkin, 1987; Nottleman, 1987; Wigfield, Eccles, MacIver, Reuman, & Midgley, 1991). A supportive family environment, later pubertal onset, and later school transitions are among the factors that have been identified as protective (Roeser et al., 1998).

In addition to these factors, students' relationships with their teachers and peers have shown to be important predictors of adjustment. Indeed, schools are interpersonal settings, in which relationships influence students' motivation, academic performance, and psychosocial adjustment (Pianta, 1999). Relationships with teachers can be particularly important to early adolescents, who are often undergoing profound shifts in their sense of self and are struggling to negotiate changing relationships with their parents and peers (e.g., Resnick et al., 1998). Because teachers have the advantage of standing outside these struggles, they can provide a safe context for support and guidance while transmitting

adult values, advice, and perspectives (Rhodes, Grossman, & Resch, 2000).

Empirical support for the protective benefits of warm and accepting teacher relationships has been widely documented (Lynch & Cicchetti, 1997; Pianta, 1999; Roeser & Eccles, 1998; Roeser et al., 1998). Drawing on attachment theory, Pianta, Steinberg, and Rollins (1995) found that positive student–teacher relationships were predictive of better conduct ratings and reduced risk for retention among elementary school students. Hughes, Cavell, and Jackson (1999) found similar patterns for aggressive outcomes in this age group. Feelings of closeness with teachers have also been associated with the adjustment of older children and adolescents (e.g., Connell & Wellborn, 1991; Ryan, Stiller, & Lynch, 1994). Goodenow (1993), for instance, found that students' perceptions of support from their teachers were the most influential component of belonging and support (measured as a subjective sense of relatedness) in the classroom. Among sixth- to eighth-graders, teacher support was also the strongest predictor of academic expectancy and explained more than one third of the variance in the interest, import, and value that students placed on their academic work. Consistent associations between perceptions of teacher–student relationships and increases in motivation, academic competence and achievement, school engagement, school value, and behavioral adjustment have also been documented (see Goodenow, 1992; Hamre & Pianta, 2001; Midgley, Feldlaufer, & Eccles, 1989; Roeser & Eccles, 1998; Roeser et al., 1998; Ryan & Grolnick, 1986; Ryan et al., 1994).

Although most work to date has centered on academic outcomes, there is growing evidence that perceptions of support from teachers can also affect psychological adjustment (Hoge, Smith, & Hanson, 1990; Midgley et al., 1989). Murray and Greenberg (2000) recently found that elementary school students who reported more positive bonds with their teachers also evidenced higher scores on self- and teacher-reported socioemotional adjustment outcomes (see also Lynch & Cicchetti, 1997; Pianta, 1994). Similar patterns have emerged for older students. For example, in

their work on school reform, Midgley and Edelin (1998) found that students who attended middle schools that deliberately sought to enhance teacher–student relationships tended to have fewer adjustment difficulties during the transition. Similarly, Roeser and Eccles (1998) found that perceptions of positive teacher regard were related to positive changes in feelings of self-esteem and declines in anger and depressive symptoms from the seventh to the eighth grades. Finally, Ryan and Stiller (1991) noted that the quality of students' relatedness with their teachers was internalized such that perceived warmth and support were associated with greater self-confidence and adoption of positive values. These findings suggest that teacher support can help to buffer some of the stress associated with middle school, offsetting the risk for adjustment difficulties (Pianta, 1999).

Interestingly, Goodenow (1993) found that associations between perceptions of teacher support and positive outcomes were higher for girls than for boys. This is consistent with research on gender development, which has underscored the role of social connectedness as both a protective and a risk factor for adolescent girls (Batgos & Leadbeater, 1994). For example, Nolen–Hoeksema and Girgus (1994) suggested girls' more communal and socially oriented styles may heighten their vulnerability to depression as they face the pubertal and social challenges of early adolescence. On the other hand, because adolescent girls tend to experience relatively higher levels of depression (Cicchetti & Toth, 1998; Worchel, Nolan, & Willson, 1987) and lower levels of self-esteem (Seidman et al., 1994; Simmons & Blyth, 1987), the protective aspect of teacher–student relationships may be particularly salient.

Despite these protective benefits, widely cited reports have suggested that girls receive relatively less attention and support from their teachers (Sadker & Sadker, 1995) and that girls' relatively lower levels of engagement with their teachers functions as a risk factor for emotional distress (Hansen, Walker, & Flom, 1995). Other researchers have noted teachers' preferences for the cooperative, responsible, and nonassertive classroom behaviors that are more typical of girls (Wentzel, 1991). Indeed, teachers rate their relationships with female students as closer and less conflictual than their relationships with male students (Birch & Ladd, 1997), a difference that is perceived by students as well (Hughes, Cavell, & Wilson, 2001). Still others have presented a more complex picture of the role of gender in shaping student–teacher relationships and psychological outcomes (Erkut, Marx, & Fields, 2001; Harter, Waters, Whitesell, & Kastelic, 1998; Sommers, 2000). Brophy and Hancock (1985), for example, observed that teachers react more to students' behavior than to their gender. Other factors, including attachment histories, classroom size, and school practices, have all been shown to influence students' relationships with their teachers (Pianta, 1999). Evidence from these and other studies have also complicated gender-specific depictions of early adolescents' emotional vulnerability (Roeser et al., 2000). Indeed, longitudinal studies of depression have shown overall increases in distress for both boys and girls, with gender differences emerging relatively later in adolescence (DuBois, Felner, Bartels, & Silverman, 1994; Nolen–Hoeksema & Girgus, 1994; Petersen, Sarigiani, & Kennedy, 1991). Adolescence presents both challenges and opportunities, which interact with a range of contextual factors to produce multiple developmental paths (Cicchetti & Toth, 1998). Examining these patterns for both girls and boys may help to illuminate the extent to which changes in mental health are a function of gender-related issues, as opposed to more general developmental issues and circumstances linked to adolescence.

Current Study

In this study, we examined teacher–student relationships as a protective factor against declines in male and female students' emotional functioning over the course of middle school. Consistent with previous research on this topic, we rely on perceptions of teacher support rather than presumably more objective reports of support. This approach is theoretically grounded in the attachment and

social support literature, which has shown that perceptions of support availability are more consistently related to outcomes than are the levels of support that are actually received (Kessler & McLeod, 1984; Lakey & Cohen, 2000). From this perspective, it is not support experiences themselves, but the cognitive representations of providers as available and supportive, that influence outcomes (Sarason, Sarason, & Pierce, 1990). Also, in keeping with previous studies (e.g., Goodenow, 1993; Hughes et al., 2001; Roeser & Eccles, 1998; Wentzel, 1997, 1998) and the middle school practice of moving from class to class each period, we assessed adolescents' perceptions of the teachers in their schools as opposed to one particular teacher.

To date, statistical techniques to understand the nature of perceived teacher support and its impact on adolescent developmental outcomes have spanned from correlational and mean level analyses of groups of students (e.g., analyses and multivariate analyses of variance) to more complex grouping and structural models. Such procedures rest on a somewhat more static view of a period that is typically characterized by heterogeneity and flux. Snapshot views of this developmental phase do not adequately capture the evolving nature of adjustment. Similarly, typical multivariate designs reflect tacit assumptions that male and female adolescents who represent a wide range of adjustment and who follow multiple trajectories can be meaningfully grouped and that teacher support remains stable through middle school. Because adolescents are adjusting to and coping with ongoing challenges in middle school and because relationships with teachers often evolve over time, such assumptions may be misleading.

Consistent with previous research, we expected that the middle school years would be marked by overall declines in students' well-being and perceptions of support from teachers. Moreover, we expected that levels of teacher support would reliably predict patterns of well-being across time. In particular, perceptions of increased teacher support were expected to correspond with increased self-esteem and decreased depressive symptoms. Similarly, perceptions of decreased teacher support were expected to correspond with decreased self-esteem and increased depressive symptoms. We also anticipated that gender would moderate the differences in the effects of perceived teacher support on self-esteem and depression. In particular, we expected perceived teacher support to be a more robust predictor of girls' outcome than of boys'. Well-being was indexed by depressive symptoms and general self-esteem, each of which has shown associations with overall support (Harter & Marold, 1994) and teacher support (Roeser & Eccles, 1998).

Method

Our data were drawn from a larger ongoing longitudinal evaluation of early adolescents in middle schools. The schools that participated in this study were all members of a statewide middle school association, which serves students from geographically, socioeconomically, and racially diverse backgrounds. Administrators in the schools agreed to participate in the study as part of a statewide school assessment plan. As part of this assessment, the schools consented to both student and staff level surveys during the spring of each academic year. The focus of the current study was on the student self-report data; specifically, their perceptions of teacher support and well-being as indexed by depressive symptoms and general self-esteem.[1] The current sample consisted of students who completed the survey on 3 consecutive years, beginning in the sixth grade in 1995. Of the 2,860 students (across 30 schools) who were followed, approximately 9% were dropped from the study because they had missing demographic

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1. The data used in the current study were drawn from a larger study of middle school students that included additional data mostly pertaining to academic adjustment. This data set also included teacher- or staff-level information. Although the importance of such information on school characteristics in producing a more complete analysis is understood, we did not have access to it.

information. Although the most commonly used procedure for handling missing data is listwise deletion, this procedure would have eliminated 1,048 students from the analyses. As such, we opted to estimate the linear structural relations (LISREL) parameters in the presence of missing data by using the full information maximum likelihood (FIML) routine available in LISREL 8.50 (Jöreskog & Sörbom, 2001). The FIML procedure in LISREL utilizes the EM algorithm to obtain estimates of the population means and covariances. These estimates were then used to obtain starting values for the maximum likelihood procedure (duToit & duToit, 2001). The advantage of this procedure is that it uses all the information of the observed data. The FIML procedure provides the maximum likelihood chi square and the root mean square error of approximation (RMSEA). Pairwise correlations, univariate means, and standard deviations for the variables are also reported (see Appendix A).

Participants

The sample consisted of 2,585 students who entered the sixth grade in 1995 and were followed through the eighth grade. The majority of the adolescents identified themselves as European American (82.2%), with Hispanic (6.2%), Asian American (3.2%), African American (6.3%), and multiracial (1.8%) making up the other reported racial groups. Half (50.3%) the sample were girls. The adolescents were drawn from 30 Midwestern schools, most (77%) of which housed Grades 6 through 8. The remaining schools housed four or more grades. Average grade enrollment ranged from 68 to 414 students.

Approximately 24% of the sample reported receiving free lunch at school at the beginning of middle school. Nearly half the students reported that their mothers had completed high school or had at least 2 years of college (46.9%). An equal number of fathers were reported to have completed high school or at least 2 years of college (39.9%) or to have graduated from college (39.9%). The majority of the students (72.1%) reported living in two-parent households.

Measures

The surveys were administered to the students in their homeroom classrooms by their teachers. Instructions and individual items were read aloud while the students read along silently. The informed consent of students and their parents was obtained and confidentiality was assured. Fewer than 10% of the parents refused to provide consent for their children to participate.[2]

Quality of teacher–student relationship. A shortened version of the teacher support subscale of a revised Classroom Environment Scale (Trickett & Moos, 1973) was utilized to index perceived teacher support. This six-item instrument asked students to rate on a 5-point scale (anchored at 1 = *never* to 5 = *always*) how often the presented statements were true of the teachers at their schools (e.g., "teachers take a personal interest in students," "teachers go out of their way to help students," and "teachers spend time just talking with students)." Reliabilities for the subscale for the

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2. A two-tiered consent procedure developed and approved by the Institutional Review Board at the University of Illinois allowed the investigators to use passive consent procedures. The first step required each school to create a Parent Advisory Team (PAT) that was reflective of the children and families attending that school. The PAT was asked to review the surveys and consent form that would subsequently be sent home to parents for their approval. The PAT was to consider community norms and values when reviewing the topics covered in the surveys and to determine if the consent form accurately represent the goals and purposes of the study. Parents serving on PAT teams were also asked to serve as resources for other parents who might have questions regarding the surveys, and copies were kept in the school office for parental review. Once the PAT signed the advisory form, schools were required to send home letters to parents, who were asked to return the form if they did not want their child to participate. The surveys were typically completed in 2 class hours and usually over a 2-day period. The schools determined the class in which to administer the survey. Some used homeroom whereas others used a class during the schoolday.

three time points were α = .74 (Time 1), .75 (Time 2), and .79 (Time 3).[3]

Depressive symptoms. Depressive symptoms were indexed with a shortened version of the Children's Depressive Inventory (Kovacs, 1980–1981). The 16-item self-report scale measures cognitive, affective, and behavioral symptoms of depression. For each item, students selected one of three statements increasing in symptom severity (anchored at 1 = *least severity* to 3 = *most severe*) that best described their feelings and ideas during the previous 2 weeks. The scale yields a single aggregate measure of depressive symptomology reflecting an underlying unidimensional construct. Lower scores indexed lower levels of reported depression. Reliability for the 3 years was α = .77, .84, and .83, respectively.

Self-esteem. Self-esteem was indexed by the six-item General Self-Esteem subscale of the Self-Evaluation Questionnaire (DuBois & Felner, 1991; DuBois, Felner, Brand, Phillips, & Lease, 1996). DuBois et al. (1996) reported convergent and discriminant validity for the scale. Students rated statements such as "I like being the way I am," " I am happy with myself as a person," and "I am as good a person as I want to be," on a 4-point scale (1 = *strongly disagree* to 4 = *strongly agree*), with higher ratings indicating higher levels of self-esteem. Internal consistency of the subscale was α = .82 (Time 1), .84 (Time 2), and .85 (Time 3).

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3. The focus of the current teacher support measure was on teachers in the school. It is possible that adolescents could perceive a high level of teacher support to students in the school yet still feel unsupported. As part of the student survey, a smaller group of students in the current study were also administered a scale to measure the extent to which they individually felt they received support from teachers at school (for instance, items included: "I can count on teachers at this school for emotional support (help with feelings)," "teachers at this school notice and give me help when I need them to"). Correlations between these measures and the measure of teachers support used in the study found a high, strong degree of association between the measures across the 3 years of study (Time 1: $r = .59$; Time 2: $r = .70$; Time 3: $r = .71$).

Demographic characteristics. Single items were used to assess students' grade level, gender (*female* = 1), race/ethnicity (*minority* = 1), whether they received free lunch or reduced price lunch at school (*free or reduced-price lunch* = 1), father and mother's educational level, and with whom they lived in the past year.

Results

Analytic strategy

Cross-domain latent growth modeling was used to test the hypotheses of the current study. The first step in this process was to use latent growth modeling strategies to define the level-1, within-person individual growth curves. The graphical representation of the analyzed model can be seen in Figure 1. Observed data (i.e., covariances among measures at each time point) are mapped onto a measurement and structural model. The measurement model represents individual growth in each construct and is defined by two growth parameters. For instance, the left side of the figure denotes the individual growth model for perceived teacher support with two latent growth parameters, intercept and slope. The right side of the figure contains the individual growth models for the outcome variables, depression and self-esteem. The structural model, which defines the relationship between latent growth models for teacher support and the outcome variables, then permits an examination of the relationship of change in one variable on change in the other. Herein lies the strength of a cross-domain approach. The specification of these models is further explicated below.

In defining each of the level-1 individual growth models, an important first step is to select a level-1 statistical model to represent change over time. As we were constrained by just three waves, a linear trajectory in growth was selected for the current model. Because observations were taken during each academic year, this defined a time interval of t = 1, 2, and 3. In order for the intercept to represent true status in the sixth grade, we rescaled the time metric by subtracting one (so that t =
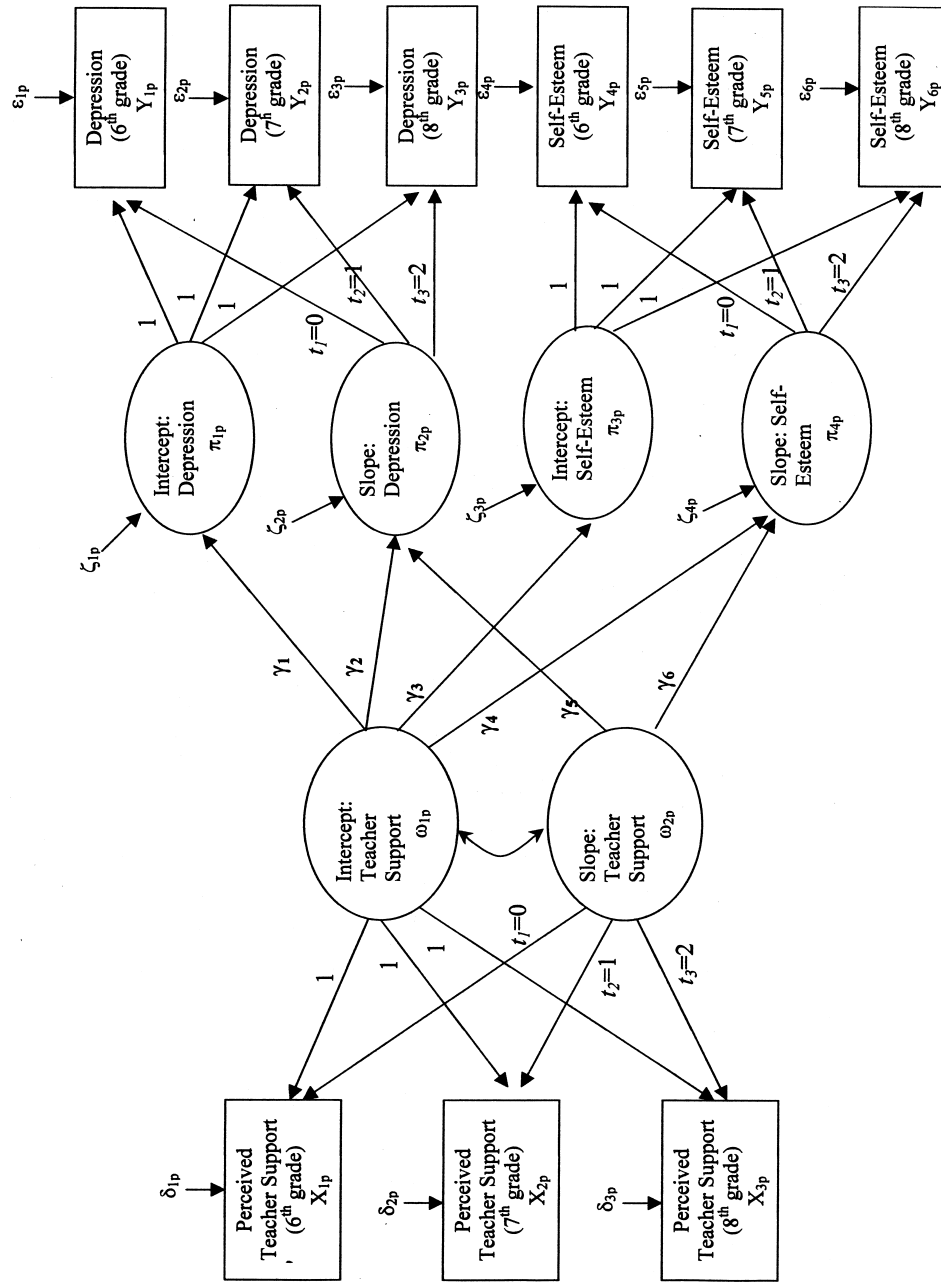
Figure 1. The latent growth model fitted. Although not shown in the figure, the errors of the slope and intercept for depression and self-esteem, as well as the errors of the indicators, were allowed to correlate freely.

0, 1, 2). Apart from ensuring that the intercept represented sixth-grade status, this rescaling also implied that the slope represents the linear rate of change over time. Note that this specification implies that all students are assumed to have the same form of growth, that is, linear, but different individuals may have different values for the two latent growth parameters. The level-1 model therefore contains two latent growth parameters: (a) an intercept parameter representing true initial status of the student in the sixth grade, and (b) a slope parameter representing the student's true rate of change over time (i.e., through middle school). For instance, the level-1 growth model for self-reported depression may be defined as:

$$Y_{ip} = \pi_{1p} + \pi_{2p}t_i + \varepsilon_{ip},$$

where Y_{ip} represents the self-reported depression of the pth student on the ith occasion of measurement ($i = 1, 2, 3$), t_i represents the student's grade level (where $t_i = 0, 1, 2$), and ε_{ip} represents the level-1 measurement errors. The growth parameters are the values of π_{1p} and π_{2p}. The intercept parameter π_{1p} represents an estimate of the true average level of depression in the population when $t_i = 0$. Students with higher values of this parameter report higher levels of depression in the sixth grade. The slope parameter π_{2p} represents estimates of the change in true levels of depression in the population from the sixth through the eighth grades. Students with higher positive values on this parameter evidence more rapid increases in depression over time. Heterogeneity in growth is captured by the variances of the intercept and slope latent factors (i.e., variance of π_{1p} and π_{2p}, respectively). Similar level-1 models can be formulated for perceived teacher support and global self-esteem.

Once these level-1, within-person models are specified, the relationship between these models defines the level-2 or between-person models. Thus, the parameter estimates contained in the gamma matrix reveal the effects of perceived teacher support on the outcomes, depression and self-esteem. For example, the latent regression coefficient γ_1 indexes the effect of levels of perceived teacher support on depression in the sixth grade whereas the γ_6 indexes the impact of the true rate of change in perceived teacher support on the rate of change in depression (for more technical reviews of these cross-domain models, refer to Willett & Keiley, 2000; Willett, Singer, & Martin, 1998).

To test the role of gender as a moderator, multigroup analyses were conducted with increasing restrictions placed on the model parameters. Equality of models across gender was tested using the chi-square difference test, with nonsignificant differences between models indicating that the more restrictive model fit the data just as well as the less restrictive model. The chi-square difference test is global. Difference in degrees of freedom reflect the number of parameters estimated freely across the groups and thus provides a test of whether there are significant differences among the groups with respect to these parameters. As our primary aim was to test whether perceived teacher support predicted depression and global self-esteem in a similar manner for boys and girls, individual paths between perceived teacher support and self-esteem and depression were first successively constrained to be equal across the groups. Each of these models was compared to the model in which the path was estimated freely across the groups. A nonsignificant chi-square difference implied that the constrained path was not statistically different between the genders. This then allowed for the application of more rigorous constraints on the model.

As stated, all models were estimated in the presence of missing data using the FIML routine available in LISREL 8.50 (Jöreskog & Sörbom, 2001). An initial analytical step was to estimate three unconditional models for the full sample, one each for the repeated measures of perceptions of support from teachers, depression, and self-esteem. This permitted the examination of the average growth trajectories as well as the presence of individual variability about the average growth parameters. It also helped us to test our first hypothesis: middle school students will perceive a re-

duced level of teachers' support over time and will sustain significant losses in their sense of well-being.

Unconditional models

Unconditional models for perceptions of support from teachers, depression, and self-esteem are represented by their respective individual growth model. For instance, the unconditional model for perceptions of teacher support is denoted by an intercept and a slope (i.e., the model in the left side of Figure 1). Similar unconditional models were estimated for depression and self-esteem.

Perceptions of support from teachers. The unconditional model for perceptions of teacher support converged in four iterations. The overall percentage of missing data reported as part of the FIML procedure was 2.32%. The FIML chi-square statistic was 32.94, with 1 degree of freedom (RMSEA = .11). The errors of the unconditional model were not allowed to correlate over time, which may have resulted in a better fitting model. The average growth trajectory revealed significant (i.e., difference from zero) levels of perceptions of teacher support at the sixth grade ($\kappa = 3.23$, $p < .001$). The estimate of the slope was negative ($\kappa = -.21$) and significantly different from zero ($p < .001$). This indicated that the population average slope decreased over the course of middle school at a rate of .21 points every year. Examination of the variance components of the latent factors revealed that both the intercept ($\Phi = .28$, $p < .001$) and the slope ($\Phi =.05$, $p < .001$) latent factors indicated significant individual differences in both sixth grade (i.e., intercept) levels and declines in perceptions of teacher support over time.

Depression. The unconditional model for depression converged in four iterations and fit the data reasonably well (FIML $\chi^2 = 9.1$, $df = 1$, RMSEA = .06). Overall percentage of missing values was reported as 4.21%. The average growth trajectory revealed significant levels of depression in the sixth grade ($\kappa = 1.34$, $p < .001$). The estimate of the slope was

positive ($\kappa = .03$) and also significantly different from zero ($p < .001$), indicating increasing reports of symptoms of depression over time. Variation in the intercept ($\Phi = .06$, $p < .001$) and the slope ($\Phi = .01$, $p < .001$) revealed the presence of heterogeneity in individual trajectories over time.

General self-esteem. The unconditional model for general self-esteem fit the data well (FIML $\chi^2 = .64$, $df = 1$, RMSEA = .0). The average growth trajectory for self-esteem revealed significant levels in the sixth grade ($\kappa = 3.13$, $p < .001$). A negative significant slope factor ($-.07$, $p < .001$) indicated decreasing levels of self-esteem over the course of middle school for the average population growth trajectory. The significant variation in both the intercept ($\Phi = .19$, $p < .001$) and the slope ($\Phi = .02$, $p < .01$) indicated that there were significant individual differences in growth trajectories over time.

Our next set of hypotheses concerned the extent to which levels of teacher support predicted patterns of well-being over time. In particular, perceptions of increased teacher support were expected to correspond with increased self-esteem and decreased depression. We further anticipated that gender would moderate these relationships, with perceived teacher support acting as a more robust predictor of girls' outcomes than of boys'.

Combined model

A combined model that included the three unconditional models defined previously was tested. To examine the influence of initial levels of teacher support, the intercepts and slopes of the outcome variables (i.e., depression and self-esteem) were regressed on the intercepts of teacher support. To explore how rates of changes in teacher support predicted rates of change in depression and self-esteem over the course of middle school, the slopes of the outcome variables were regressed on the slope of teacher support. Moreover, to study if gender moderated the differences in the effects of perceived teacher support, the

combined model was tested in a multi sample procedure.

In particular, a series of nested models was estimated to test the moderating role of gender. Each restrictive model was compared against prior, less restrictive models using the chi square difference test. We first examined the specified model estimated freely across boys and girls. This model fit the data relatively well with FIML χ^2 (22) = 98.26, RMSEA = .05. The first series of restrictions was then placed on the paths from the intercept and slope of perceived teacher support to the intercept and slopes of the outcome variables, namely depression and self-esteem. These individual paths were consecutively constrained to be equal across boys and girls.[4]

Although the effects of perceptions of teacher support on depression and self-esteem were generally the same for boys and girls, a gender difference emerged in the influence of the slope (i.e., rate of change) of teacher support on the slope of depression (FIML χ^2_{diff} = 5.69, p < .05) and is discussed in more detail next. Next, as a more rigorous test, the variance–covariance matrices were constrained successively. Although the population true residual variances and covariances for depression and self-esteem were identical across gender, FIML χ^2_{diff} (9) = 7.61, p > .10, there was a larger residual covariance in the intercept and slope of teacher support for girls than for boys, FIML χ^2_{diff} (3) = 9.65, p < .05.

Finally, we tested if the levels and slopes of teacher support and the outcome variables differed by gender. Although boys and girls differed with respect to the intercept (i.e., initial levels) of perceived teacher support, FIML χ^2_{diff} (1) = 46.32, p < .001, the slope (i.e., consisting of the rates of change) of this variable was the same across gender, FIML χ^2_{diff} (1) = .08, p > .10. By contrast, although

there were no differences between boys and girls with respect to initial levels of depression, FIML χ^2_{diff} (1) = .16, p > .10, the slope of depression differed across gender, FIML χ^2_{diff} (1) = 5.26, p < .05. Similar to the teacher support variable, gender difference emerged with respect to initial levels of self-esteem, FIML χ^2_{diff} (1) = 18.24, p < .001, but not for the slope of this variable, FIML χ^2_{diff} (1) = .58, p > .10.

These findings suggest that gender acts as a moderator and that differences emerge in patterns of perceived teacher support and well-being over time. Boys and girls differed with respect to their initial levels of perceived teacher support and global self-esteem, as well as the rate of change in levels of depression over the course of middle school. Although the influence of the slope of teacher support on the slope of depression did not differ by gender, the magnitude of this association was stronger for boys than for girls. The specific patterns of gender differences that emerged these nested models are elucidated next.

Patterns of influences of perceived teacher support on well-being for adolescent boys and girls

The parameter estimates of the final model are shown in Table 1. The EM algorithm of the FIML procedure reached convergence in five iterations for girls and six iterations for boys. Overall percentages of missing data for girls and boys were 3.73 and 6.10%, respectively. The model fit the data reasonably well, FIML χ^2 (42) = 109.59, RMSEA = .04. The Q plot of the standardized residuals for both boys and girls revealed that the errors fell mainly along the diagonal, indicating them to be normally distributed.

At the start of middle school, both boys and girls reported significant (i.e., different from zero) levels of perceived teacher support. Moreover, girls (κ = 3.30) report higher levels of perceived teacher support than boys (κ = 3.12). Over the course of middle school, however, this support was perceived to wane significantly for both groups (κ = −.22, p < .001). The variance–covariance matrix for

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4. For the sake of economy, although the paths for depression and self-esteem were tested individually, only the final model with all paths simultaneously constrained is reported. As expected, these prior models evidenced nonsignificant differences when compared to the model in which paths were estimated freely across the genders, implying that the impact of changes in perceived teacher support on self-esteem and depression were the same for boys and girls.

Table 1. *Parameter estimates for the final cross-domain model*

Parameter Label	Estimate
Population true mean of depression and self-esteem trajectory for those with a null perceived teacher support trajectory	
Initial status: average depression in sixth grade	1.87***
Rate of true change: average true change in depression per grade	
Girls	.06
Boys	.02
Initial status: average self-esteem in sixth grade	
Girls	2.33***
Boys	2.40***
Rate of true change: average true change in self-esteem per grade	−.08
Population true residual variances and covariance in depression and self-esteem, controlling for perceived teacher support	
True initial status: partial variance of true depression in sixth grade	.06***
Rate of true change: partial variance of true change in depression per grade	.01***
True initial status and rate of change: partial covariance of true depression in sixth grade and true change in depression per grade	−.01***
True initial status: partial variance of true self-esteem in sixth grade	.18***
Rate of true change: partial variance of true change in self-esteem per grade	.02***
True initial status and rate of change: partial covariance of true self-esteem in sixth grade and true change in self-esteem per grade	−.02***
Population true mean trajectory in perceived teacher support	
Initial status: average support in sixth grade	
Girls	3.30***
Boys	3.12***
Rate of true change: average true change in support per grade	−.22***
Population true residual variances and covariance in perceived teacher support	
True initial status: variance of true support in sixth grade	.25***
Rate of true change: variance of true change in support per grade	.04***
True initial status and rate of change: covariance of true support in sixth grade and true change in support per grade	
Girls	−.05***
Boys	−.03*
Population regression of change in perceived teacher support on change in depression	
γ_1 Regression of true adolescent depression in sixth grade on true adolescent-perceived teacher support in sixth grade	−.17 (.33)***
γ_2 Regression of true rate of change in adolescent depression on true adolescent-perceived teacher support in the sixth grade	−.02 (−.10)
γ_5 Regression of true rate of change in adolescent depression on rate of true change in perceived teacher support	
Girls	−.22 (−.42)***
Boys	−.32 (−.63)***
Population regression of change in perceived teacher support on change in self-esteem	
γ_3 Regression of true adolescent self-esteem in sixth grade on true adolescent-perceived teacher support in sixth grade	.24 (.27)***
γ_4 Regression of true rate of change in self-esteem depression on true adolescent-perceived teacher support in sixth grade	.02 (.05)
γ_6 Regression of true rate of change in self-esteem depression on rate of true change in perceived teacher support	.21 (.29)**

Note: The graphical representation of the γ paths can be seen in Figure 1. Values within parentheses represent the common metric standardized coefficients. Model FIML χ^2 (42) = 109.59, RMSEA = .04.
*$p < .05$. **$p < .01$. ***$p < .001$.
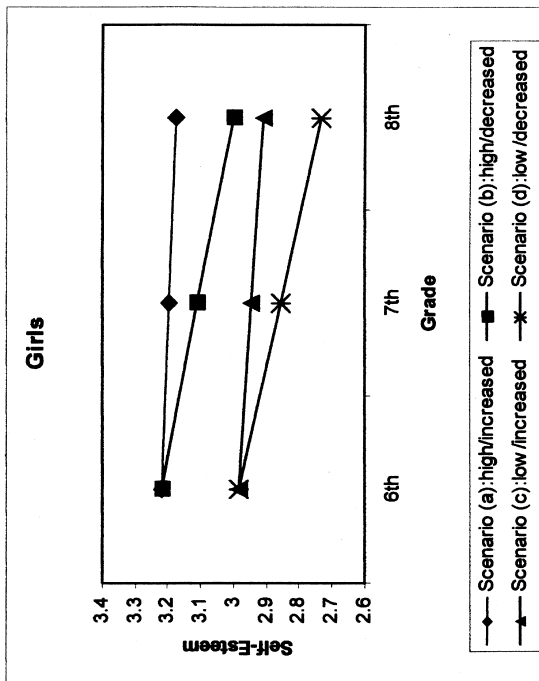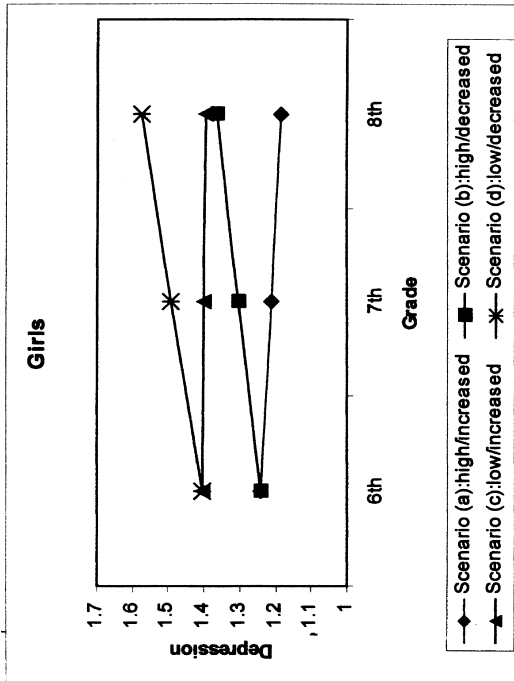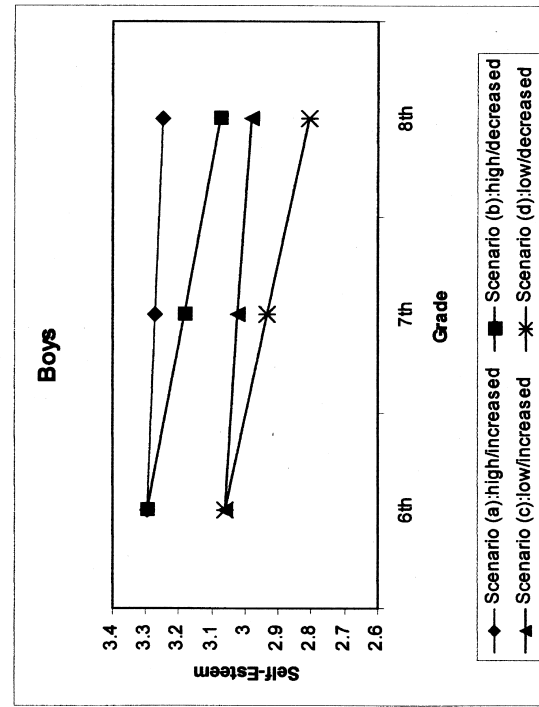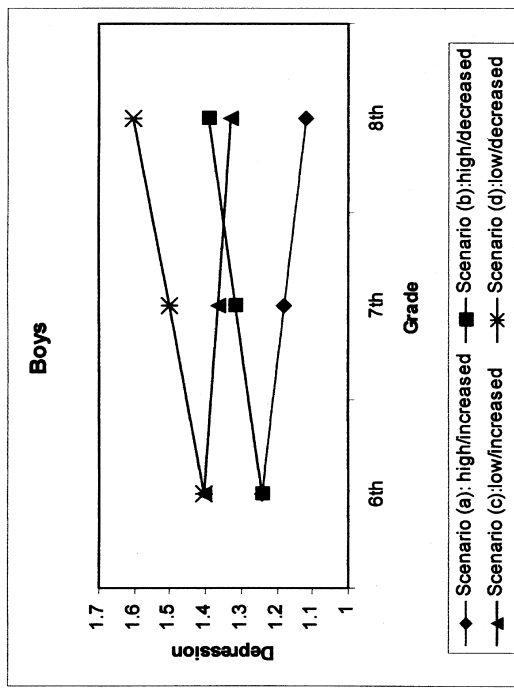
teacher support also indicated significant heterogeneity in perceptions of teacher support at the start of middle school ($\Phi = .25$, $p < .001$) as well as in the slopes of these perceptions from the sixth through the eighth grades ($\Phi = .04$, $p < .001$).

With respect to depression, although the earlier, nested models indexed gender differences in the slopes of depression, these estimates proved nonsignificant (i.e., relatively consistent over time) for boys ($\alpha = .02$, $p > .10$) and girls ($\alpha = .06$, $p > .10$) in the final model. There were also no gender differences in the initial levels of depression, and both boys and girls evidenced significant (i.e., different from zero) levels of depression in the sixth grade ($\alpha = 1.87$, $p < .001$). Similarly, for self-esteem, there were no gender differences in the slope of self-esteem ($\alpha = -.08$, $p > .05$). Gender differences, however, emerged with respect to initial levels of self-esteem; boys ($\alpha = 2.40$, $p < .001$) reported higher levels of self-esteem than girls ($\alpha = 2.33$, $p < .001$). However, caution should be exercised in interpreting these results. They reflect mean level differences between boys and girls while holding the pattern of the relationships between teacher support and the outcomes invariant. Similar conditional interpretations also apply to the population true residual variances and covariances of the outcome variables. There was significant heterogeneity in the residual rates of change and initial levels of self-esteem and depression while controlling for teacher support.

The pattern of influence of perceived teacher support on self-esteem and depression was similar across boys and girls. Initial levels of perceived teacher support were positively and significantly (i.e., different from zero) related to initial levels of self-esteem ($\gamma = .24$, $p < .001$) and negatively and significantly related to initial levels of depression ($\gamma = -.17$, $p < .001$). This relationship was identical for boys and girls. Higher levels of perceived teacher support in the sixth grade were associated with greater well-being (i.e., lower levels of depression and higher levels of general self-esteem). Moreover, the slope (i.e., rate of change) of perceived teacher support was significantly related to the slopes of both general self-esteem ($\gamma = .21$, $p < .01$) and depression. Adolescents who perceived increases in teacher support over the course of middle school reported corresponding increases in self-esteem during that time period. We also found that the slope of teacher support was negatively related to the slope of depression. As the rate of change in teacher support declined over time, there was a corresponding increase in the reported rates of depression. This relationship was stronger for boys ($\gamma = -.32$, $p < .001$) than for girls ($\gamma = -.22$, $p < .001$).

Prototypical plots

To elucidate these findings, we used a series of prototypical plots that graphically portray the pattern of results of the effects of perceived teacher support on depression and self-esteem (see Figure 2). These trajectories represent the pattern of change in depression and self-esteem for students 1 *SD* both above and below the average true mean trajectory for perceived teacher support. They thus represent the fitted trajectories of prototypical adolescents, that is, adolescents who share specific values of perceived teacher support and thus serve as exemplars of the range of effects on the sample, and by extension, in the population. This also enabled the display of the

Figure 2. The fitted trajectories for depression and self-esteem: scenario (a) high/increased, students who report high teacher support in the sixth grade and increasing positive perceptions of teacher support across middle school; scenario (b) high/decreased, students who report high teacher support in the sixth grade and decreasing positive perceptions of teacher support across middle school; scenario (c) low/increased, students who report low teacher support in the sixth grade and increasing positive perceptions of teacher support across middle school; scenario (d) low/decreased, students who report low teacher support in the sixth grade and decreasing positive perceptions of teacher support across middle school. For depression a lower score implies lower depression. For self-esteem a low score implies lower self-esteem.

relative magnitude of the effects of teacher support on well-being. Four scenarios are illustrated: (a) students who start out with relatively high levels (i.e., 1 *SD* above the mean) of perception of teacher support in the sixth grade and perceive increases in teacher support across middle school; (b) students who start with high levels but report progressive decreases in teacher support; (c) students who report low levels (i.e., 1 *SD* below the mean) of teacher support in the sixth grade but perceive increases throughout middle school; and (d) students who start with low levels and report decreases in teacher support over time. Because the intercepts and slopes varied by gender, trajectories were constructed for boys and girls separately. Note also that the plots are constructed separately for each of the outcome variables, although the estimates used in plotting them are based on a model that assumes correlation among the outcome variables.

The top two plots of Figure 2 represents the fitted trajectories for depression. These trajectories illustrate the significant impact of changes in perceptions of teacher support on changes in reported depression. Scenarios (d) and (c) represent the first (i.e., top) and second lines of each plot, respectively, whereas scenarios (b) and (a) are illustrated by the third and bottom lines in each plot, respectively. As seen in the plots, students in both scenarios (c) and (d) began middle school with relatively high levels of depression. However, students who perceived declines in teacher support over the course of middle school (scenario d) reported more depressive symptoms over time than students who perceived increasing levels of teacher support (scenario c). Similar patterns can be observed in the plots for scenarios (a) and (b). Students in both these groups began middle school with relatively low levels of depression. However, students who perceived declines in teacher support (scenario b) reported more depressive symptoms over time. By the eighth grade, these students reported levels of depression similar to those who started middle school with higher levels of depression but perceived increasing teacher support over

time (scenario c). This pattern can be seen most clearly among the boys.

The self-esteem trajectories can be seen in the bottom two plots of Figure 2. These plots reveal similar trends in the trajectory for general self-esteem in relation to different rates of change in perceptions of teacher support. Students who perceived decreasing levels of teacher support over the course of middle school also tended to report declining levels of general self-esteem over the same period of time and vice versa. In summary, for both boys and girls, sixth-grade level of perceived teacher support was predictive of initial level of psychological adjustment. Moreover, the rate of change in perceptions of teacher support significantly predicted rates of change in both depression and self-esteem.

Post hoc analyses

Arguments could be made that the associations found between perceptions of teacher support and psychological outcomes were due to response biases, for example, students who feel good about themselves also perceive higher levels of support. To test this possibility, we performed a post hoc analysis of the original combined model (i.e., the model represented in Figure 1). In this model, however, perceptions of teacher support were viewed as an outcome variable and depression and self-esteem were entered as predictors. We could thus make qualitative comparisons of model effects and offer some empirical evidence for the superiority of ordering effects from perceptions of teacher support to psychological well-being. The competing model was estimated using the FIML procedures. The model did not fit the data as well as the original combined model, FIML χ^2 (22) = 235.35, RMSEA = .09. Examination of the *Q* plot of the standardized residuals showed them to fall mainly along the diagonal, indicating that they were normally distributed. The standardized residuals for both boys and girls ranged from −1.53 to 1.37. With the exception of the influence of the intercept of depression on the intercept of teacher support for girls ($\gamma = -.46$, $p < .001$), none of the remaining pathways re-

lating depression and self-esteem to the intercept and slope of perceptions of teacher support were significant for either boys or girls. Whereas the original analysis indicated that slope of perceptions of teacher support significantly predicted depression and self-esteem, in this set of analyses, neither the slope of depression (girls: $\gamma = -.41$, $p > .10$; boys: $\gamma = -4.50$, $p > .05$) nor the slope of self-esteem (girls: $\gamma = .13$, $p > .10$; boys: $\gamma = -4.19$, $p > .10$) significantly predicted the slope of teacher support. That is, the rate of change in psychological well-being did not significantly influence the rate of change in perceptions of teacher support for either boys or girls over the course of middle school. As such, the trajectories of growth in psychological well-being indicators appear to be influenced by trajectories of perceptions of teacher support and not the reverse.

Discussion

The major goal of this study was to examine changes in students' well-being and perceptions of teacher support and to detect gender-specific patterns in associations among these variables over the course of middle school. Using an idiographic approach, we studied interindividual pathways of change in adolescent depression, self-esteem, and perceptions of teacher support. Consistent with previous findings, students evidenced declines in functioning and losses in their sense of support from their teachers over time. Moreover, for both male and female students, changes in perceptions of teacher support reliably predicted changes in psychological adjustment. In particular, students who perceived increasing levels of teacher support evidenced corresponding decreases in depression and increases in self-esteem. Likewise, perceptions of decreasing teacher support corresponded with increases in depression and losses in self-esteem. Subsequent analyses revealed similar trends among students who entered middle school reporting different levels of depression and self-esteem. Taken together, these findings build on previous work that has noted the important role of teacher support in

predicting student well-being and underscores the importance of tracking perceptions of both support and well-being as both of these variables change over time. Individual growth curves helped to illuminate the dynamic nature of associations among these variables and aided in exploring both individual and average trends and the influence of teacher support.

A related goal of this study was to explore how associations among the variables varied as a function of gender. We found more similarities than differences between boys and girls in the current study, and overall rates of change for depression and self-esteem remained relatively stable for both genders. The most striking differences were in initial levels of teacher support and self-esteem. Although both genders demonstrated significant declines across middle school, girls perceived higher initial levels of teacher support. This finding runs counter to common portrayals of girls' relative neglect in school (Sadker & Sadker, 1995), but is consistent with the literature on teachers' and students' reports (Hughes et al., 2001). Adolescent girls are thought to be more attuned or responsive to the interpersonal cues of their teachers (DeBold, Brown, Wessen, & Brookins, 1999). On the other hand, boys reported higher levels of self-esteem in the sixth grade, a finding that is generally supported in the literature (e.g., Roeser et al., 2000), and these levels remained relatively stable over middle school. Contrary to our expectations, there were no gender differences in initial levels of depression. As noted above, however, gender differences in depression tend to emerge later in adolescence (Compas et al., 1997; Kling, Hyde, Showers, & Buswell, 1999).

Thus, although some of these findings concur with previous reports (e.g., Lord, Eccles, & McCarthy, 1994; Wigfield et al., 1991), we found neither decreasing self-esteem nor a moderating effect of gender on depression (e.g. Hirsch & Rapkin, 1987; Slavin & Rainer, 1990). It appears that gender per se may not be a salient predictor of differences, but may instead be linked to a range of contextual factors in the lives of adolescents. For

instance, the moderating roles of ethnicity and social class need to be explored. Unfortunately, the sample grouping of these demographic variables within each gender was not sufficient to conduct finer tests of moderation.

The strength of the current study is its methodological approach. Adolescence is a period of growth and change. Cross-domain modeling allows an examination of growth trajectories across multiple contexts as well as the relationships among them. It is important to note, however, that our assessment of teacher support was based on students' perceptions of teachers in general. Students are likely to have different experiences with different teachers and across different curricular and social contexts. Moreover, students could have reported that they experienced teachers as supportive to other students, even if they themselves felt a lack of connection. Although this remains a possibility, it is important to note that these more global perceptions correlated with a subset of students' perceptions of the support that they themselves felt from teachers (see footnote 3). Moreover, our assessment approach was in keeping with the ecological reality of middle school, where students move from class to class each period rather than stay in one class for the entire school day. Nonetheless, it will be important to determine whether the patterns observed in the study remain when relationships with particular teachers and other school-based non-parent adults (e.g., guidance counselors, coaches, afterschool providers) are observed. Along similar lines, future studies should incorporate more domain-specific indices of self-esteem. It may be the case, for example, that teacher support is more strongly related to some dimensions (i.e., scholastic competence) than to others.

Although the findings implicate teacher support in student adjustment, arguments could be made that students who were well-adjusted were also more prone to view their teachers in a favorable light (as would be implied by the initial levels). Nonetheless, if the findings merely reflected positive response biases, we would expect that changes in depression and self-esteem would predict changes in teacher support, and not necessarily the re-

verse. This was not the case. The post hoc analysis indicated the direction of influence to be unidirectional; the slope (i.e., rate of change) of perceptions of teacher support predicted the slopes of self-esteem and depression, but not the reverse.

It is also important to note that the observations were measured contemporaneously, limiting our ability to make inferences regarding causality. We were interested in exploring the amount of variance that perceptions of teacher support could reliably explain in the outcome variables and therefore focused on such predictions through cross-domain modeling. An additional limitation may stem from the method of data collection, in which teachers administered questionnaires. Although this arrangement may inhibit students' willingness to provide candid appraisals, this potential bias may have been attenuated by the confidentiality and anonymity that they were afforded. Moreover, the questions pertained to teachers in the school, not the particular teacher who administered the questionnaire.

As noted above, our analyses depended on adolescents' subjective perceptions of teacher support, which may not necessarily map onto actual amounts that were enacted or received. Nonetheless, several studies have shown that individuals' reports of how much support would be available to them if needed (i.e., perceived support) are more consistently related to positive outcomes than the help that is actually received (Kessler & McLeod, 1984; Sarason et al., 1990). These perceptions are shaped by many interacting factors, including students' attachment histories and family environments (Lakey & Dickinson, 1994). Ratings of teacher supportiveness and availability are thus likely to derive, at least in part, from templates that were developed in parental relationships (Chirkov & Ryan, 2001; Midgley & Edelin, 1998). Future studies should track changing perceptions of both parental and teacher relationships to help decipher the extent to which teacher support contributes unique variance to student adjustment.

In addition to gaining a better understanding of how such perceptions change over time, it will be important to develop and test conceptual models of the underlying pro-

cesses by which such perceptions influence adjustment. For example, teacher support is likely to have direct influences on psychological adjustment, but it is also likely to indirectly influence this outcome through its effects on the learning environment. In particular, student engagement with their teachers is likely to enhance feelings of belonging in the school setting and academic efficacy which, in turn, have implications for students' adjustment (Roeser, Midgely, & Urdan, 1996).

In addition to serving as an impetus for future research, this study has implications for school policies and practices. Our results indicate that perceptions of teacher support offer some protection against the heightened vulnerability to the losses in well-being that are typically seen in early adolescence. Unfortu-

nately, many middle school students still experience a loss in teacher support over time. Although these decrements may be explained, in part, by normal developmental changes, the less voluntary aspects of this loss of teacher support are cause for concern. Rather than presenting impediments, schools should work toward increasing opportunities for supportive relationships to emerge between students and teachers (Midgley & Edelin, 1998). Practices that enrich student–teacher relationships, such as homeroom assignments, advising, multi-year teacher placements, and smaller groupings of students, might go a long way toward enhancing the well-being of middle school students. Continued longitudinal research on the role of relational processes in the school is therefore essential to further understanding of adolescent adjustment in middle schools.

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Appendix A

Pairwise correlations, univariate means, and standard deviations of the variables in the study

	1	2	3	4	5	6	7	8	9
Girls									
1. Depression T1	*								
2. Depression T2	.56	*							
3. Depression T3	.42	.52	*						
4. Self-worth T1	−.58	−.40	−.33	*					
5. Self-worth T2	−.45	−.60	−.39	.53	*				
6. Self-worth T3	−.35	−.38	−.58	.41	.48	*			
7. Teacher support T1	−.21	−.11	−.14	.19	.11	.13	*		
8. Teacher support T2	−.22	−.29	−.17	.15	.26	.13	.42	*	
9. Teacher support T3	−.12	−.14	−.24	.08	.14	.23	.31	.43	*
Means	1.33	1.33	1.39	3.11	3.03	2.97	3.35	3.09	2.94
Standard deviation	0.33	0.32	0.37	0.58	0.59	0.60	0.71	0.69	0.69
Sample size	1240	1202	1209	1237	1226	1231	1276	1255	1256
Boys									
1. Depression T1	*								
2. Depression T2	.45	*							
3. Depression T3	.38	.45	*						
4. Self-worth T1	−.55	−.35	−.32	*					
5. Self-worth T2	−.33	−.58	−.30	.43	*				
6. Self-worth T3	−.33	−.41	−.55	.45	.46	*			
7. Teacher support T1	−.25	−.12	−.13	.13	.10	.10	*		
8. Teacher support T2	−.18	−.29	−.21	.14	.18	.14	.41	*	
9. Teacher support T3	−.15	−.21	−.29	.09	.12	.22	.32	.44	*
Means	1.35	1.36	1.40	3.15	3.05	2.99	3.17	2.86	2.75
Standard deviation	0.32	0.36	0.41	0.59	0.62	0.59	0.79	0.75	0.79
Sample size	1229	1185	1174	1227	1191	1193	1287	1264	1237

Note: T, time.

*All correlations are significant at *p* = .01.