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The Transition to High School as a Developmental Process Among Multiethnic Urban Youth

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The high school transition was examined in an ethnically diverse, urban sample of 1,979 adolescents, followed from 7th to 10th grade (M_{age} = 14.6, SD = .37 in 7th grade). Twice annually, data were gathered on adolescents' perceptions of school climate, psychological functioning, and academic behaviors. Piecewise growth modeling results indicate that adolescents were doing well before the transition but experienced transition disruptions in psychological functioning and grades, and many continued to struggle across high school. The immediate experience of the transition appeared to be particularly challenging for African American and Latino students when the numerical representation of their ethnic groups declined significantly from middle to high school. Findings highlight the value of examining the transition in a larger developmental context and the importance of implementing transition support.

For most American youth, school transitions are normative experiences typically occurring when students enter elementary school, middle or junior high school, and high school. Although frequent and predictable, school transitions can be disruptive for students across developmental domains. The vulnerabilities students experience during school transitions may result from the potential mismatch between the youth's stage of development and the demands of the school environment (e.g., Eccles, Lord, & Midgley, 1991). As such, understanding how the transition unfolds requires not only an examination of developmental trajectories across time, but also an exploration of how changes differ as a function of both individual characteristics and changing school contexts.

To date, most school transition research has focused on the move from elementary to middle school, due to both its concurrent timing with the onset of adolescence and the changes in school environments that occur as students shift from smaller, more personal elementary schools to larger, more impersonal, and often more academically rigorous middle schools (Aikins, Bierman, & Parker, 2005; Rudolph, Lambert, Clark, & Kurlakowsky, 2001; Simmons & Blyth, 1987; Simmons, Burgeson, Carlton-Ford, & Blyth, 1987). Research on the transition to high school is more limited, although studies have documented similar academic challenges to those experienced across the middle school transition (Barber & Olsen, 2004; Reyes, Gillock, & Kobus, 1994; Roeser, Eccles, & Freedman-Doan, 1999). For many students, entry into ninth grade is their first exposure to a completely departmentalized curriculum, extensive academic tracking, ordering of ability via class rankings, and recurrent reminders of graduation requirements. Those practices define students' academic identity and their opportunities after high school at a developmental stage when they are still exploring multiple identities and weighing options about who they are and who they hope to become.

Relatively little is known about the high school transition of adolescents of color despite the fact that they face particular kinds of vulnerabilities beyond the normative challenges described above. Ethnic minority youth do more poorly in high

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school on virtually every indicator, and they are at greater risk of school drop out (Orfield & Lee, 2005). Failure to navigate the high school transition successfully has high stakes, and the waters can be especially turbulent for ethnic minority youth.

Placing the High School Transition in a Larger Developmental Context

In the research reported here, we examine the transition to high school in an ethnically diverse sample. We conceptualize the high school transition as a developmental process that unfolds over time, a notion derived from the life course perspective (Elder, 1998; George, 1993). The life course perspective is one of the dominant developmental theories in the sociological tradition and an often used theory in both educational research generally (Crosnoe & Huston, 2007) and school transition research specifically (Entwisle & Alexander, 2002). According to this perspective, the life course encompasses multiple trajectories (interconnected pathways across social domains) and life transitions embedded within these trajectories. Transitions, both normative and nonnormative, in combination with the skills and experiences individuals have and the adaptations they choose in the face of transitions, can serve as ''turning points'' and change life course trajectories (Elder, 1985; Rutter, 1996). In the United States, the high school transition is both normative and predictable (i.e., moving from eighth to ninth grade); however, each student brings a unique set of past experiences, personal resources, and expectations, and their transitions occur within distinct environments, all of which affect the adaptations they make when moving to high school and their subsequent life course trajectories.

Guided by the life course perspective, this study sought to examine the high school transition experiences of adolescents from different racial/ethnic groups, specifically exploring their perceptions of school climate, psychological functioning, and academic behaviors in middle school, how these outcomes change across the transition, and how experiences of the school transition affect trajectories during the first 2 years of high school. The life course perspective acknowledges the interrelated nature of individuals' development across multiple domains (e.g., socioemotional, academic; see Alexander, Entwisle, Blyth, & McAdoo, 1988), and our selection of variables was guided by this principle. In particular, we were interested in whether parallel trajectories and similar changes across the high school transition would emerge for different developmental domains.

The Influence of Social Ties

The life course perspective posits that social ties both influence and are influenced by life transitions (Elder, 1998). In the current study, perceptions of school climate (feelings of belonging and school liking) reflect students' ties to their academic institutions. School ties may be particularly challenged during periods of transition inasmuch as pretransition friendships and social supports are often disrupted, yet how the high school transition alters adolescents' perceptions of these social ties has received scant attention in the extant literature. Moreover, results have revealed rather inconsistent findings. For example, Barber and Olsen (2004) reported declining school liking across the transition from eighth to ninth grade, whereas Benner and Graham (2007) identified improvements in school liking over the same period. It could be that the novelty of high school fosters a short-term ''honeymoon period'' that dissipates with time.

The life course perspective's attention to social ties is also relevant to explorations of psychological functioning. For example, feelings of social anxiety and loneliness at school, constructs explored in the current study, reflect adolescents' ties to their peers and school personnel. However, less is known about changes in students' psychosocial adjustment across the high school transition. A retrospective ethnographic study found that students developed more positive self-perceptions from middle to high school (Kinney, 1993), yet two studies found no significant changes across the transition in students' self-esteem (Seidman, Aber, Allen, & French, 1996) or general psychological functioning (Roeser et al., 1999), and another found declining self-esteem and increasing depression across the high school transition (Barber & Olsen, 2004). Evidence does suggest that girls may be experiencing more psychological distress across the high school transition than boys (Finn & Rock, 1997).

Cumulative Disadvantage and Academic Achievement

A particular strength of the life course perspective is its ability to link developmental processes to cumulative disadvantage (Elder, 1998). Throughout the life course, transitions and the ease with which individuals navigate transitions influence

developmental outcomes in a cumulative fashion. Although early success can promote cumulating advantages for youth, early challenges may have dire consequences for life course trajectories. This is particularly pertinent to academic performance. In the U.S. educational system, research has consistently documented the achievement divide that separates White and Asian students from their African American, Latino, and Native American peers; this divide is observed as early as preschool and only widens across elementary and secondary school (KewalRamani, Gilbertson, Fox, & Provasnik, 2007). The current study examined the possibility of cumulative academic disadvantage within different racial/ethnic groups by investigating middle school academic trajectories, changes across the transition, and academic trajectories across the first 2 years of high school.

Extensive study of students' academic performance across the high school transition consistently shows that from middle to high school, students experience declines in grades (Barber & Olsen, 2004; Roderick, 2003; Seidman et al., 1996) and school engagement (Isakson & Jarvis, 1999; Reyes et al., 1994; Roeser et al., 1999). However, explorations of racial/ethnic differences in high school transition effects often yield inconsistent findings. For example, Murdock, Anderman, and Hodge (2000) found that African American students were more likely to be in the lowest achieving group in ninth grade when compared to their White peers, whereas Seidman et al. (1996) found no transition differences in grades by student race/ethnicity. In addition to the moderating effects of race/ethnicity, some evidence suggests that boys may be struggling more academically across the high school transition than their female peers (Finn & Rock, 1997; Lee & Smith, 1995; Roderick, 2003; Russell, Elder, & Conger, 1997).

Sociocultural Context

The life course perspective recognizes the importance of sociocultural context for developmental transitions and the influence of transitions on cumulating disadvantage (Alexander et al., 1988; Elder, 1998; Schulenberg & Maggs, 2002), and our examination of how transition experiences might vary as a function of individual social-structural characteristics (e.g., gender, race/ethnicity) was guided by this tenet. In recognition of the perspective's emphasis on the ecological context in which life transitions unfold (Elder, 1998), our study incorporated a number of school characteristics, including school size, socioeconomic status (SES), and ethnic diversity. All were measured both before and after the transition in recognition of the possible influence of changing ecologies on adolescents' outcomes. Prior high school transition research integrating ecological contexts has focused almost exclusively on school size and feeder patterns. Findings suggest that students in smaller high schools have stronger achievement than their peers enrolled in larger schools (Lee & Smith, 1995; Russell et al., 1997) and that students transitioning in a more traditional feeder pattern (i.e., middle school to high school) experience greater declines in grades (Russell et al., 1997) and are more likely to later drop out of school (Alspaugh, 1999) than students enrolled in schools serving 7th to 12th grades.

Research more peripheral to the high school transition literature suggests that school ethnic composition may be associated with student outcomes. For example, previous research has found that 11th-grade students in racially balanced high schools (i.e., schools with relatively equal proportions of African American and White students) have higher academic achievement levels than their peers in racially unbalanced schools (Gray-Little & Carels, 1997). Existing research, however, has not examined how differences in the ethnic composition of students' middle and high schools might influence their experiences of the transition and their developmental trajectories across high school. For example, given Gray-Little and Carels's (1997) findings, if students transition to high schools that are more ethnically diverse (i.e., more racially balanced) than their middle schools, might this promote students' academic behaviors in terms of attendance or grades in school?

Person–Context Interactions

Person–context interactions also influence developmental outcomes according to the life course perspective (Schiller, 1999; Schulenberg & Maggs, 2002). In the current study, we explored a very specific person–context interaction—how the adolescent's race/ethnicity intersected with the racial/ethnic composition of his or her school (i.e., ethnic incongruence)—and how changes in this match between individual race/ethnicity and school composition from middle to high school influenced transition experiences and subsequent high school trajectories. Note that we make a distinction

between ethnic diversity as a school characteristic and ethnic incongruence as an individual characteristic that captures the interaction between participants' ethnicity and the ethnic composition of their middle and high schools. We believe that these are important distinctions because school ethnic diversity and ethnic incongruence could be related to different adjustment outcomes across the transition.

Our earlier research on *ethnic incongruence*—decreasing numerical representation of an adolescent's ethnic group from middle school to high school—posited that ethnic incongruence would be associated with poorer adjustment because there is more of a mismatch between the ethnic context of the departing and receiving school. Consistent with that hypothesis, we found that when ethnic incongruence increased (i.e., students moved from a middle to a high school with fewer students who were ethnically similar to them), students reported diminished feelings of belonging and connectedness to their schools (Benner & Graham, 2007). Whether incongruence influences other developmental domains, such as academic performance, remains unexamined, as does the persistent effects that incongruence may exert across high school.

Methodological Issues

With the life course perspective as the conceptual framework for the current study, we also sought to address methodological limitations inherent in most research on students' experiences of the transition to high school. Some of those limitations can be seen in the hypothetical data shown in Figure 1, which depicts the high school transition as a developmental process that unfolds over time. Imagine that researchers are studying changes in school belonging across the transition to high school. Data on this variable are gathered in fall and spring of 7th and 8th grades before the high school transition and in fall and spring of 9th and 10th grades after the transition. The lettered paths display several possible trajectories of school belonging across the eight time points from 7th to 10th grade.

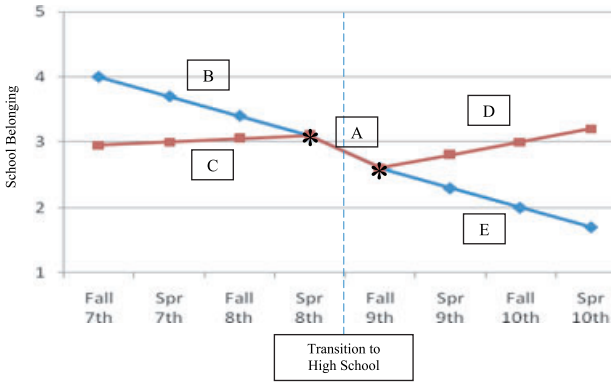

Figure 1. Conceptual model for understanding the high school transition as a developmental process.
Note. Path A represents possible change across the transition, Paths B and C represent possible experiences prior to the transition, and Paths D and E represent possible adjustment following the transition.

Almost all existing studies reviewed above on the high school transition are short-term longitudinal investigations, assessing student outcomes at one time point prior to the transition (e.g., spring of eighth grade) and at one time point after the transition (e.g., fall of ninth grade; Path A in Figure 1). For example, Benner and Graham (2007) documented that African American students experienced diminished sense of school belonging from spring of eighth to fall of ninth grade when they went from being the majority to the minority ethnic group in their school. Although the use of two time points is certainly informative, this type of design tells us little about how students were adjusting long before the actual transition. Across middle school, multiple trajectories may lead to the same end state in functioning. Using the Benner and Graham (2007) study as an example, it could be that feelings of belonging were declining across middle school (Path B) and continued to decline across the transition (Path A) *or* that students were actually adjusting well during middle school (Path C) and suffered a temporary setback at the transition. Short-term longitudinal designs also do not shed light on whether students' negative (or positive) adjustment across the transition is maintained as students gain additional experience in the high school setting. For example, it is possible that declines in school belonging at the time of the transition were thereafter followed by a period of recovery across high school (Path D) or that they continued to decline (Path E).

The Present Study

Addressing past limitations within a life course perspective, we examine paths such as those depicted above with a longitudinal design that places the transition to high school in a larger developmental context. Our design allows for a more comprehensive exploration of the various pathways

during middle school leading up to the transition as well as during the first 2 years of high school that follow the transition. We recruited a large and multiethnic urban sample who attended 1 of 11 middle schools and then transitioned to over 100 high schools in 9th grade. Twice annually from 7th to 10th grade, data were gathered on participants' perceptions of school climate (i.e., school liking, belonging), psychological functioning (i.e., loneliness, social anxiety), and academic behaviors (i.e., grades, attendance). Student outcomes were explored longitudinally across eight waves of data (fall and spring of 7th to 10th grade) in order to assess pretransition functioning across middle school, immediate experiences of the transition to high school, and posttransition functioning across the first 2 years of high school. We also examined the effects of individual-level covariates (i.e., gender, race/ethnicity), person–context interactions (i.e., ethnic incongruence), and school-level covariates (i.e., school size, SES, ethnic diversity) on transition experiences.

We were reluctant to pose many specific study hypotheses for two reasons. First, our study explored constructs not well examined in the extant transition literature, such as perceived school climate and psychological functioning, as well as constructs for which consistent high school transition effects have not been established (e.g., race/ethnicity). Second, the existing transition literature has generally focused solely on the immediate transition experience and has ignored the larger life course trajectories in which the high school transition is embedded. We did expect declines in grades across the transition, as previous research has consistently documented that the high school transition is stressful academically. We did not, however, form hypotheses regarding students' possible academic recovery across high school. Similarly, we predicted that ethnic incongruence would result in lower feelings of belonging across the immediate transition, replicating Benner and Graham (2007), but we had no specific hypotheses about the effects of ethnic incongruence on belongingness or other variables examined here across the first 2 years of high school.

Method

Participants

Participants were 1,979 students taking part in a larger longitudinal study of peer relations in school. The students were initially recruited in two cohorts from 11 middle schools in metropolitan Los Angeles, with schools chosen from among those of comparable size in demographically similar low-income/working class neighborhoods. All schools were eligible for Title I compensatory funding and were carefully selected to represent a continuum of ethnic diversity (e.g., from primarily Latino or African American to ethnically diverse). Given the longitudinal nature of the current study and its focus on school transitions, students were excluded from our analyses if they (a) attended the same school from middle school to high school (n = 24), (b) were home schooled in ninth grade (n = 3), (c) completed high school early and were attending college (n = 2), or (d) attended a private school in high school (n = 17) inasmuch as school demographic data were not readily available for private schools in California. The final sample size of 1,979 students (M_{age} = 14.6, SD = .37 in the fall of seventh grade) included 46% boys and 54% girls as well as a high proportion of ethnic minority students—46% Latino (primarily Mexican and Central American), 21% African American, 11% Asian (primarily East Asian), 9% White, and 13% biracial/multiethnic. More than 90% of Latino and Asian youth were at least second generation (U.S. born children of immigrants), and all were sufficiently proficient in English to complete written questionnaires (i.e., all were in mainstream, non-English language learner English classes at the time of recruitment; only 20% reported speaking no English at home, and more than 97% primarily spoke English at school with their friends).

Issues of Attrition

The larger longitudinal study from which these data were drawn initially recruited approximately 2,300 sixth-grade students. In the spring of eighth grade, 75% of the initial sample (n = 1,704) remained in the study. Because the average student mobility rate for the 11 participating schools was quite high (41%), this 75% retention rate is satisfactory. This rate is also comparable to other longitudinal studies with similar urban youth samples (see Gutman & Eccles, 2007; Seidman, Allen, Aber, Mitchell, & Feinman, 1994). The retention rate from eighth to ninth grade was greater than 80%. Independent-sample t tests for students in the current study confirmed that, with the exception of grade point average, the attrited and retained students across the high school transition did not differ at spring of eighth grade on the dependent variables under study.

Measures

The study relied on a combination of school- and student-level data. School demographic data for students' middle and high schools were drawn from the California Department of Education (CDE). Perceptions of school climate, psychological functioning, and academic behaviors were measured longitudinally during the fall and spring semesters in middle school (7th and 8th grades) and high school (9th and 10th grades), for a total of eight time points. Table 1 displays descriptive statistics for each measure by time point. Cronbach's alpha levels reported for each measure are means across the eight time points.

School Climate

There were two measures of school climate—how much the respondents liked school and how much they felt like they belonged—both adapted from Gottfredson's (1984) Effective School Battery. School liking was assessed with three items (e.g., ''I look forward to going to school''). These items were rated on a 5-point scale that ranged from 1 (*for sure yes!*) to 5 (*no way!*). Items were reverse coded, with higher mean scores reflecting greater liking of school (average Cronbach's $\alpha = .75$). School belonging was assessed using five items (e.g., ''I feel like I'm a part of this school''). Ratings ranged from 1 (*for sure yes!*) to 5 (*no way!*) and were reverse coded, such that higher mean scores reflected greater feelings of school belonging (average $\alpha = .73$). In fall of seventh grade, only students in the second cohort were asked about their belonging; this time point was therefore excluded from all longitudinal analyses involving school belonging.

Psychological Functioning

Two measures assessed adolescents' psychological functioning. Social anxiety was assessed using a shortened version of the Social Anxiety Scale for Adolescents (SAS–A: La Greca & Lopez, 1998). A sample item is ''I worry about what others think of me.'' Ratings ranged from 1 (*not at all*) to 5 (*all the time*), with higher mean scores reflecting greater anxiety (average $\alpha = .88$). The Loneliness Scale (Asher & Wheeler, 1985) measured students' feelings of loneliness at school (e.g., ''I have nobody to talk to''). Minor modifications to the 16-item scale were made to make it more age appropriate for adolescents. For each item, students rated how true the statement was for them, from 1 (*always true*) to 5 (*not true at all*). Higher mean scores indicated more loneliness at school (average $\alpha = .91$).

Academic Behaviors

Grade point average (GPA) and attendance were the two measures of academic behavior. Information on students' grades was collected from their report cards at the end of each school year. Grades for all courses from each semester were coded on a 5-point scale (A = 4 and F = 0) and then averaged to create a composite GPA for each student. Students' absences were collected from school records data. Absences included the total number of days

Table 1
Mean Student Outcomes for Fall and Spring of Grade 7 (W3, W4), Grade 8 (W5, W6), Grade 9 (W7, W8), and Grade 10 (W9, W10)

	Middle school				High school			
Measure	W3 *M* (*SD*)	W4 *M* (*SD*)	W5 *M* (*SD*)	W6 *M* (*SD*)	W7 *M* (*SD*)	W8 *M* (*SD*)	W9 *M* (*SD*)	W10 *M* (*SD*)
Perceptions of school climate								
School like	3.32 (0.86)	3.29 (0.78)	3.39 (0.77)	3.35 (0.73)	3.50 (0.70)	3.42 (0.73)	3.39 (0.71)	3.38 (0.72)
School belonging[a]	—	3.36 (0.77)	3.46 (0.78)	3.47 (0.76)	3.50 (0.76)	3.48 (0.76)	3.50 (0.76)	3.51 (0.79)
Psychological functioning								
Anxiety	2.04 (0.79)	2.01 (0.76)	1.89 (0.70)	1.86 (0.69)	1.91 (0.68)	1.92 (0.72)	1.91 (0.71)	1.88 (0.71)
Loneliness at school	1.64 (0.57)	1.65 (0.57)	1.61 (0.56)	1.61 (0.54)	1.64 (0.56)	1.70 (0.61)	1.71 (0.60)	1.82 (0.65)
Academic behaviors								
Attendance	4.52 (5.73)	5.51 (6.33)	4.56 (5.63)	4.87 (6.30)	4.92 (6.13)	6.41 (7.73)	5.91 (7.09)	11.95 (12.63)
Grade point average	2.42 (0.94)	2.43 (0.96)	2.47 (0.95)	2.53 (0.92)	2.40 (1.00)	2.38 (1.04)	2.24 (1.00)	2.28 (1.04)

[a]The school belonging questions were not asked of Cohort 1 students in Wave 3 (W3), and thus this wave was not included in longitudinal analyses.

absent from school. When students were absent for only part of the school day, if they missed more than half of their classes in a given day, they were identified as absent for that day.

Individual Characteristics

Social-structural characteristics. We included two individual social-structural characteristics in the study—adolescent gender and race/ethnicity. Students self-reported their gender and their race/ethnicity. For race/ethnicity, students could choose from among 10 ethnic categories or provide an open-ended description of their race/ethnicity (e.g., biracial/multiethnic respondents). Student responses were aggregated into five primary racial/ethnic categories—Latina/o, African American, Asian/Pacific Islander, White, and biracial/multiethnic. For those students reporting biracial/multiethnic ($n = 250$), one third were multiracial, providing three or more race/ethnicities (e.g., Filipino/Japanese/Black/German, Black/Native American/Korean, White/Mexican/Pacific Islander). Of the biracial/multiethnic youth providing written descriptions of their racial/ethnic backgrounds, the two largest groups were Latino/White (36 students) and Latino/African American (30 students).

In preliminary analyses, it was discovered that 27% of students changed their race/ethnicity identification at least once in their self-report middle school surveys. Of these students, 94% changed between biracial/multiethnic and another ethnic category. For students whose self-reported ethnicity changed across time points, categorization into one of the five aggregate racial/ethnic groups was determined by identifying which racial/ethnic group the student identified in the majority of the survey waves (6th through 10th grades). We conducted independent-sample t tests to examine whether students who changed race/ethnicity reports differed from those who were consistent in their reports of race/ethnicity in the variables under study; no systematic differences were observed.

Person–context interaction. We included one measure of person–context interaction—ethnic congruence/incongruence. To determine students' ethnic congruence scores, we relied on a combination of school and student data. School-level race/ethnicity data were drawn from the CDE for schools that the students attended in middle school and high school; data were aggregated into four primary racial/ethnic categories—Latino, African American, Asian (including Pacific Islander and Filipino), and White. Congruence could not be determined for biracial/multiethnic students because the CDE combines biracial/multiethnic and missing ethnicity data into a single variable.

For middle and high school separately, congruence scores were created by matching CDE race/ethnicity school data with students' self-reported race/ethnicity. A student's congruence score reflected the proportion of students in the school that matched the student's self-reported ethnicity. For example, if a Latino student attended a middle school that was 50% Latino and 50% African American, the student's middle school congruence score would be 0.5. If this student then transitioned to a high school that included 25% Latino and 75% African American students, the student's high school congruence score would be 0.25. Congruence scores for middle school and high school were then transformed using an inverse logit transformation ($y = 1/(1 + \exp(-b \times (x - 0.5)))$). This transformation results in weighting congruence scores in the middle of the distribution more than congruence scores at the high and low extremes. Congruence change scores were computed by subtracting the transformed middle school congruence score from the transformed high school congruence score. Thus, for a student with a transformed middle school congruence score of 0.5 and a transformed high school congruence score of 0.25, the congruence change score would be −0.25. This transformation acknowledges that students may experience identical shifts in numerical representation of their ethnic group but that this shift will be meaningfully different for those who remain in the majority ethnic group at their schools from middle to high school as compared to those whose ethnic group representation in the school actually change (e.g., from majority to minority).

A dichotomous congruence variable was created based on congruence change scores. Scores that were 1 *SD* below the mean were coded as 1 and labeled as ''incongruent''; these students experienced substantial declines in their ethnic congruence over the transition. All other congruence change scores were coded as 0 and labeled as ''congruent.'' These congruent students did not experience a large, negative shift in their ethnic congruence as they transitioned from middle to high school. This method for creating two congruence groups was similar to that employed by French, Seidman, Allen, and Aber (2000) and Benner and Graham (2007).

Table 2
Descriptive Statistics for School Structure Covariates for Middle Schools and High Schools

Measure	Middle school			High school		
	M	*SD*	Range	*M*	*SD*	Range
CDE state-level data[a]						
Total school enrollment	1,998	689	1,274–3,742	2,930	1,303	120–5,213
School SES (% *not* receiving FRPL)	31.4	17.7	7.1–65.5	46.7	23.2	7.3–100.0
School ethnic diversity	0.53	0.19	0.05–0.98	52.5	18.8	4.6–97.7

Note. FRPL = free or reduced-priced lunch.
[a]Middle school means based on data for school year 2002–2003. High school means based on data for school year 2004–2005.

School Structural Characteristics

Three middle school and high school structural variables, drawn from databases available annually from the CDE, were included as covariates in the analyses (see Table 2 for descriptive statistics). These variables were the schools' size, the SES of the student population (i.e., percent of students *not* receiving free or reduced-price lunch), and the school's ethnic diversity. Based on school-level race/ethnicity data drawn from the CDE (proportion of Latino, African American, Asian American, and White students), school-level ethnic diversity was computed using Simpson's (1949) index of diversity:

$$D_c = 1 - \sum_{i=1}^{g} p_i^2.$$

In this formula, a school's ethnic diversity (D_c) depends on the proportion (p) of students in the school who are in each ethnic group (i). The proportions are squared and summed across the total number of ethnic groups in the school (g). The index of diversity accounts for both the relative proportion of each ethnic group and the number of ethnic groups represented within the school, providing the probability (ranging from 0 to approximately 1) that two students randomly selected from the same school will belong to different ethnic groups. Higher scores on the diversity index reflect greater ethnic diversity within the school.

Procedures

Each school year, students with both parental consent and student assent completed confidential questionnaires during the middle of both the fall and the spring semesters. This study specifically drew upon student data from the fall and spring semesters of Grades 7 to 10 (eight waves of data). During survey administration, trained research assistants (graduate and undergraduate students) read all items aloud as small groups of adolescents provided individual responses on their questionnaires. During each questionnaire administration, students were generally pulled from elective classes; administration typically occurred in empty rooms on the school campus (e.g., library, cafeteria, classroom). Questionnaires took approximately 40 min to complete, and students received small monetary compensation for their participation. School record data (i.e., grades, absences) were collected for all participating students each semester. School demographic data were downloaded from the CDE Web site (http://www.cde.ca.gov) for each student's middle and high school.

Results

Analysis Plan

The data were analyzed using piecewise growth modeling, an analytical tool that can be used to represent trajectories across different phases of individuals' development (i.e., middle school and high school). All analyses were conducted using Mplus 4.12 (Muthén & Muthén, 1998–2006). The current data set included some missing data, and the Mplus estimation procedure handles missing data through full-information maximum likelihood (FIML) imputation, enabling us to include all available data in the analyses. Missing data are a potential source of concern for all longitudinal studies, and FIML is one of the preferred methods to allow generalization of results to the population (e.g., Arbuckle, 1996) and the use of all available data. FIML does not estimate the missing data, as is the case with mean- or regression-based imputation

techniques. Rather, it fits the covariance structure model directly to the observed (and available) raw data for each participant (Enders, 2001). FIML assumes that the missing data are either missing completely at random or missing at random (MAR). For data MAR, missingness is a function of the observed variables in the model, and we addressed the assumptions of MAR through our inclusion of covariates, some of which were related to missing data for our study constructs (McCartney, Bub, & Burchinal, 2006).

Another issue relevant to missing data is the treatment of students nested in schools. With a piecewise growth modeling framework, the best way to account for students nested in middle and high schools across the transition is to cluster by school feeder pattern, so that the analysis takes into account the particular middle school and high school that students attend. When using the CLUSTER function in Mplus, which accounts for clustering and produces correctly adjusted standard errors in the model estimations, students without identified feeder patterns are excluded, which may lead to the missing data problems that FIML is designed to address. Because we did not have valid feeder patterns for approximately 20% (n = 446) of the sample and because an additional 25% (n = 492) did not attend their designated feeder high school (resulting in a large number of feeder patterns with $n < 5$), we did not cluster the data by school feeder pattern in order to retain a larger sample size. However, when running models with the CLUSTER function on the reduced sample, results are consistent with those reported here (results available from the first author upon request).

In the results to follow, we first describe results for the unconditional piecewise growth models for the six outcome variables. Within-wave correlations across our variables of interest were negligible to moderate (r range = .00–.56). However, because models were run separately for each construct of interest, issues of collinearity were not germane for these analyses. In the second section of the results, we detail the effects of the individual- and school-level covariates.

Unconditional Models of Transition Outcomes

The piecewise models had two intercepts and two growth factors. Figure 2 illustrates the structure of the models, using the school liking variable as an example. One intercept and growth factor described students' outcomes during middle school (four time points from fall of 7th grade to spring of 8th grade), the first phase of development. A second intercept and growth factor described students' outcomes during high school (four time points from fall of 9th grade to spring of 10th grade), the second phase of development. The second intercept was included to allow for the possibility that students could experience dramatic changes in one or more of the outcomes of interest in fall of 9th grade due to the immediacy of their experience of the high school transition. To test this hypothesis, we conducted Wald tests of parameter constraints (W),

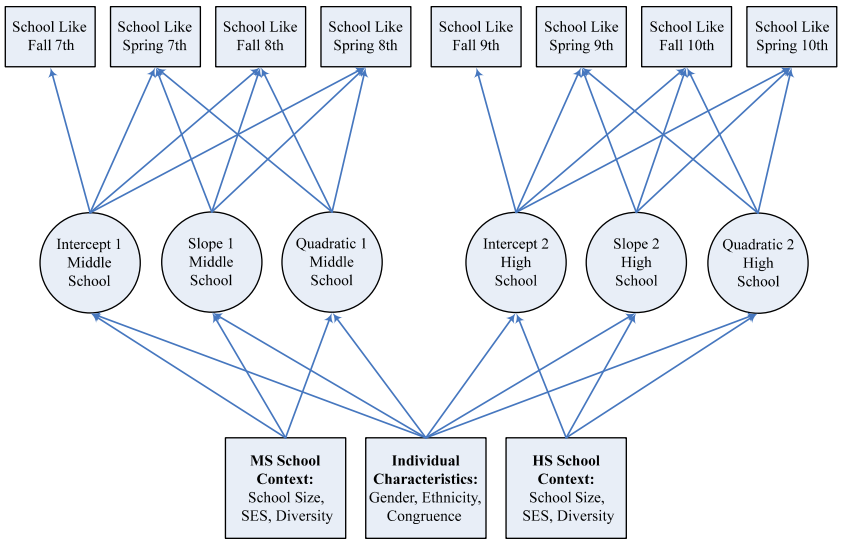

Figure 2. Analysis model using school liking as an example.
Note. SES = socioeconomic status.

Table 3
Summary of Unconditional Growth Models for Perceptions of School Climate, Psychological Functioning, and Academic Behaviors

	Model fit		Wald test		Middle school			High school		
	CFI	RMSEA	*W*	*p* value	Inter[a]	Slope	Quad	Inter[a]	Slope	Quad
School liking	0.99	0.03	58.1	.001	3.35	0.02**	−0.01	3.49	−0.08***	0.01*
School belonging	0.99	0.03	0.3	*ns*	3.47	0.10***	0.03***	3.46	0.01	0.00
Anxiety	0.99	0.03	7.3	.007	1.85	−0.07***	0.00	1.89	−0.01	−0.01
Loneliness at school	0.99	0.04	7.1	.008	1.61	−0.01*	−0.00	1.65	0.01	0.01**
Attendance[b]	0.84	0.15	2.4	*ns*	4.98	2.14***	2.34***	5.22	−1.03***	1.01***
GPA	0.98	0.08	44.3	.001	2.43	0.01	0.01	2.31	−0.07***	0.02

Note. CFI = comparative fit index; RMSEA = root mean square error of approximation; Inter = intercept (spring of eighth in middle school, fall of ninth in high school); Slope = linear growth; Quad = quadratic growth; GPA = grade point average.
[a]All intercept values significant at $p < .001$. [b]Cubic growth for middle school = 0.56***.
*$p < .05$. **$p < .01$. ***$p < .001$.

which determined whether the difference between the middle school intercept (spring of 8th grade) and the high school intercept (fall of 9th grade) was significantly different from 0. We also calculated effect sizes to determine the magnitude of the difference (Cohen, 1988). An additional benefit of piecewise growth modeling is its ability to capture nonlinear growth. Thus, we were able to examine whether students' perceptions of school climate, psychological functioning, and academic behaviors changed in nonlinear ways over time (delineated in the models by the inclusion of quadratic terms in both pieces). For one variable (total absences), we also included a cubic factor in the middle school phase to capture the S-shaped growth observed in students' raw data. Model fit statistics and results for the unconditional models are presented in Table 3.

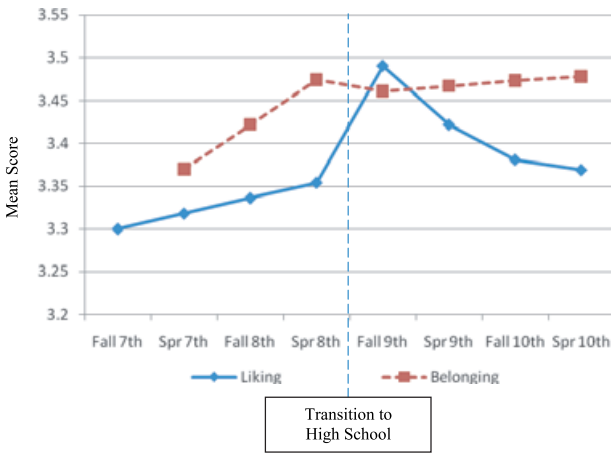

Figure 3. Change in school liking and school belonging across middle school (fall 7th–spring 8th), the transition to high school (spring 8th–fall 9th), and high school (fall 9th–spring 10th) based on estimated means.

Perceptions of School Climate

The model fit statistics for both school liking and school belonging indicated that the piecewise growth models fit the data well. Figure 3 shows the pattern of change for both of these climate variables. Across middle school, students increased in their school liking ($b = 0.02$, $p < .01$) and immediately after the transition to high school, students reported liking school more than at the end of middle school ($W = 52.1$, $p < .001$, $d = .33$). However, this positive trend of increased school liking did not continue across high school. Instead, school liking declined from fall of 9th to spring of 10th grade ($b = -0.04$, $p < .001$). The quadratic growth factor was also significant ($b = 0.01$, $p < .05$), indicating that although school liking did decline across high school, it began to stabilize by 10th grade.

For school belonging, Figure 3 shows that students' feelings of belonging increased across middle school ($b = 0.06$, $p < .001$). In contrast to school liking, students did not experience any change in their general feelings of school belonging immediately after the high school transition ($W = 0.2$, *ns*) or across high school ($b = 0.01$, *ns*).

Psychological Functioning

Figure 4 shows the pattern of change for anxiety and loneliness. The piecewise growth models fit the data well for both outcomes. Self-reported anxiety decreased across middle school ($b = -0.07$, $p < .001$). However, immediately after the transition to high school, students reported more anxiety than at the end of middle school ($W = 7.3$, $p < .01$, $d = .13$). Across high school, students generally maintained the level of anxiety reported in fall of 9th grade ($b = -0.01$, *ns*).

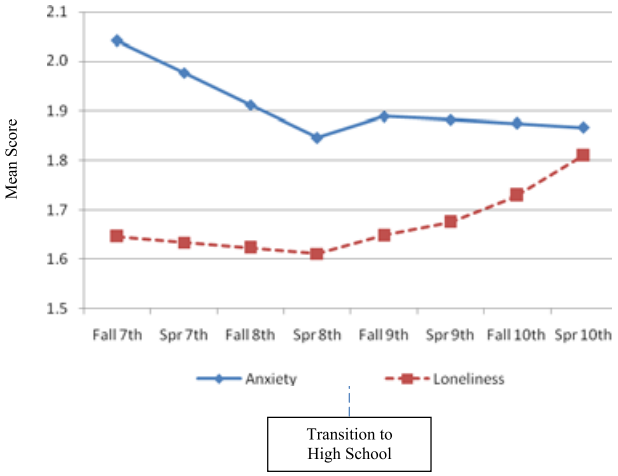

Figure 4. Change in anxiety and loneliness at school across middle school (fall 7th–spring 8th), the transition to high school (spring 8th–fall 9th), and high school (fall 9th–spring 10th) based on estimated means.

Figure 4 shows that self-reported loneliness, similarly to anxiety, decreased across middle school ($b = -0.01$, $p < .05$) but increased immediately after the transition to high school ($W = 4.5$, $p < .05$, $d = .13$). Unlike anxiety, however, feelings of loneliness only intensified from fall of 9th to spring of 10th grade, with the significant quadratic term indicating accelerated growth over high school ($b = 0.01$, $p < .01$).

Academic Behaviors

For both academic behaviors, the piecewise growth models fit the data adequately. Regarding GPA, as seen in the left panel of Figure 5, across middle school, students' grades remained relatively stable ($b = 0.01$, *ns*). Consistent with other transition studies, immediately after transitioning to high school, students' grades declined significantly ($W = 84.0$, $p < .001$, $d = .21$), and they continued to decline across 9th and 10th grades ($b = -0.07$, $p < .001$).

For absences, as shown in the right panel of Figure 5, change in students' total absences across middle school was observed to be cubic, with higher absences in the spring semesters than in the fall semesters of 7th and 8th grades ($b = 0.56$, $p < .001$). Absences did not change significantly across the transition to high school ($W = 2.35$, *ns*), but in high school, there was a substantial increase in total absences, with quadratic growth indicating accelerated increase by spring of 10th grade ($b = 1.01$, $p < .001$).

To summarize, the analyses of unconditional models revealed different trajectories for the school climate, psychological adjustment, and academic outcomes across the transition to high school, with most trajectories underscoring the challenges of the high school transition in comparison to middle school experiences. For school climate, students liked school more over middle school and across the transition; however, with more experience in 9th and 10th grades, reported school liking declined significantly. Feelings of loneliness also increased across the first 2 years of high school. At the same time, students' grades were declining across those years and their school absences were increasing. In the next set of analyses, we examine how these average trajectories were affected by individual and school structural characteristics.

Effects of Individual and School Structural Characteristics

The second set of piecewise growth models included covariates that were phase independent (i.e., participant gender, ethnicity) and phase specific (i.e., school structure variables; see Figure 2).

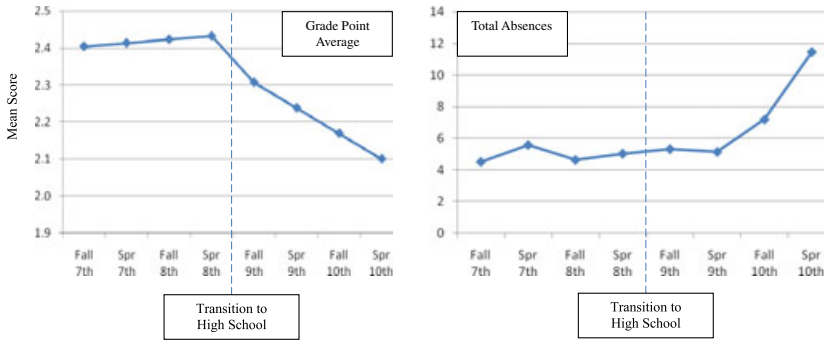

Figure 5. Change in grade point average and total absences across middle school (fall 7th–spring 8th), the transition to high school (spring 8th–fall 9th), and high school (fall 9th–spring 10th) based on estimated means.

For the first phase, school structural covariates (i.e., values for size, SES, ethnic diversity) were specific to students' middle schools; in the second phase of the model, school structure covariates were specific to students' high schools. The piecewise models with covariates yielded coefficients that documented the effects of each covariate on the intercept, slope, and quadratic factors. We also examined whether the covariates influenced students' immediate experiences of the transition, first testing a model where the covariate influences were free to vary across the two intercepts for a given outcome and then testing a model in which the covariate influences on the two intercepts were held constant. A chi-square difference test was computed to determine whether this constraint caused a significant decline in model fit. Covariate influences were constrained for a single covariate at a time in order to determine exactly which covariates influenced students' immediate transition experiences.

Results of covariate influences on the six outcomes are presented first for individual-level covariates and then for school-level covariates. All results are net the influence of all other relationships in the model. All growth models with individual- and school-level covariates fit the data well. Model fit statistics are presented in Table 4. A summary of results appears in the Appendix.

Table 4
Summary of Growth Models With Individual- and School-Level Covariates for Perceptions of School Climate, Psychological Functioning, and Academic Behaviors

	Chi-square			
	Chi-square value (*df*)	*p* value	CFI	RMSEA
Perceptions of school climate				
School liking	207.7 (130)	.001	.985	.017
School belonging	182.1 (119)	.001	.985	.016
Psychological functioning				
Anxiety	212.8 (150)	.001	.990	.015
Loneliness at school	195.9 (130)	.001	.988	.016
Academic behaviors				
Attendance	1,094.0 (69)	.001	.832	.087
GPA	611.9 (150)	.001	.961	.039

Note. CFI = comparative fit index; RMSEA = root mean square error of approximation; GPA = Grade point average. Degrees of freedom vary due to whether the model includes quadratic growth (i.e., school liking, loneliness at school, absences) or cubic growth (absences), whether variance of quadratic and cubic growth factors were set to 0 (absences), and the number of time points included in the growth model (i.e., school belonging includes only three time points across middle school).

Individual-Level Covariates

Gender. Girls liked school significantly more than boys at the end of middle school ($b = 0.23$, $p < .001$) and the beginning of high school ($b = 0.13$, $p < .001$), and they expressed stronger feelings of school belonging than boys both at the end of middle school ($b = 0.16$, $p < .001$) and at the beginning of high school ($b = 0.08$, $p < .05$). Whereas both girls and boys increased in their liking of school from spring of eighth grade to fall of ninth grade, boys increased at a faster rate, $\Delta\chi^2(1) = 9.1$, $p < .01$. Although girls generally expressed more positive feelings than boys about school climate, they tended to experience more difficulties in their psychological adjustment. Girls reported more anxiety than boys both at the end of middle school ($b = 0.10$, $p < .01$) and the beginning of high school ($b = 0.13$, $p < .001$). Similar findings emerged for loneliness. As students transitioned from middle to high school, boys maintained relatively low levels of loneliness, whereas girls increased in loneliness from spring of eighth to fall of ninth grade, $\Delta\chi^2(1) = 6.4$, $p < .05$. Relatedly, girls' feelings of loneliness were higher than boys at the beginning of high school ($b = 0.06$, $p < .05$).

Gender differences also emerged in adolescents' academic behaviors, with girls performing better academically overall but experiencing more difficulties across the transition. Specifically, girls earned higher grades at the end of middle school ($b = 0.37$, $p < .001$) and the beginning of high school ($b = 0.29$, $p < .001$). However, across the immediate transition to high school, girls experienced greater declines in GPAs than their male peers, $\Delta\chi^2(1) = 5.5$, $p < .05$. Moreover, results for high school indicate that although both girls and boys had declining GPAs across high school, girls declined at a faster rate than their male peers ($b = -0.05$, $p < .01$). No gender differences emerged for total absences.

Race/ethnicity. For all ethnicity analyses, the reference group was White adolescents. All racial/ethnic groups were sufficiently large to detect group differences (see Muthén & Curran, 1997, for discussion of power in growth models). In rating their school climates, African American and Asian students reported liking school more in the spring of eighth grade than White students (*b*s = 1.03 and 1.01, $p < .05$ for African American and Asian students, respectively). For school belonging, in the fall of ninth grade, African American students expressed less school belonging than White students ($b = -0.90$, $p < .05$). No other racial/ethnic differences emerged for either school liking

or belonging. For psychological functioning, racial/ethnic differences emerged in the trajectory of loneliness across the high school transition. Whereas White students remained relatively stable in their feelings of loneliness from spring of eighth to fall of ninth grade, both African American, $\Delta\chi^2(1) = 4.6$, $p < .05$, and Asian students, $\Delta\chi^2(1) = 6.8$, $p < .01$, reported more loneliness immediately following the transition to high school.

For academic behaviors, racial/ethnic differences across the transition are consistent with the more general literature on the achievement gap. African American ($b = -1.53$, $p < .01$), Latino ($b = -1.36$, $p < .05$), and biracial/multiethnic students ($b = -1.19$, $p < .001$) earned lower GPAs than White students in spring of eighth grade. Whereas White students maintained their high grades in school from spring of eighth grade to fall of ninth grade, African American, $\Delta\chi^2(1) = 6.4$, $p < .05$, and Latino students, $\Delta\chi^2(1) = 6.9$, $p < .01$ experienced significant declines over the transition.

In relation to school absences and compared to their White peers, African American students had more absences ($b = 1.79$, $p < .01$) and Asian students had fewer absences ($b = -1.43$, $p < .05$) in spring of eighth grade. Across the transition, Latino students' absences increased whereas White students' absences declined, $\Delta\chi^2(1) = 4.6$, $p < .05$. At the beginning of high school, African American ($b = 3.29$, $p < .001$), Latino ($b = 1.52$, $p < .01$), and biracial/multiethnic students ($b = 1.70$, $p < .05$) had more absences than White students. Finally, during high school, although all students experienced substantial increases in their total absences, African American and biracial/multiethnic students' increases were significantly higher than White students ($b = 0.90$, $p < .01$ and $b = 0.67$, $p < .05$ for African American and biracial/multiethnic students, respectively).

Ethnic incongruence. As previously described, students were classified as incongruent if their congruence change scores were 1 *SD* below the mean; these students experienced substantial declines in the percentage of same-ethnicity peers over the transition. Students whose change scores did not exceed 1 *SD* below the mean were classified as congruent; these congruent students did not experience a large, negative shift in same-ethnicity peers as they transitioned from middle to high school. Preliminary analyses revealed that only African American and Latino students varied on the incongruence variable (i.e., no White or Asian students were incongruent, and congruence scores could not be calculated for biracial/multiethnic students). Further analyses including ethnic incongruence as a covariate were conducted separately for African American and Latino students.

Ethnic incongruence exerted a strong influence on adolescents' school liking and belonging across the immediate experience of the transition and across the first 2 years of high school. As shown in the left panel of Figure 6, from spring of 8th grade to fall of 9th grade, incongruent African American students experienced substantial declines in their feelings of school belonging, whereas congruent African American students' school belonging remained relatively stable across the transition, $\Delta\chi^2(1) = 13.5$, $p < .001$. Similar findings emerged in differences between congruent and incongruent Latino students, $\Delta\chi^2(1) = 5.3$, $p < .05$ (see the right panel of Figure 6). Relatedly, incongruent students reported less school belonging in the fall of 9th grade than congruent students ($b = -0.41$, $p < .001$ and $b = -0.35$, $p < .01$ for African American and Latino students, respectively). Consistent with this trend, incongruent African American students expressed less school liking in the fall of 9th grade than congruent African American students ($b = -0.28$, $p < .01$). However, the advantages of congruency appeared to dissipate over time in that congruent African American students experienced

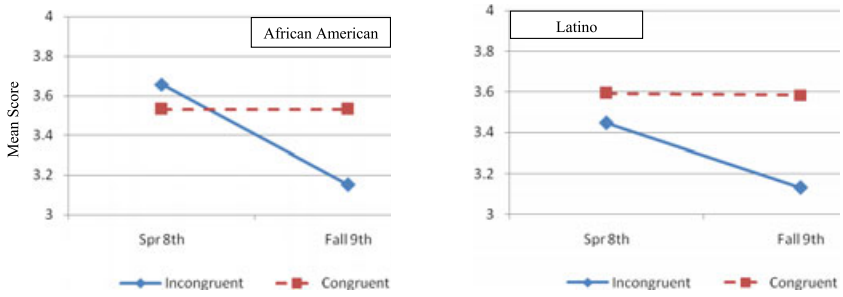

Figure 6. Change in school belonging across the transition to high school (spring 8th–fall 9th) by incongruence for African American and Latino students based on estimated means.

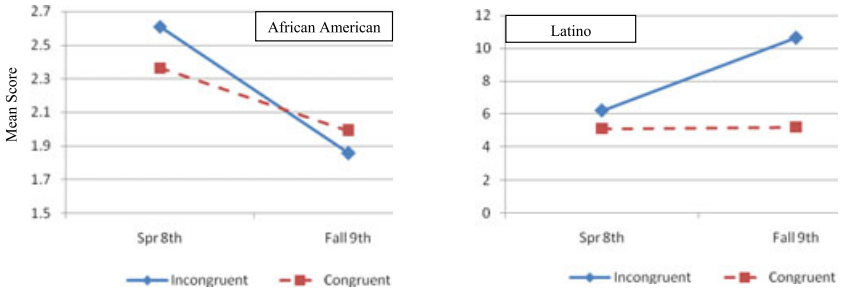

Figure 7. Change in grade point average (for African American students) and school absences (for Latino students) across the transition to high school (spring 8th–fall 9th) by incongruence based on estimated means.

a steeper decline in school liking across 9th and 10th grades than did their incongruent peers ($b = 0.32$, $p < .01$).

Incongruence had no effect on students' anxiety or loneliness at school, but it did influence academic behaviors. For students' grades, across the immediate transition to high school, incongruent African American students experienced substantial declines in GPAs, whereas congruent African American students' GPAs declined only slightly, $\Delta\chi^2(1) = 8.1$, $p < .01$ (see the left panel of Figure 7). Relatedly, incongruent African American students had lower GPAs in fall of ninth grade as compared to congruent African American students ($b = -0.25$, $p < .05$). Incongruence was not related to Latino students' grades in school.

In contrast, an examination of students' total absences revealed that incongruence was problematic for Latino students (see the right panel of Figure 7). In particular, across the immediate transition to high school, incongruent Latino students' absences increased significantly, whereas congruent Latino students' absences remained relatively stable, $\Delta\chi^2(1) = 19.2$, $p < .001$. Incongruent Latino students also had significantly higher absences than their congruent peers in the fall of ninth grade ($b = 4.83$, $p < .001$). Incongruence was unrelated to African American students' pattern of absences. Thus within each ethnic group, incongruent students experienced more academic challenges than congruent students, although the type of challenge (grades vs. attendance) was different for the two ethnic groups.

In summary, the inclusion of individual-level covariates sheds new light on which groups might be particularly challenged by the high school transition (see the Appendix). Somewhat unexpectedly, girls seemingly had more adjustment difficulties than boys. Girls felt more lonely and anxious across the transition, and their grades declined faster, despite the fact that they exhibited better achievement than boys during middle school. Ethnicity per se affected achievement across the transition, with African American and Latino students generally performing more poorly than White students. Ethnic incongruence, representing the interaction between ethnicity and school ethnic composition, had negative effects on school climate (belonging and liking) and academic achievement for African American and Latino students.

School Structural Characteristics

We also examined the influence of three school structural variables—school SES, size, and ethnic diversity. No school structural characteristics influenced adolescents' anxiety or loneliness at school, and in general there were fewer effects of school structural covariates as compared to individual-level covariates.

School size. Overall, transitioning to larger schools was detrimental to student outcomes. Increasing school size from middle to high school was associated with declining feelings of school belonging across the transition, $\Delta\chi^2(1) = 6.6$, $p < .01$, and students in larger high schools expressed less feelings of school belonging in fall of 9th grade than those in smaller high schools ($b = -0.01$, $p < .01$). Students' grades in fall of 9th grade were also lower in larger schools ($b = -0.01$, $p < .05$). In relation to absences, although all students experienced substantial increases in their total absences by the spring of 10th grade, this increase was significantly higher for students in larger high schools ($b = 0.04$, $p < .001$).

School SES. As the difference in SES between the sending and receiving school increased (i.e., the more affluent the high school was in comparison to the middle school), the greater the decline in students' GPAs from spring of eighth grade to fall of ninth grade, $\Delta\chi^2(1) = 39.2$, $p < .001$. For school absences, however, as school SES increased from

middle to high school, the greater the decline in absences across the transition, $\Delta\chi^2(1) = 7.1$, $p < .01$. Students in higher SES schools also had fewer absences in the fall of ninth grade than students in lower SES schools ($b = -0.45$, $p < .001$) and had lower and more stable absences across high school ($b = -0.18$, $p < .001$).

School ethnic diversity. As students transitioned to high schools that were increasingly more diverse than their middle schools, students' school belonging across the transition increased, $\Delta\chi^2(1) = 4.0$, $p < .05$. Yet, increasing school ethnic diversity across the transition was associated with greater declines in grades from spring of 8th grade to fall of 9th grade, $\Delta\chi^2(1) = 10.6$, $p < .01$. For school absences, however, as school diversity increased, the substantial increase observed in student absences by spring of 10th grade was attenuated ($b = 0.19$, $p < .05$).

In summary, as school-level SES and ethnic diversity increased across the transition, students' grades declined, but their absences also decreased. Growth in school size, however, was associated with lower grades and increased absences. Smaller and more ethnically diverse schools also promoted more feelings of belonging.

Discussion

This study places the transition to high school in a larger developmental context, an important addition to existing transition research that typically only documents short-term transition effects. Adolescents in the current study were doing well in their middle schools, and it is within this positive developmental context that the transition to high school occurred. Perhaps due to the novelty of the new school context, immediately after the transition adolescents liked their high schools more than their middle schools. Yet entry into this new school setting was not wholly positive. The adolescents in this study transitioned to large urban schools, unfamiliar settings that were quite possibly more turbulent and less supportive than their smaller and more intimate middle schools (Baker et al., 2001; Weiss, 2001). Perhaps reflective of these differences, adolescents were both lonelier and more anxious immediately following the transition. They also struggled more academically, consistent with the shifting academic demands associated with moving to high school (Baker et al., 2001).

Navigating the urban high school settings did not get particularly easier with time. Students felt increasingly lonely across the first 2 years of high school, and the higher levels of anxiety they experienced across the transition did not diminish with time. Academically, grades continued to decline, and absences increased. And the honeymoon with liking high school more than middle school quickly disappeared, as adolescents' reports of school liking decreased steadily across 9th and 10th grades. As a whole, these results suggest that the high school transition experience negatively altered the positive academic and psychosocial life course trajectories observed in middle school.

Modeling the individual- and school-level covariates enriched our understanding of these general developmental patterns. In some respects, girls appeared to have more difficulty with the transition than boys. Girls felt lonelier and more anxious across the transition than did boys, and even though they were doing better academically overall, their GPAs in 9th and 10th grades declined more rapidly than did those of their male peers. This is consistent with previous high school transition studies that documented greater psychological distress for girls (Finn & Rock, 1997; Lee & Smith, 1995; Russell et al., 1997). Cross-sectional research on middle and high school students using data from the National Study of Adolescent Health also reports that girls experience more emotional struggles than boys in high school as compared to middle school (Johnson, Crosnoe, & Elder, 2001). We suspect that girls' mean-level achievement advantages over boys may mask the mental health challenges brought on by worrying about both the academic demands of high school and the social pressure to establish a new peer group. The piecewise modeling of life course trajectories both pre- and posttransition provides a richer picture of the ebbs and flows of the transition process for the two gender groups than do mean comparisons between girls and boys at specific pre- and posttransition time points.

Ethnicity and Person–Context Interactions

The most compelling findings regarding ethnicity in this study had less to do with ethnic differences per se in transition experiences than with person–context interactions, where context was defined by changes in the numerical representation of one's ethnic group from middle school to high school. Our results indicate that the transition was more stressful when African American and Latino students transitioned to high schools where there were significantly fewer same-ethnicity peers.

These incongruent African American and Latino students, on average, experienced a 36% decline in the representation of their group across the high school transition (range = −22% to −66%). The transformation that we used in calculating incongruence also placed more weight on congruence change scores at the middle of the distribution (e.g., percent same-ethnicity peers declining from 55% to 35%) than at either extreme (e.g., declines from 95% to 75% or from 35% to 15%). This transformation, we argue, is more contextually sensitive, recognizing the particular challenge of moving from the numerical majority to the numerical minority as compared to, for example, declining but remaining in the numerical majority.

Both African American and Latino students in the incongruent group experienced decreased feelings of belonging after the transition compared to their congruent same-ethnicity peers, and African American incongruent students also liked school less. The academic challenges of the transition also were exacerbated in both incongruent groups: grades declined more steeply for African American incongruents, and absences increased more steeply for Latino incongruents. It is noteworthy that the social ties impacted by ethnic incongruence relate more to perceived school climate (i.e., belonging, liking) than to intrapersonal adjustment (i.e., loneliness, anxiety). Feelings of belonging in particular, more so than general mental health, capture social adaptation at school and establishment of positive social ties (finding one's niche and fitting in), a process that is more likely to be influenced by ethnic incongruence.

Because ethnic incongruence signals a mismatch between the social context of the departing and receiving school, the transition disruptions that incongruent students experienced are consistent with the larger school transition literature on developmental mismatch (see Eccles, 2004). However, declining ethnic representation, or moving from being a majority to minority group member, also underscores the importance of a ''critical mass'' of same-ethnicity peers in any school context to ease the challenges of finding one's niche and fitting in. What that critical mass might be was of interest to developmental researchers in the early school desegregation literature (e.g., Schofield & Sagar, 1983; St. John, 1975), and it continues to be part of the public discourse on both affirmative action in higher education and race-conscious policies in the assignment of K–12 students to schools (National Research Council, 2007). For example, it has been suggested that any ethnic group should be at least 15% of the school population to mitigate the isolation and vulnerability to out-group hostility that sometimes accompanies minority status (e.g., National Research Council, 2007). Our findings suggest that it is not only absolute levels of ethnic group representation that need to be considered, but also *changes* in those levels across critical school transitions.

The negative transition experiences of African American and Latino incongruent students documented in the current study may serve as a precursor to later educational challenges. The life course perspective suggests that transition experiences have the potential to alter life course trajectories, particularly in relation to cumulating disadvantage (Elder, 1998). It may be that the disruptions across the transition due to ethnic incongruence are a risk factor for well-documented challenges in high school that African American and Latino students encounter, including higher dropout and lower graduation rates (Laird, DeBell, & Chapman, 2006; Orfield, Losen, Wald, & Swanson, 2004). Future research should explore whether transition disruptions experienced by these student populations do indeed exert effects on more distal educational outcomes.

School Characteristics and Transition Experiences

In addition to examining person–context interactions through ethnic incongruence, we used a complimentary method to examine ethnicity in context, namely, schools' ethnic diversity, which takes into account both the number of ethnic groups represented and the relative proportions of each ethnic group. Whereas ethnic incongruence examines the match between the person and the environment, school diversity focuses solely on the structural characteristics of the environments in which students are embedded. The effects of school ethnic diversity and other school-level covariates were only modest once we accounted for the individual-level covariates. School size, SES, and ethnic diversity related primarily to academic outcomes rather than social ties, and the relations were not surprising. For example, the negative association between increases in school diversity from middle school to high school and GPA may be, in part, attributable to higher academic standards in these more diverse schools; in the current sample, school diversity was highly correlated with school-level performance on the Academic Performance Index (API), a school-wide aggregate of performance on California's statewide assessment program (r = .63 and .70 for

the middle and high school levels, respectively). School SES and API were also highly correlated (r = .81 and .67 for the middle and high school levels, respectively), which may partly explain why increases in school SES were associated with both higher grades and lower absences across the transition.

Although the school-level covariates did a reasonable job of differentiating students' immediate experiences of the transition, they provided almost no illumination of students' trajectories across high school. Other studies of high school outcomes that include both individual- and school-level covariates also find relatively little impact of between-school differences (e.g., Johnson et al., 2001). It may be that the critical variables for understanding adolescents' high school trajectories are not specific to the school ecology, the primary context examined in the current study. Instead, out-of-school factors such as involvement in romantic relationships, after-school employment, contact with the juvenile justice system, or other relevant factors not assessed here may be more critical for understanding adolescents' outcomes across high school. As such, the link between adolescents' out-of-school experiences and their in-school adaptation—in other words, the multiple and interrelated contexts in which they function—is an important topic for future research (for examples, see Benner, Graham, & Mistry, 2008; Cook, Herman, Phillips, & Settersten, 2002).

Strengths, Caveats, and Limitations

Several design features contributed to the strength of the current study. Whereas previous studies of the high school transition typically used only two time points and studied primarily academic adjustment, we utilized eight time points, four in middle school and four in high school, and we included previously understudied constructs (i.e., school climate, psychological functioning), all of which were affected by the high school transition. Piecewise growth modeling for both middle and high school allowed us to explore whether any observed changes across time were linear or nonlinear and to determine how time-varying and time-invariant individual- and school-level covariates influenced students' transitions.

Although we believe that the current study makes a significant contribution to the high school transition literature, some limitations and caveats should be noted. First, these findings are specific to the urban sample from which the data were drawn. The sample is not nationally representative, and it must be acknowledged that adolescents in suburban or rural areas may have different high school transition experiences. Also, there were no incongruent White and Asian students in our sample, so we do not know whether decreases in the numerical representation of one's ethnic group from one school context to another have the same disruptive effects on racial/ethnic groups that enjoy higher societal status and that achieve better educational outcomes. Additionally, the current study does not take into account the transition supports that districts or schools may be implementing. Although previous studies have found some evidence of the success of high school transition programming (Felner, Ginter, & Primavera, 1982; Smith, 1997), school and district data regarding transition interventions were not readily available for the current sample. Finally, we modeled trajectories of school climate, psychological adjustment, and academic achievement in separate analyses. We did this because we were primarily interested in the effects of individual and school covariates on these specific outcomes and because we were introducing a relatively new method for examining change across an important transition. We conducted a total of 12 analyses (2 per variable of interest), and we acknowledge the possibility that multiple models can lead to observing noneffects (i.e., Type I errors). However, to the extent that the changes we observed across the transition and in the larger developmental context were consistent with the life course perspective and our theoretical expectations, our confidence in our findings is strengthened. We also recognize that changes in perceived school climate, psychological adjustment, and academic outcomes are interrelated in complex ways, and we believe that the analyses presented here are needed first steps for unraveling that complexity.

Directions for Future Research

Much of adolescents' high school transition experiences remain to be explored. Future research should confirm that the trajectories observed in the current study are attributable to school transitions rather than a normative developmental pattern of late adolescence. Simmons and Blyth (1987) used differences in students' school feeder pattern structures to verify that the negative developmental outcomes they observed across the middle school transition were attributable to students' transition experiences rather than to normative adolescent

development. We suggest a similar strategy for future exploration of the high school transition. In addition to verifying the transition effect, exploration of the social timing of the high school transition should also be explored. Whether off-time students, for example, those who experience earlier retention in grade and are thus above age for the transition to high school, exhibit more transition challenges than those making an on-time transition remains a question for future study.

The study of school processes, in addition to school structural variables, that may ease disruptions is also a ripe area for future inquiry. The life course perspective posits that individuals share linked lives, an interdependence that influences how individuals adjust to life transitions (Elder, 1998). One operationalization of linked lives may be in the relationships between teachers and students across the transition. For example, we know that the high school transition is accompanied by less personal student–teacher relationships (Reyes et al., 1994; Seidman et al., 1996). However, if students are able to form close relationships with a teacher early in ninth grade, this might buffer some of the negative effects and bolster some of the positive effects of the transition. In addition, school organizational features, such as academic detracking, and extracurricular activities that increase the mixing opportunities of students from different ethnic groups are likely to enhance intergroup relations and improve feelings of belonging of all students (see Moody, 2001).

Although we adopted the life course perspective as the theoretical framework for our research, we acknowledge that other life-span approaches to development in ethnically diverse youth are also present in the developmental literature. The phenomenological variant of ecological systems theory (PVEST) developed by Spencer and colleagues offers a particularly rich analysis of context, culture, and how ethnic minority youth negotiate both normative and nonnormative developmental challenges (for review, see Spencer, 2006). Studies of the high school transition that focus on the developmental processes most central to PVEST would be a welcome addition to the transition literature.

Finally, and perhaps most importantly, future research should explore how adolescents' experiences of the transition to high school affect their later outcomes. Life-span approaches suggest that the ways in which individuals negotiate transitions can affect their subsequent life course trajectories. As such, it is critical to determine how students' transition experiences influence more distal educational outcomes, including performance on high school exit exams and other markers of successful high school completion.

References

Aikins, J. W., Bierman, K. L., & Parker, J. G. (2005). Navigating the transition to junior high school: The influence of pre-transition friendship and self-system characteristics. *Social Development*, *14*, 42–60.

Alexander, K. L., Entwisle, D. R., Blyth, D. A., & McAdoo, H. P. (1988). Achievement in the first two years of school: Patterns and processes. *Monographs of the Society for Research in Child Development*, *53*, 1–157.

Alspaugh, J. W. (1999). *The interaction effect of transition grade to high school with gender and grade level upon drop-out rates*. Paper presented at the American Educational Research Association. Montreal, Canada.

Arbuckle, J. L. (1996). Full information estimation in the presence of incomplete data. In G. A. Marcoulides & R. E. Schumacker (Eds.), *Advanced structural equation modeling: Issues and techniques* (pp. 243–277). Mahwah, NJ: Erlbaum.

Asher, S. R., & Wheeler, V. A. (1985). Children's loneliness: A comparison of rejected and neglected peer status. *Journal of Consulting and Clinical Psychology*, *53*, 500–505.

Baker, J. A., Derrer, R. D., Davis, S. M., Dinklage-Travis, H. E., Linder, D. S., & Nicholson, M. D. (2001). The flip side of the coin: Understanding the school's contribution to dropout and completion. *School Psychology Quarterly*, *16*, 406–426.

Barber, B. K., & Olsen, J. A. (2004). Assessing the transitions to middle and high school. *Journal of Adolescent Research*, *19*, 3–30.

Benner, A. D., & Graham, S. (2007). Navigating the transition to multi-ethnic urban high schools: Changing ethnic congruence and adolescents' school related affect. *Journal of Research on Adolescence*, *17*, 207–220.

Benner, A. D., Graham, S., & Mistry, R. S. (2008). Discerning direct and mediated effects of ecological structures and processes on adolescents' educational outcomes. *Developmental Psychology*, *44*, 840–854.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

Cook, T., Herman, M., Phillips, M., & Settersten, R. (2002). Some ways in which neighborhoods, nuclear families, friendship groups, and schools jointly affect changes in early adolescent development. *Child Development*, *73*, 1283–1309.

Crosnoe, R., & Huston, A. C. (2007). Socioeconomic status, schooling, and the developmental trajectories of adolescents. *Developmental Psychology*, *43*, 1097–1110.

Eccles, J. S. (2004). Schools, academic motivation, and stage-environment fit. In R. M. Lerner & L. Steinberg (Eds.), *Handbook of adolescent psychology* (pp. 125–153). Hoboken, NJ: Wiley.

Eccles, J. S., Lord, S., & Midgley, C. (1991). What are we doing to early adolescents? The impact of educational

contexts on early adolescents. *American Journal of Education*, *99*, 521–542.

Elder, G. H. (1985). Perspectives on the life course. In G. H. Elder (Ed.), *Life course dynamics: Trajectories and transitions, 1968–1980* (pp. 23–49). Ithaca, NY: Cornell University Press.

Elder, G. H. (1998). The life course as developmental theory. *Child Development*, *69*, 1–12.

Enders, C. K. (2001). The performance of the full information maximum likelihood estimator in multiple regression models with missing data. *Educational and Psychological Measurement*, *61*, 713–740.

Entwisle, D. R., & Alexander, K. L. (2002). The first grade transition in life course perspective. In J. Mortimer & M. Shanahan (Eds.), *Handbook of the life course* (pp. 229–250). New York: Kluwer Academic/Plenum.

Felner, R. D., Ginter, M., & Primavera, J. (1982). Primary prevention during school transitions: Social support and environmental structure. *American Journal of Community Psychology*, *10*, 277–290.

Finn, J. D., & Rock, D. A. (1997). Academic success among students at risk for school failure. *Journal of Applied Psychology*, *82*, 221–234.

French, S. E., Seidman, E., Allen, L., & Aber, J. L. (2000). Racial/ethnic identity, congruence with the social context, and the transition to high school. *Journal of Adolescent Research*, *15*, 587–602.

George, L. K. (1993). Sociological perspectives on life transitions. *Annual Review of Sociology*, *19*, 353–373.

Gottfredson, G. (1984). *Effective School Battery*. Odessa, FL: Psychological Assessment Resources.

Gray-Little, B., & Carels, R. (1997). The effect of racial dissonance on academic self-esteem and achievement in elementary, junior high, and high school students. *Journal of Research on Adolescence*, *7*, 109–131.

Gutman, L. M., & Eccles, J. S. (2007). Stage-environment fit during adolescence: Trajectories of family relations and adolescent outcomes. *Developmental Psychology*, *43*, 522–537.

Isakson, K., & Jarvis, P. (1999). The adjustment of adolescents during the transition into high school: A short term longitudinal study. *Journal of Youth and Adolescence*, *28*, 1–26.

Johnson, M., Crosnoe, R., & Elder, G. (2001). Students' attachment and academic engagement: The role of race and ethnicity. *Sociology of Education*, *74*, 318–340.

KewalRamani, A., Gilbertson, L., Fox, M., & Provasnik, S. (2007). *Status and trends in the education of racial and ethnic minorities (NCES 2007-039)*. Washington, DC: National Center for Education Statistics.

Kinney, D. A. (1993). From nerds to normals: The recovery of identity among adolescents from middle school to high school. *Sociology of Education*, *66*(1), 21–40.

La Greca, A. M., & Lopez, N. (1998). Social anxiety among adolescents: Linkages with peer relations and friendships. *Journal of Abnormal Child Psychology*, *26*, 83–94.

Laird, J., DeBell, M., & Chapman, C. (2006). *Dropout rates in the United States: 2004 (NCES 2007-024)*. Washington, DC: National Center for Education Statistics.

Lee, V. E., & Smith, J. B. (1995). Effects of high school restructuring and size on early gains in achievement and engagement. *Sociology of Education*, *68*, 241–270.

McCartney, K., Bub, K. L., & Burchinal, M. (2006). VI. Selection, detection, and reflection. *Monographs of the Society for Research in Child Development*, *71*, 105–126.

Moody, J. (2001). Race, school integration, and friendship segregation in America. *American Journal of Sociology*, *107*, 679–716.

Murdock, T. B., Anderman, L. H., & Hodge, S. A. (2000). Middle-grade predictors of students' motivation and behavior in high school. *Journal of Adolescent Research*, *15*, 327–351.

Muthén, B. O., & Curran, P. J. (1997). General longitudinal modeling of individual differences in experimental designs: A latent variable framework for analysis and power estimation. *Psychological Methods*, *2*, 371–402.

Muthén, L. K., & Muthén, B. O. (1998–2006). *Mplus user's guide* (4th ed.). Los Angeles: Muthén & Muthén.

National Research Council. (2007). *Race conscious policies for assigning students to schools: Social science research and the Supreme Court cases*. Washington, DC: National Academy Press.

Orfield, G., & Lee, C. (2005). *Why segregation matters: Poverty and educational inequality*. Cambridge, MA: The Civil Rights Project at Harvard University.

Orfield, G., Losen, D., Wald, J., & Swanson, C. B. (2004). *Losing our future: How minority youth are being left behind by the graduation rate crisis*. Cambridge, MA: The Civil Rights Project at Harvard University.

Reyes, O., Gillock, K. L., & Kobus, K. (1994). A longitudinal study of school adjustment in urban, minority adolescents: Effects of a high school transition program. *American Journal of Community Psychology*, *22*, 341–369.

Roderick, M. (2003). What's happening to the boys? Early high school experiences and school outcomes among African American male adolescents in Chicago *Urban Education*, *38*, 538–607.

Roeser, R. W., Eccles, J. S., & Freedman-Doan, C. (1999). Academic functioning and mental health in adolescence: Patterns, progressions, and routes from childhood. *Journal of Adolescent Research*, *14*, 135–174.

Rudolph, K. D., Lambert, S. F., Clark, A. G., & Kurlakowsky, K. D. (2001). Negotiating the transition to middle school: The role of self-regulatory processes. *Child Development*, *72*, 929–946.

Russell, S. T., Elder, G. H., & Conger, R. D. (1997). *School transitions and academic achievement*. Paper presented at the American Sociological Association. Toronto, Canada.

Rutter, M. (1996). Transitions and turning points in developmental psychopathology: As applied to the age span between childhood and mid-adulthood. *International Journal of Behavioral Development*, *19*, 603–626.

Schiller, K. S. (1999). Effects of feeder patterns on students' transition to high school. *Sociology of Education*, *72*, 216–233.

Schofield, J., & Sagar, H. (1983). Desegregation, school practices, and student race relations. In C. Rossell &

W. Hawley (Eds.), *The consequences of school desegregation* (pp. 58–102). Philadelphia: Temple University Press.

Schulenberg, J., & Maggs, J. (2002). A developmental perspective on alcohol use and heavy drinking during adolescence and the transition to young adulthood. *Journal of Studies on Alcohol*, *63*, 54–70.

Seidman, E., Aber, L. J., Allen, L., & French, S. E. (1996). The impact of the transition to high school on the self-esteem and perceived social context of poor urban youth. *American Journal of Community Psychology*, *24*, 489–515.

Seidman, E., Allen, L., Aber, J. L., Mitchell, C., & Feinman, J. (1994). The impact of school transitions in early adolescence on the self system and perceived social context of poor urban youth. *Child Development*, *65*, 507–522.

Simmons, R. G., & Blyth, D. A. (1987). *Moving into adolescence: The impact of pubertal change and school context*. Hawthorn, NY: Aldine.

Simmons, R. G., Burgeson, R., Carlton-Ford, S., & Blyth, D. A. (1987). The impact of cumulative change in early adolescence. *Child Development*, *58*, 1220–1234.

Simpson, E. H. (1949). Measurement of diversity. *Nature*, *163*, 688.

Smith, J. B. (1997). Effects of eighth-grade transition programs on high school retention and experiences. *Journal of Educational Research*, *90*, 144–170.

Spencer, M. B. (2006). Phenomenology and ecological systems theory: Development of diverse groups. In R. Lerner & W. Damon (Eds.), *Handbook of child psychology* (pp. 829–893). Hoboken, NJ: Wiley.

St. John, N. (1975). *School desegregation: Outcomes for children*. New York: Wiley.

Weiss, C. C. (2001). Difficult starts: Turbulence in the school year and its impact on urban students' achievement. *American Journal of Education*, *109*, 196–227.

Appendix

Summary of Piecewise Growth Models for Perceptions of School Climate, Psychological Functioning, and Academic Behaviors—Models With Covariates

	Spring 8th (*b*)	Change across transition ($\Delta\chi^2$)	Fall 9th (*b*)	Change across high school (*b*)
School liking				
Gender	girls > boys	boys > girls	girls > boys	*ns*
Race/ethnicity	Afr Amer > White Asian > White	*ns*	*ns*	*ns*
Incongruence	*ns*	*ns*	aa: incongr < congr	aa: incongr > congr
School size	*ns*	*ns*	*ns*	*ns*
School SES	SES ↑ like ↓	*ns*	*ns*	*ns*
Diversity (diver)	*ns*	*ns*	*ns*	*ns*
School belonging				
Gender	girls > boys	*ns*	girls > boys	*ns*
Race/ethnicity	*ns*	*ns*	Afr Amer < White	*ns*
Incongruence	*ns*	aa: incongr < congr la: incongr < congr	aa: incongr < congr la: incongr < congr	aa: incongr > congr
School size	*ns*	*ns*	size ↑ belong ↓	*ns*
School SES	*ns*	*ns*	*ns*	*ns*
Diversity (diver)	*ns*	diver ↑ belong ↑	*ns*	*ns*
Anxiety[a]				
Gender	girls > boys	*ns*	girls > boys	*ns*
Race/ethnicity	*ns*	*ns*	*ns*	*ns*
Loneliness[a]				
Gender	*ns*	girls > boys	girls > boys	*ns*
Race/ethnicity	*ns*	Afr Amer > White Asian > White	*ns*	*ns*
Absences (abs)				
Gender	*ns*	*ns*	*ns*	*ns*
Race/ethnicity	Afr Amer > White Asian < White	Latino > White	Afr Amer > White Latino > White Biracial > White	Afr Amer > White Biracial > White
Incongruence	*ns*	la: incongr > congr	la: incongr > congr	*ns*
School size	*ns*	*ns*	*ns*	size ↑ abs ↑
School SES	*ns*	SES ↑ abs ↓	SES ↑ abs ↓	SES ↑ abs ↓
Diversity (diver)	*ns*	*ns*	*ns*	diver ↑ abs ↓

Continued

Appendix
Continued

	Spring 8th (*b*)	Change across transition ($\Delta\chi^2$)	Fall 9th (*b*)	Change across high school (*b*)
Grades in school (GPA)				
Gender	girls > boys	boys > girls	girls > boys	boys > girls
Race/ethnicity	Afr Amer < White Latino < White Biracial < White	Afr Amer < White Latino < White	*ns*	*ns*
Incongruence	*ns*	aa: incongr < congr	aa: incongr < congr	*ns*
School size	*ns*	*ns*	size ↑ gpa ↓	*ns*
School SES	SES ↑ gpa ↑	SES ↑ gpa ↓	*ns*	*ns*
Diversity (diver)	diver ↑ gpa ↓	diver ↑ gpa ↓	*ns*	*ns*

Note. Afr Amer and aa = African American; la = Latino; incongr = incongruent; congr = congruent; SES = socioeconomic status; GPA = grade point average.
[a]The only covariate influences observed related to gender and race/ethnicity.