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Following Different Pathways: Social Integration, Achievement, and the Transition to High School

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Abstract

This study expands research on an academic and social turning point for adolescents, the transition to high school, by analyzing how students' level of social integration into school can affect high school academic performance. Using nationally representative data, three different pathways emerged as students transition to high school, characterized by varying amounts of disruption and opportunity for new social relationships upon entering high school. Findings suggest that elements of middle school social integration, including teacher bonding, popularity, and extracurricular participation, affect academic achievement when students enter high school. However, the association between integration into school and academic performance appears to be contingent upon the pathway students follow.

Introduction

Transitions between institutions can serve as turning points for youth (Kinney 1993; Seidman and French 2004; Weiss and Bearman 2007). Students who make a successful transition from middle school to high school are better prepared for the challenges facing them throughout their high school years. One of the most important elements of a successful school transition is academic performance; student achievement in the first year of high school affects the rest of a student's high school career (Stevenson et al. 1994). Academic success in school is more likely among students who form social relationships within the school (Coleman 1988) and are attached to the school (Finn 1989; Johnson et al. 2001). However, during the transition to high school, these attachments are reconfigured and can either provide opportunities to form new social ties in high school or, alternatively, exacerbate students' vulnerabilities if they enter high school with limited social support (Roderick 2003; Schiller 1999; Swanson and Schneider 1999).

The extent to which social relationships are maintained and reconfigured during the transition to high school depends, in part, on the district feeder pattern. Most students move between middle school and high school along prescribed feeder patterns (Myers et al. 1995; Schiller 1999) that create pathways that students follow when they transition to high school. For example, students in rural districts are often more constrained in their choices as they transition to high school since typically one middle school feeds into one high school. Other districts may be organized such that many middle schools feed into one high school. Students may also have the option to choose their pathway, attending a magnet high school or a private high school (Tice et al. 2006).

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Using new nationally representative longitudinal data, this study expands upon a large body of research that investigates the academic consequences of school transitions (Alspaugh 1998; Catterall 1998; Schiller 1999; Smith 1997) by exploring two interrelated elements of school transitions: students' social integration into schools and the pathway they follow when they make a transition to high school. Social integration is an important facet of continued persistence and success in schooling (Marcus and Sanders-Reio 2001), but students must renegotiate the social relationships they form within schools after a school transition. Furthermore, the ways that social integration changes during school transitions is in part a function of the pathway followed by students. This study investigates whether academic performance in the first year in high school is related to the pathway students follow during their school transition and how this pathway interacts with students' integration into school.

Theoretical Background

Academic Consequences of the Transition to High School

Students' grade point average (GPA) in their first year of high school is a predictor of both more rigorous course taking as well as cumulative GPA (Stevenson et al. 1994). Furthermore, it is an indication of integration into the new school environment and a student's ability to understand teachers' expectations (Schiller 1999). As students transition to high school, it is common for the GPA to decline (Barone et al. 1991; Gillock and Reyes 1996; Weiss and Bearman 2007), although evidence suggests that this decline in academic achievement is temporary for most students who are not considered at-risk (Catterall 1998; Roderick 1993).

Previous research has identified two major components of the transition to high school that help shape students' academic outcomes in the first year of high school. First, students' academic achievement after the transition to high school seems to vary depending on the institutional context of the transition (Alspaugh 1998; Felner et al. 1982; Heck et al. 2004; Schiller 1999). Second, social relationships built within the school with teachers and peers serve as a guide to students as they face school transitions (Berndt et al. 1999; Newman et al. 2000) and can influence achievement (Little and Garber 2004; Reyes et al. 1994). Exploring these facets together helps further understanding of the factors that may influence students' academic performance after a school transition.

Social Integration and the Transition to High School

Students' integration into school permeates their experience of schooling in both academic and nonacademic realms (Crosnoe et al. 2004; Finn 1989; Libbey 2004; Smerdon 2002). This integration aids with persistence in schooling and is a beneficial component to being connected to the institution of education (Finn and Voelkl 1993; Marcus and Sanders-Reio 2001). Furthermore, social integration is a key component to consider when studying transitions because it must be renegotiated after a school change.

This study explores three integral elements of middle school adolescents' social worlds that are transformed during a school transition and that may affect students' academic performance in the first year of high school: teacher bonding, popularity among middle school classmates, and middle school extracurricular participation. While previous research suggests that supportive relationships in school promote increased academic achievement (Coleman 1988), the transition to high school may provide an opportunity to remove oneself from negative reputations among teachers or damaging peer groups (Aikins et al. 2005; Harter et al. 1992; Kinney 1993; Reyes et al. 2000). In other words, social integration into school may play a distinct role in students' lives when they are making a school transition as compared to other points in adolescents' schooling.

First, bonds with middle school teachers are an important type of affective attachment for students (Croninger and Lee 2001; Rosenfeld et al. 2000); they are perhaps most useful to students because teachers can be considered institutional agents (Stanton-Salazar and Dornbusch 1995). Yet, these are also the relationships that change most dramatically during school transitions (Midgley et al. 1989; Reyes et al. 1994; Roeser et al. 1998). Second, peer relationships fluctuate in complex ways during normative school transitions as some friends are left behind and the opportunity for new friendships occurs (Cantin and Boivin 2004; Seidman et al. 1994). Popularity among peers, in particular, can be especially crucial during this stage in the life course (de Bruyn and van den Boom 2005; Milner 2004). Popularity remains established among peers following their district feeder pattern, but it must be renegotiated among students who either choose an alternate high school or enter high school with cohorts of students from other middle schools.

Finally, students become integrated into their school through extracurricular participation (Eccles and Barber 1999; Goldstein et al. 2005; Mahoney 2000; McNeal 1995). Social relationships formed within the context of extracurricular participation are institutionally based and may more easily be re-formed in students' new school. As students move between institutions, a pattern of extracurricular involvement in both the sending and receiving school may be an especially effective way to make friends because the opportunity for friendship exists as a part of the institution rather than a specific set of social relations. For all types of social integration into school, students' social relationships are transformed in potentially distinct ways depending on the pathway students follow to high school.

Pathways in the Transition to High School

Beyond students' integration into their school, the institutional context within which the transition occurs may be associated with academic achievement. Therefore, it is important to consider not only how students' contexts vary depending on their district feeder pattern but also what this signifies for students' integration into school. Taken together, the district feeder pattern and the student's experience of this feeder pattern represent the "pathways" that students follow to high school. For example, most students enter high school with the majority of their middle school classmates. Some enter high schools where their middle school is the only feeder school, while others enter high schools with multiple middle school feeders. The latter involves a very different institutional context at the receiving school for students, where they have an opportunity to form new social ties with incoming students from other middle schools. In addition, students who follow this type of pathway may have greater academic opportunity via course selection (Powell et al. 1985).

Some students deviate from their feeder pattern entirely and enter high school with few, if any, middle school classmates. These students experience the pathway in the transition to high school as a dramatic reconfiguration of middle school social ties. The ability for students to follow this pathway, however, is in some part dependent upon the availability of school choice policies (Lauen 2007; Plank et al. 1993).

Current Study

This study extends current research on school transitions by exploring the transition to high school as a pathway that may play a role in students' initial high school academic performance. In addition, this study explores whether students' social integration into schools is affected differentially depending on which pathway is followed. Three crucial elements of students' social integration into schools—bonds with teachers, status among peers, and involvement in extracurricular activities—are important to maintain across school transitions but are likely reconfigured differently depending on which pathway is followed.

As discussed above, bonding with teachers is an important part of social integration into schools, yet students' attachments to their teachers change dramatically when they are experiencing school transitions. I expect that teacher bonding will be the most salient to students who follow the prescribed feeder pattern due to "vertical teaming," curricular consistency across levels of schooling where middle school teachers play a formal role in course placement decisions and an informal role in communicating about student performance even across levels of schooling. This practice is more likely to occur in districts with more prescribed and simpler feeder patterns, such as where one middle school feeds into one high school (Anderson 2002).

Due to the importance of peer status, or popularity, during early adolescence (Milner 2004), popularity is expected to play a role in all three pathways. In particular, as students enter high school and are sorted into the social and academic structure of their new high school, popularity is hypothesized to be most salient in pathways characterized by a reorganization of students at the receiving high school (e.g., when multiple middle schools feed into one high school). In addition, students who are less popular among middle school classmates may find benefits from following an alternative pathway that removes them from their middle school peers.

Social integration into schools also occurs through extracurricular participation. This type of integration is not based on interpersonal relationships but is institutionally driven. For example, students previously involved in sports will likely try out for an athletic team in high school regardless of which school they attend, ensuring a venue for becoming integrated into the peer culture of high school despite disruption of ties with peers and teachers. Therefore, extracurricular participation is expected to be an important component for all students in the transition to high school as an avenue to recreate social integration in their new school. Finally, this study also explores whether elements of social integration differ depending on prior academic achievement in school. It may be the case that high-achieving students are protected from some of the difficulties that others face as their middle school social relationships are transformed in the transition to high school.

Method

Data and Sample

This study uses the National Longitudinal Study of Adolescent Health (Add Health) and its education component, the Adolescent Health and Academic Achievement (AHAA) study. Add Health is a school-based survey of adolescents in grades 7–12 from 134 public, private, and parochial schools (Harris et al. 2003). Add Health sample members were drawn from a random sample of 80 high schools with an eleventh grade, stratified by region, urbanicity, size, type, and race/ethnic composition. In addition, 52 middle or elementary schools that "fed" into the Add Health high school were sampled. Project investigators first collected data using "in-school" questionnaires, administering the survey to all students present in school on the day the survey was given ($n = 90,118$). At most of the schools, students were sampled from the school roster based on nationally representative sociodemographic populations. Selected students were given an "in-home" interview (wave 1; $n = 20,745$) during the 1994–95 school year and were followed up during the 1995–96 school year (wave 2; $n = 14,738$).

Add Health chronicles adolescents' social lives, including adolescents' peer and familial relationships, at-risk behaviors, and feelings of social isolation. Although rich in social context, Add Health has limited information on the academic trajectories of youth. The AHAA study, which collected original Add Health sample members' transcripts ($n = 14,003$), provides academic information from high school transcripts and detailed

information from the last school attended (Muller et al. 2007). Respondents' high school transcripts were coded using procedures designed for the National Educational Longitudinal Study (NELS) and the National Assessment of Educational Progress (NAEP), providing data on students' grades, courses taken, and the academic structure of the school.

To explore the transition from middle school to high school, I exploit both the survey design of Add Health and the transcript data, which provides a broader picture of concurrent academic and social changes occurring during the transition to high school than is available in previous research. In this national sample, three cohorts from Add Health transition to high school: first, there are eighth graders transitioning to high school in 1996 ($n = 1,290$); second, there are eighth graders transitioning to high school in 1995 ($n = 1,300$); third, some districts in the United States are structured such that middle school ends in ninth grade. Although they are slightly older, students of the third group still make the crucial transition between schools, but they do so from ninth grade to tenth grade; therefore these students are retained in this analysis ($n = 89$).¹

Academic Achievement

The dependent variable of this study is student's GPA at the end of the first year of high school, which is taken from the high school transcript. First-year GPA gauges where students start their high school career and how they adjust to the academic demands of high school, which heavily influences their end of high school GPA. First-year GPA is an average of grades in all courses taken in that year. For most students, this is their ninth-grade GPA; for those who transition from a ninth-grade middle school to a tenth-to-twelfth-grade high school, the first-year GPA is from tenth grade.

Pathways to High School

Students typically transition to high school with subsets of their middle school class. As detailed in prior research (Schiller 1999), the proportion of middle school classmates transitioning to high school together gives an indication of the amount of disruption in students' integration into school from middle school to high school. Therefore, I first created a measure of the proportion of students transitioning together for each wave 1 middle school grade level; this represents the pathway students followed as they fed from middle school into high school. As the analytic sample is drawn from the longitudinal sample (i.e., not a census of the entire transitioning cohort),² the proportion of students who transitioned to high school together was determined from the entire cohort class by aggregating individual sample weights within each sampled student's cohort.

The pathway students take as they transition to high school, however, necessarily involves the context of two schools: both the middle school and the high school. While national longitudinal research has focused exclusively on the middle school context, this study incorporates the context of the incoming class at the receiving high school as well. The Add Health middle school students' relative contribution to the incoming high school class for all high schools attended was estimated from the weighted number of students who transitioned in each year divided by the freshman class size as reported in the Common Core Data and Private School Survey (CCD/PSS). When considering both the proportion of students who transition to high school together and the proportion of students who contribute to the incoming class, three main pathways emerge.

¹Exploratory analyses included flags for student's age as well as dummy variables for the different cohorts. These were never statistically significant and are not retained in the models presented in this article.

²For more information on the survey design, see Chantala and Tabor (2002).

First, some students transition with almost all of their middle school class and contribute to the majority of the incoming high school class. These students transition to high school in districts where it is likely that only one middle school feeds into one high school. In this pathway, the “uniform” pathway ($n = 1,175$), very little transformation of social relationships occurs from middle school to high school. Second, other students also transition to high school with the majority of their middle school classmates but make up less than half of their incoming class. This likely occurs in districts where multiple middle schools feed into the high school. This pathway is labeled the “mixed” pathway due to the mixing that occurs among incoming cohorts from different middle schools ($n = 719$). In the mixed pathway, middle school social ties are maintained, but there is also the opportunity to make new friends with students from other feeder middle schools. Finally, some students do not follow the prescribed feeder pattern at all and transition to high school alone or with very few students from their middle school class; these students diverge from their feeder patterns. In this, the “divergent” pathway ($n = 785$), students lack the maintenance of middle school peer relationships and contribute to a very small proportion of the incoming class as they enter high school.

Middle School Social Integration

This study focuses on three central components of students’ integration into schooling: teacher bonding, popularity, and extracurricular participation. Bonding with teachers is associated with academic achievement (Croninger and Lee 2001) and gives students access to informal knowledge in their school (Stanton-Salazar and Dornbusch 1995). Teacher bonding is measured with three items ($\alpha = .64$): teachers treat students fairly (1 = strongly agree to 5 = strongly disagree), how often students have trouble getting along with their teachers (0 = never to 4 = everyday), and whether teachers care about them (1 = not at all to 5 = very much). All teacher bonding responses were reverse coded when necessary such that higher scores indicate stronger bonds. This scale is commonly used among Add Health researchers to gauge students’ overall affect for their teachers (Crosnoe et al. 2004; Crosnoe and Needham 2004; Resnick et al. 1997).

The second measure of integration, popularity among classmates, gives an indication of both increased social support and status among peers (de Bruyn and van den Boom 2005). Popularity was calculated using Add Health friendship data from the in-school survey and is a count of the number of sampled students nominating an individual respondent as a friend (range = 0–32). Students with no nominations were given a zero on this measure, and the one middle school without popularity data was eliminated from the analysis.

Third, adolescents’ participation in school sports or clubs, which promotes integration into school (Mahoney 2000), is taken from the in-school survey asking students to list activities in which they are involved at school. From these responses, a binary measure was created that indicates below-average middle school extracurricular participation (0) and participation in middle school sports or clubs at rates above average for the sample (1).³ This measure translates into involvement in three or more activities, which indicates students’ integration into institutional activities in middle school that are likely at least partially continued into high school.

³Extensive supplementary analysis was conducted concerning the best way to measure students’ extracurricular involvement. While involvement in only one high school extracurricular activity has been shown to prevent high school dropout (McNeal 1995), this study measures involvement in middle school. Above-average involvement therefore is a conservative estimate considering possible continued high school involvement. Results from models with alternate operationalizations of extracurricular involvement are similar to those presented in this study.

Prior Academic Achievement

All models include controls for students' middle school achievement, taken from self-reported grades in math, science, language arts, and social studies. Middle school GPA is a continuous measure averaged across subjects. Since middle school transcripts are not available, self-reported GPA in middle school is used as a proxy for actual GPA. The self-reported GPA in Add Health is correlated with transcript GPA among high school cohorts at .88.

Other Characteristics of the Transition

In order to account for concurrent transitions and nonnormative moves between schools as discussed by previous research (Astone and McLanahan 1994; Pribesh and Downey 1999), models include two dichotomous transition characteristics. First, students may experience other transitions either immediately before or concurrent with the transition to high school, such as a family structure change (1 = change between waves) or a recent residential move (1 = moved within the past year). Second, receiving school traits may influence students' academic outcomes in the first year of high school. All analyses controlled for aspects of students' high schools, such as size, private school, and urbanicity.⁴ These variables are taken from the CCD/PSS. High school size measures the total number of students in the school, and private school is a dichotomous variable. High school urbanicity is a series of dummy variables, including city, suburb (fringe of a city), town, and rural.

Demographic Controls

All analyses controlled for respondents' demographic characteristics, which were measured at wave 1. Control variables include sex (1 = female); racial or ethnic identity, with dummy variables for non-Latino white, Asian American, Latino, African American, and other race/ethnicity; and parents' highest education level (1 = eighth grade or less to 9 = professional training). In addition, family structure is measured as a series of dummy variables for living with both biological parents, a parent and stepparent, single mother, and other family structure.

Analytic Sample

The analytic sample includes students surveyed in wave 3 who participated in the AHAA education component. Only students who were enrolled in middle school grades in wave 1 were eligible to make a transition to high school. In addition, only students with a valid sample weight and a valid value on the dependent variable were retained in the final analytic sample. Table 1 presents selected descriptive statistics for these filters. Students in the analytic sample have similar demographic characteristics as those in the original sample, but they have slightly higher academic achievement.

Plan of Analysis

This study explores how students' social integration into their middle school may affect academic performance during the first year of high school and how this may differ by the pathway followed to high school. Models predict students' academic first-year GPA with weighted ordinary least squares (OLS) regression. Analyses are first conducted with all middle school students together and then to allow the effects of students' middle school integration to vary (Coleman et al. 1982; Schiller 1999); because the meaning of social integration may be different among students who follow pathways with greater disruption, each of the three pathways are modeled separately.⁵

⁴While attending a magnet school is also a relevant control, there were too few students who transitioned to this type of school to include in multivariate analyses ($n = 61$).

Analyses with all middle school students explore the direct association between middle school social integration and pathway on first-year GPA, including all demographic controls, other characteristics of the transition, and prior academic achievement. In addition, analyses explore interactions between middle school social integration and pathways, as well as interactions to determine whether middle school social integration differed by middle school academic achievement.

Each set of analyses examining the pathways separately consists of two models. First, students' GPA during the first year of high school was predicted in models including all of the controls listed above and measures of middle school social integration. The second set of models included interaction terms. Similar to the approach taken by Schiller (1999), who found that students' middle school academic performance interacted with the type of feeder pattern to influence high school GPA, models in the present study include interaction terms for students' middle school GPA and each of the three measures of social integration.⁶

Results

Preliminary Look at Three Transition Patterns

Figure 1 displays the three main pathways that Add Health students followed as they transitioned to high school: uniform, mixed, and divergent. The black portion of the pie graph illustrates the proportion of students from the sending school transitioning together (left column) and the proportion of the incoming high school class at the receiving school (right column). The uniform pathway involves the maintenance of the majority of social ties with middle school classmates because almost all of the middle school class transitions to the same high school together. In the second group, students following a mixed pathway attend high school with the majority of their middle school class yet they make up less than half of the incoming class. Unlike their peers who follow a uniform pathway, those following the mixed pathway have more of an opportunity to develop new social relationships in high school.

Students following the divergent pathway experience the greatest reconfiguration of their middle school social relationships in the transition to high school, as figure 1 illustrates; they diverge from the usual middle school-to-high school feeder pattern and move with few classmates. Upon entering high school, this subgroup of students makes up a small proportion of their incoming high school class.

Table 2 displays descriptive statistics for all measures for students in each of the three pathways to high school. Superscript asterisks indicate that the subgroup mean or proportion is significantly different from that of the sample, illustrating some basic differences between the pathways. Bivariate statistics suggest that students who follow a uniform pathway are more likely to be non-Latino white (hereafter, white), while minority students are more likely to follow a divergent pathway. Students who follow a mixed pathway have parents with higher average education levels, while those who follow a divergent pathway have parents with lower levels of education than the middle school student sample. Divergent students are less likely to live with both biological parents, and they report lower average GPAs in middle school. Students in the mixed pathway are less likely on average to have moved recently.

⁵Although the analysis of pathways in separate models is theoretically motivated, I also conducted *t*-tests between coefficients in each of the separate models to determine whether or not the coefficients were also statistically different. Except in very few cases, the coefficients produced by separate models were statistically significantly different from each other using the most conservative value for ANOVA.

⁶Interactions are mean centered (Cohen and Cohen 1983), which reflects the average difference between groups when all other variables are zero, easing the interpretation of results. Models with noncentered measures yielded similar results.

When we turn to mean levels of middle school social integration reported by students in the three pathways, some interesting differences begin to emerge. Those who follow the uniform pathway to high school report higher levels of middle school teacher bonding than their peers following a mixed pathway, and they have higher average levels of popularity than their peers in either the mixed or divergent pathways. These differences in middle school social ties may indicate distinct realities of students' connection to the people in their schools as they face a school transition. Social ties to classmates could be more salient for students in uniform pathways, whereas those with more reconfiguration of social ties in their transition to high school may experience the transition differently due to weaker ties to their school.

As shown with the presentation of high school characteristics in table 2, the pathways students follow to high school vary by size and are clustered by urbanicity. The uniform pathway, characterized by the maintenance of social ties among middle school classmates during the transition to high school, is most common among schools that are smaller on average and is least common in cities. Alternatively, the mixed and divergent pathways occur most often in larger high schools and in cities. The divergent pathway is also common in the suburbs. It is likely that the possibility for school choice is greater in urban and suburban school districts than in small towns and rural areas, which explains the prevalence of the divergent pathway in these areas. Given these differences, urbanicity becomes an important control in multivariate models exploring the possible impact of the pathway followed net of school characteristics.

Social Integration, Pathway Followed, and First-Year GPA

We now turn to the multivariate analysis investigating associations between pathway followed and academic achievement. In addition, these models explore whether social integration into school interacts with middle school academic achievement to predict academic achievement differences in the first year of high school. Students who follow a mixed pathway earn a higher predicted GPA in the first year of high school. This suggests differences in academic achievement for students depending on which pathway they follow to high school, with students who transition surrounded by middle school peers yet enter high school with more academic and social opportunity benefitting from this pathway.

In addition, teacher bonding in middle school and popularity among middle school classmates predict higher grades in the first year of high school. Those involved in extracurricular activities also receive a boost in GPA after the transition to high school. As shown in the interactions between pathway and middle school GPA, students with higher middle school achievement who follow the divergent pathway earn lower first-year GPAs than those in the uniform pathway. This suggests that high-achieving students in middle school have greater difficulty adjusting academically when following the divergent pathway to high school. Finally, interactions between middle school GPA and social integration into middle school are not statistically significant in the pooled analyses of table 3.

Due to suggested differences in predicted GPA among students who follow different pathways, table 4 shows results from analyses where pathways are considered separately. Analyses presented explore whether the impact of social integration into middle school on students' academic achievement in high school varies according to the pathway followed to high school and if dimensions of social integration affect students differently.

Table 4 shows regression coefficients predicting first-year GPA for students following the uniform, mixed, and divergent pathways from middle school to high school. When comparing results across pathways, middle school GPA predicts first-year GPA for all students, regardless of pathway followed.

Next, there are some differences among pathways concerning the impact of social integration into middle school on the predicted first-year GPA. First, in the uniform pathway and the mixed pathway, students who are more bonded with their teachers have a higher first-year GPA. Interestingly, middle school teacher bonding gives a boost in predicted first-year GPA only among students who follow the prescribed feeder pattern to high school with most of their middle school classmates (e.g., uniform and mixed). In the uniform pathway and the divergent pathway, greater popularity is associated with a higher first-year GPA, while in the mixed pathway, it fails to produce a similar predicted boost in first-year GPA. Finally, only in the uniform pathway is extracurricular involvement associated with a higher first-year GPA, and this association is rendered nonsignificant after considering interactions between middle school GPA and social integration (see model 2 of table 4; $b = .09, p < .10$).

For interactions between middle school GPA and social integration into middle school, the only significant associations occur among students who follow the mixed pathway. First, in the mixed pathway, higher-achieving middle school students who are also popular among middle school classmates receive a predicted boost in first-year GPA. Interestingly, in the mixed pathway, there was no direct association in separate models between popularity and first-year GPA. This seems to indicate that, in the mixed pathway, only high-achieving students benefit from popularity.

Second, high-achieving middle students in the mixed pathway receive a lower first-year GPA when involved in extracurricular activities ($b = -.22, p < .001$). To better interpret this interaction, I conducted analyses of predicted probabilities. As illustrated in figure 2, the difference between the predicted first-year GPA for students who participate in middle school extracurricular activities versus those who do not occurs primarily among high-achieving middle school students. Those with an A average in middle school have a higher predicted GPA when they do not participate in extracurricular activities in middle school, with almost a full grade-level difference in predicted first-year GPA (3.36 vs. 2.54). Among middle school students with a B average, those who do not participate in extracurricular activities are predicted to receive half a grade lower for their first-year GPA than those who do participate. Among C average and D average students, there is not nearly as large of a difference in predicted first-year GPA by participation in extracurricular activities. This finding suggests that extracurricular participation may work against high-achieving middle school students as they make a transition to high school following a mixed pathway.

Discussion

Relying on previous studies that incorporate either the structural elements of students' transition to high school (Barber and Olsen 2004; Heck and Mahoe 2006; Schiller 1999; Weiss 2001) or the social side of schooling during this period of disruption (Akos and Galassi 2004; Isakson and Jarvis 1999; Kinney 1993; Newman et al. 2000; Seidman et al. 1994), the main goal of this study was to consider structural and social components together to provide new evidence about a crucial step in students' academic trajectory—the transition to high school. Results support the notion that students experience school transitions differently given the circumstances surrounding their transition (Rudolph et al. 2001).

Among all middle school students, results indicate that both the pathway followed and social integration into middle school are associated with academic performance in the first year of high school (see table 3). Students who follow the mixed pathway receive a higher first-year GPA compared to those who follow the uniform pathway. Both the mixed and uniform pathways allow the maintenance of social relationships from middle school, yet students who follow the mixed pathway have the opportunity to make new friends among incoming students from other middle schools. The presence of opportunity in the mixed pathway

appears to be beneficial for students. In addition, high-achieving middle school students who follow a divergent pathway are associated with a lower GPA in the first year of high school. These students seem to be at a disadvantage when they enter high school with few middle school peers, which is consistent with prior research (Schiller 1999).

In pooled analyses, all measures of middle school social integration are associated with better academic adjustment, as measured by GPA, in the first year of high school.⁷ When separating out analyses by pathway followed, some difference in the apparent salience of middle school social integration begins to emerge. It was expected that teacher bonding would be most important among students who followed the prescribed feeder pattern. As shown in table 4, teacher bonding was associated with a higher first-year GPA for students who followed both the uniform and mixed pathways but not the divergent pathway. Therefore, results appear as expected. The importance of relationships with middle school teachers in these pathways may be due to vertical teaming, which is more likely to occur for students following their feeder pattern to high school (Anderson 2002).

Regarding popularity, I expected that higher status among peers would be important to all students. However, popularity among middle school peers was only a significant predictor of first-year GPA for students who followed the uniform and the divergent pathways. In the uniform pathway, students enter high school with their middle school classmates and no other middle school feeder. Here, social status in middle school is likely maintained and therefore retains its importance. For those who follow a divergent pathway, one of two interpretations can be made. First, “popular” students in middle school may be those who are more dynamic and make friends easily—and therefore they will have an easier time adjusting academically to their new high school due to these characteristics. Second, the flag for those students missing popularity data was statistically significant (see table 4) among students who followed a divergent pathway to high school, and it is in the opposite direction of the popularity coefficient. This indicates that specific conclusions cannot be made concerning the validity of the impact of popularity on first-year GPA among students in the divergent pathway.

Interestingly, popularity among middle school classmates did play a role among students following a mixed pathway to high school, as expected, but only among certain students. High-achieving middle school students receive a greater benefit from popularity when transitioning to high school following the mixed pathway. This could be due to the sorting of students that occurs in this pathway, with “popular” middle school students from a variety of middle schools vying for higher social status upon entering high school, where only those with both high academic and social status get a boost in GPA in the first year of high school.

When exploring differences in the effect of extracurricular participation between the pathways, findings were not in expected directions. It was expected that students who followed a divergent pathway would benefit most from extracurricular participation, since this provides an institutionally based format for creating social integration and relies less on a specific set of social relationships. While extracurricular participation was associated with a boost in GPA in pooled models, none of the three pathways revealed a lasting association between extracurricular participation and academic achievement in high school once other covariates were included in the model.

⁷While significant, the coefficients of measures of social integration are somewhat small. This is largely due to the inclusion of students' previous achievement in models. In supplementary analyses that excluded middle school achievement, these coefficients were considerably larger.

The only evidence of middle school extracurricular participation playing a role in academic achievement in high school was the interaction between participation in extracurricular activities and high-achieving middle school students who followed the mixed pathway (see fig. 2). Due to the possible demands on students' time that occurs when heavily involved in extracurricular activities and the specific reconfiguration of social ties that occurs in the mixed pathway, it appears that high-achieving students are somewhat penalized in terms of their first-year GPA if they have a history of participation in extracurricular activities in middle school. Conclusions regarding extracurricular participation should be met with caution, however. While it is likely that this participation continues as students transition to high school, this may not necessarily be the case. For this reason, the impact of extracurricular participation warrants further investigation.

Findings also highlight the different experience of transitions by race/ethnicity. African American students and students whose parents have lower levels of education are consistently predicted to receive lower grades in the first year after the transition to high school, regardless of the pathway followed. This is consistent with previous research (Gamoran 1992; Gillock and Reyes 1996; Roderick 2003). Future research should explore the persistence of vulnerability and circumstances of resiliency for these students.

In addition, results suggest that future research should also consider if some pathways exacerbate certain specific individual differences among students. In pooled models (see table 3) and among students who follow a uniform pathway, students in an alternative family structure and those who have recently experienced family structure changes are associated with a lower GPA in the first year of high school. Among students who follow a mixed pathway in the transition to high school, students who live with a parent and stepparent have a lower predicted first-year GPA, while those who recently moved have a higher predicted first-year GPA. Taken together, these findings reinforce caution on the part of researchers for treating all students' reactions to school change as identical (Harter et al. 1992). In addition, they suggest that students with other types of disruption in their lives may be particularly vulnerable during school transitions.

Transitions have been found to affect girls and boys differently (Simmons and Blyth 1987), particularly in the area of social relationships (Wigfield et al. 1991). Findings do suggest that girls have a higher predicted first-year GPA both in pooled models and in each separate pathway, and future research should consider the role of gender in students' adjustment to their first year of high school.

While this study is the first of its kind to consider the pathways students follow to high school with such depth, certain limitations must be considered when interpreting results and making conclusions. First, a number of additional unmeasured factors could influence students' choice to follow a certain pathway as they transition to high school; these factors may also influence their high school academic achievement. Although this study controlled for residential mobility and changes in family structure, unmeasured risk factors might come into play or interact to precipitate a spiral of cumulative stress for students. Previous research has shown that cumulative stress affects adolescents differently than does the stress of a single transition (Simmons 1987). Although exploratory analysis indicated no such evidence, Add Health is limited in measurement of these risk factors. Second, the reasons why students transition to high school along a certain pathway are not known. Individual agency and preexisting circumstances could also play key roles, particularly for students following a divergent pathway. Students who follow divergent pathways may also be predisposed to do worse in school. Although the multivariate models included many controls related to their prior circumstances, unmeasured factors no doubt remain, particularly for

students who follow pathways with few classmates. Future research should prioritize investigating students' propensities to make nonnormative transitions.

Finally, other types of social integration may also play a role in students' successful transition to high school. Closeness with specific friends has been found to help students (Little and Garber 2004). While Add Health asks students about closeness to specific friends, due to the sampling procedures used in these data, it is not known whether these middle school friends transition to high school together. In addition, while attachment to a specific school has consistently predicted better student outcomes (Libbey 2004), this measure of engagement is likely less relevant when students change schools since measures of attachment are only available for the sending school. Therefore, despite the presence of other measures of social integration in the data, the three included in this study are the most theoretically relevant for students across school transition types and operate as the strongest predictors of academic achievement.

This study illustrates that variation in the impact of school transitions stems not only from individual reactions to the transition but also from the institutional context and students' embeddedness within that context. Overall, the way that school administrators structure the feeder patterns of their school district can make a difference in student performance in the first year of high school, and researchers should consider the study of school transitions through this lens. Specifically, high school teachers and administrators who are in schools where students follow pathways similar to the mixed pathway, characterized by the maintenance of classmates as well as opportunity to form new social ties, would potentially benefit from designing orientation programs that create a new sense of community in the high school among the many incoming cohorts. Results suggest that students in this pathway experience the most disruption in their middle school social integration as it relates to academic achievement. In addition, students who follow the divergent pathway, or one with few middle school classmates, might need additional support during the first year of high school. Results indicate that these students struggle more academically, particularly when they have been successful in middle school. By incorporating elements of students' social worlds in schools as well as the institutional context within which they move through their schooling in studying transitions, new knowledge can be gained concerning how school transitions affect students. Future research should continue this more comprehensive look at school transitions and investigate how other elements of students' high school context might improve academic adjustment in the first year of high school.

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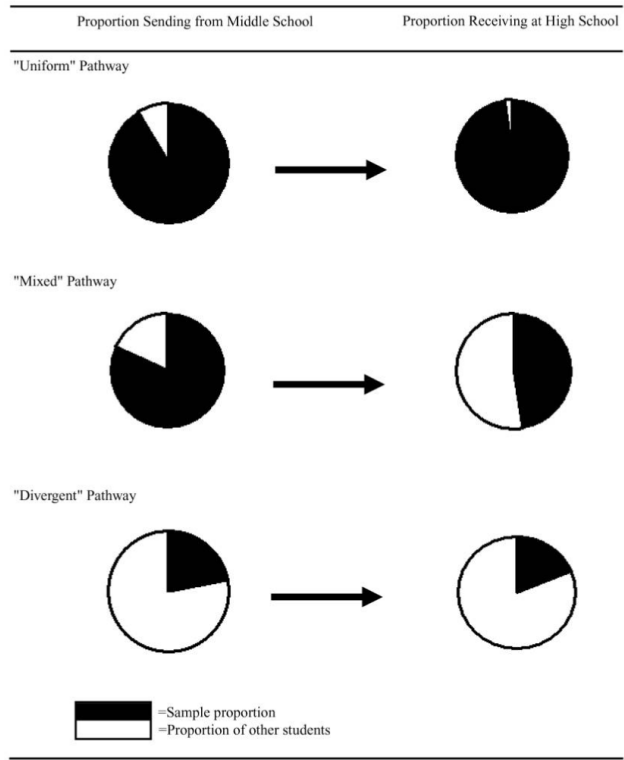


FIG. 1.
Pathways in the transition to high school

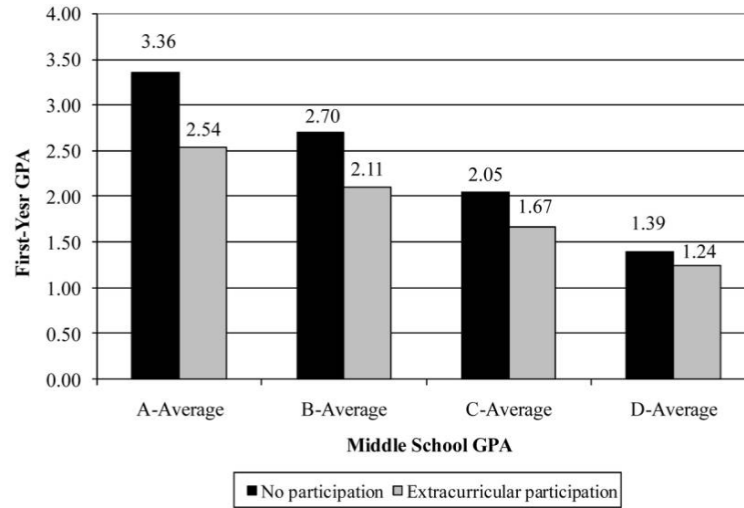


FIG. 2. Predicted probabilities of first-year GPA among students following the mixed pathway, by middle school GPA and extracurricular participation.

TABLE 1
Selected Means from Sample Attrition

	Sample 1*	Sample 2 [†]	Sample 3 [‡]	Analytic Sample [§]
Female	.53	.55	.55	.55
Non-Latino white	.54	.59	.59	.58
Living with both biological parents	.57	.58	.59	.58
Parents' level of education	6.12	6.21	6.23	6.16
Middle school GPA	2.83	2.95	2.95	2.94
<i>N</i>	12,167	3,147	3,044	2,679

* Full wave 3 education component with valid transcript sample.

[†] Included filter to sample 1 for only wave 1 middle school students.

[‡] Included filter to sample 2 for having a valid sample weight.

[§] Included filter to sample 3 for having data on the dependent variable (first-year GPA) and from a school with friendship data.

TABLE 2
Weighted Descriptive Statistics of All Measures Used in Analyses, by Pathway Followed

	MIDDLE SCHOOL SAMPLE	PATHWAY		
		Uniform	Mixed	Divergent
Female	.49	.51	.46	.49
Race/ethnicity:				
Non-Latino white	.67	.77*	.69	.52
Asian American	.04	.02	.04	.06
Latino(a)	.04	.02*	.03	.06
African American	.16	.13*	.14	.22
Other race/ethnicity	.09	.06*	.10	.13
Parents' level of education	6.03	6.05*	6.27*	5.80
Family structure:				
Both biological parents	.60	.62	.59	.57
Parent-stepparent	.15	.14	.17	.16
Single mother	.20	.20	.18	.21
Other family structure	.05	.04	.06	.06
Other disruptions:				
Recent move	.10	.12*	.06*	.09
Family structure change between waves	.10	.09	.09	.12
Middle school GPA	2.91	2.96	2.89	2.86*
Social integration:				
Teacher bonding	3.78	3.83*	3.77	3.70
Popularity	4.79	5.35*	4.57*	4.16*
Extracurricular participation	.36	.36	.38	.35
Pathway:				
Uniform	.45			
Mixed	.24			
Divergent	.31			
High school characteristics:				
School size	1,106.20	867.40*	1,473.71*	1,162.74*
Urban location:				
City	.29	.07*	.48*	.45*
Suburb	.36	.37*	.28	.40*
Town	.19	.28*	.14*	.09*
Rural	.17	.27*	.09*	.07*
Private school	.05	.02*	.08	.08*
First-year GPA	2.56	2.60*	2.63	2.45*

	MIDDLE SCHOOL SAMPLE	PATHWAY		
		Uniform	Mixed	Divergent
<i>N</i>	2,679	1,175	719	785

* Denotes mean/proportion for mixed is statistically significantly different from uniform using chi-square or ANOVA tests for significance.

TABLE 3
Ordinary Least Squares (OLS) Regression Coefficients and Standard Errors Predicting
First-Year GPA among All Middle School Students

	MODEL 1		MODEL 2	
	<i>b</i>	SE	<i>b</i>	SE
Female	.20***	.03	.20***	.03
Race/ethnicity (reference = non-Latino white):				
Asian American	.15	.09	.17*	.08
Latino(a)	-.15	.11	-.15	.11
African American	-.39***	.08	-.40***	.08
Other race/ethnicity	-.13	.07	-.13	.07
Parents' level of education	.07***	.01	.07***	.01
Family structure (reference = both biological parents):				
Parent-stepparent	-.09	.05	-.09	.05
Single mother	.02	.05	.02	.05
Other family structure	-.26**	.09	-.26**	.10
Other disruptions:				
Recent move	.02	.06	.03	.06
Family structure change between waves	-.16*	.07	-.15*	.07
Middle school GPA	.62***	.03	.62***	.03
Social integration:				
Teacher bonding	.07**	.02	.07**	.02
Popularity	.02***	.00	.02***	.00
Extracurricular participation	.08*	.04	.07*	.04
Pathway (reference = uniform):				
Mixed	.19**	.06	.19**	.06
Divergent	.11	.06	.11	.06
High school characteristics:				
School size	.01	.00	.00	.00
Urban location (reference = city):				
Suburb	.20**	.08	.19**	.07
Town	.28***	.07	.28***	.07
Rural	.15	.10	.14	.09
Private school	.02	.10	.02	.11
Missing flag:				
Missing popularity	-.09	.05	-.09	.05
Pathway × middle school GPA:				
Mixed × middle school GPA			-.07	.06
Divergent × middle school GPA			-.15**	.05
Middle school GPA × social integration:				

	MODEL 1		MODEL 2	
	<i>b</i>	SE	<i>b</i>	SE
Middle school GPA × teacher bonding			.02	.03
Middle school GPA × popularity			.00	.00
Middle school GPA × extracurricular participation			.01	.05
Intercept	-.21	.16	-.22	.17
R^2	.49		.49	

NOTE.—Reference categories, where relevant, are in parentheses.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

TABLE 4
Ordinary Least Squares (OLS) Regression Coefficients and Standard Errors Predicting First-Year GPA, by Pathway Followed

	UNIFORM						MIXED						DIVERGENT					
	Model 1		Model 2		Model 1		Model 2		Model 1		Model 2		Model 1		Model 2			
	b	SE	b	SE	b	SE	b	SE	b	SE	b	SE	b	SE	b	SE		
Female	.23***	.04	.22***	.05	.24***	.05	.24***	.05	.12*	.05	.12*	.05	.12*	.05	.12*	.05		
Race/ethnicity (reference = non-Latino white):																		
Asian American	.16	.09	.15	.09	-.12	.15	-.11	.16	.30*	.14	.30*	.14	.30*	.15	.16	.15		
Latino(a)	-.05	.16	-.05	.16	-.15	.13	-.16	.13	-.16	.16	-.16	.16	-.15	.16	-.15	.16		
African American	-.42***	.09	-.42***	.09	-.39***	.10	-.39***	.10	-.39***	.13	-.39***	.13	-.39***	.13	-.39***	.13		
Other race/ethnicity	-.13	.13	-.12	.13	-.24	.15	-.24	.15	-.02	.08	-.02	.08	-.02	.08	-.02	.08		
Parents' level of education	.04**	.01	.04**	.01	.03**	.01	.03**	.01	.12***	.02	.12***	.02	.12***	.02	.12***	.02		
Family structure (reference = both biological parents):																		
Parent-stepparent	-.12	.08	-.12	.08	-.13*	.06	-.14*	.06	-.04	.09	-.04	.09	-.04	.09	-.04	.09		
Single mother	-.03	.06	-.04	.06	.04	.09	.06	.09	.13	.10	.13	.10	.13	.10	.13	.10		
Other family structure	-.37*	.15	-.37*	.15	-.12	.14	-.14	.14	-.27*	.14	-.27*	.14	-.27*	.14	-.27*	.14		
Other disruptions:																		
Recent move	-.03	.09	-.03	.09	.31**	.11	.31	.10	-.10	.08	-.10	.08	-.09	.08	-.09	.08		
Family structure change	-.26*	.13	-.25*	.13	-.09	.08	-.06	.08	-.09	.10	-.09	.10	-.08	.09	-.08	.09		
Middle school GPA	.69***	.04	.69***	.03	.67***	.05	.65***	.04	.50***	.05	.50***	.05	.50***	.05	.50***	.05		
Social integration:																		
Teacher bonding	.06*	.03	.07*	.03	.09	.05	.09*	.04	.06	.04	.06	.04	.06	.04	.06	.04		
Popularity	.02**	.01	.02**	.01	.00	.01	.00	.01	.03*	.01	.03*	.01	.03*	.01	.03*	.01		
Extracurricular participation	.09*	.04	.09	.05	.04	.05	.06	.05	.08	.07	.08	.07	.07	.07	.07	.07		
High school characteristics:																		
School size	-.01	.01	-.01	.01	-.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01		
Urban location (reference = city):																		
Suburb	.04	.08	.04	.09	.18*	.08	.17*	.07	.27*	.12	.27*	.12	.27*	.12	.27*	.12		

	UNIFORM						MIXED						DIVERGENT						
	Model 1			Model 2			Model 1			Model 2			Model 1			Model 2			
	<i>b</i>	SE		<i>b</i>	SE		<i>b</i>	SE		<i>b</i>	SE		<i>b</i>	SE		<i>b</i>	SE		
Town	.16*	.07		.17*	.07		.40***	.08		.40***	.08		.10	.14		.09	.14		.14
Rural	-.06	.12		-.06	.12		.37***	.09		.38***	.08		.24	.14		.23	.13		.13
Private school	-.07	.13		-.06	.13		-.04	.12		-.06	.13		.14	.15		.14	.15		.15
Missing flag:																			
Missing popularity	-.06	.08		-.06	.08		.03	.09		.03	.09		-.19*	.09		-.19*	.09		.09
Middle school GPA × social integration:																			
Middle school GPA × teacher bonding				.04	.05			.05			.06			-.02			.08		
Middle school GPA × popularity				.00	.01			.02**			.01			.00			.01		
Middle school GPA × extracurricular participation				.06	.06			-.22***			.06			.08			.08		
Intercept	-.06	.18		-.11	.19		-.02	.26		.00	.24		-.08	.31		-.08	.31		.31
R ²	.53			.53			.53			.54			.46			.46			.46

NOTE.—Reference categories, where relevant, are in parentheses.

* $p < .05$.

** $p < .01$.

*** $p < .001$.