School Context, Family Instability, and the Academic Careers of Adolescents: The Role of Family Instability within Schools

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The living arrangements of American children are increasingly complex. An emerging literature suggests that these complex family histories are linked with multiple domains of adolescent development. Much of this scholarship focuses on associations at the individual level. Here, we build on this work and consider whether aspects of the school context—the aggregate level of family instability within schools—moderate this link. Taking advantage of the school-based design and the retrospective reports of family structure in Add Health and the linked academic transcript data in AHHA, we explore whether being in schools with lower proportions of peers with histories of family instability is good for all students, especially those in unstable families, or if students in unstable families do *worse* than expected when they attend schools with a fewer peer with unstable family history. Models will be estimated in HLM.

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The Role of Family Instability within Schools

The living arrangements of American children are increasingly dynamic. At the midpoint of the 20th century, three quarters of American children lived in "traditional" nuclear families—defined as families with two biological parents married to each other, full siblings only, and no other household members—until they reached adulthood (Furstenberg, 2007). Today, increases in non-marital fertility, divorce, and cohabitation, combined with declines in marriage and remarriage, have translated into more complex, dynamic living arrangements for American adolescents. Indeed, life course estimates suggest that *most* American youth will spend some time living outside of a "traditional" nuclear family (Kennedy & Bumpass, 2008). This instability, and the turbulence it can introduce into adolescents' lives, is associated with rising inequality among American youth (McLanahan, 2004). More specifically, an emerging literature documents an association between complex family structure histories and a host of behavioral, social, and academic problems (Cavanagh & Huston, 2006, 2008; Fomby & Cherlin, 2007; Osborne & McLanahan, 2007; Cavanagh, Schiller, & Reigle-Crumb, 2006; Heard, 2009; Cavanagh, Crissey, & Raley, 2008; Wu & Thomson, 2001).

Many of these observed problems are manifest and rooted in schools. During this life stage, young people spend more waking hours at school than in any other setting. At the same time, they have more freedom and autonomy from adults—parents and teachers—spending a substantial portion of their day with peers (Collins, 1984). Young people also become increasingly self-conscious and cognizant of social comparisons. Finally, they are often enrolled in large high schools in which teacher-student relations are less personal, academic pressures are greater, and academic motivation and achievement decline compared to what students experienced in elementary schools (Eccles et al., 1993; Eccles & Midgely, 1989; Simons & Blyth, 1987). Taken together, the curricular organization of schools becomes more open and less structured just as young people's motivation and opportunities to disengage and act out increase.

Although family scholars who study the link between family structure and adolescent well-being typically control for adolescent age or grade, the complexity of the changing emotional, social, and institutional transitions that define the school context in adolescence are understudied. We connect the concurrent, dynamic trajectories of family and school experience to investigate whether school context conditions the previously established association between family instability and course-taking patterns in high school (Cavanagh et al., 2006; Fomby & Sennott 2009). To that end, we take advantage of the school-based design and the retrospective reports of family structure captured in the National Longitudinal Study of Adolescent Health (Add Health) and the linked academic transcript data in the Adolescent Health and Achievement Study (AHHA). Specifically, we consider whether the family structure histories of students at the school level school moderate the individual level association between cumulative family instability and the math and science course-taking patterns of high school students.

Family Instability and the Educational Careers of Adolescents

The romantic lives of parents and the academic careers of their children are dynamic trajectories that often intersect and unfold over time (Cavanagh et al., 2006). On one hand, the romantic relationship histories of American adults often involve a dynamic set of relationships, including spells of marriage, cohabitation, singleness, divorce, or some combination of these

statuses (Cavanagh & Huston, 2006; Wu, 1996; Wu & Martinson, 1993). These transitions, in turn, can shape the flow of time, money, and emotional supports to children. On the other hand, students' academic experiences in a given year are one part of a larger trajectory that makes up their educational careers (Kerckhoff 1993; Pallas 2003). This trajectory is the clearest in subjects like math and science, where courses are arranged in a hierarchical sequence, ranging from less advanced (e.g., Remedial Mathematics, basic Science) to more advanced courses (e.g., Calculus and Physics), and where access to more advanced courses is contingent on the successful completion of earlier ones (Adelman 1999; Schneider, Swanson, & Riegle-Crumb, 1998; Riegle-Crumb, Farkas, & Muller, 2006).

These hierarchically structured subjects are especially well-suited to studying individual students' academic progression. Students who begin high school in higher-level math and science can lose this advantage (Pallas 2003; Schiller 1999) over time. In particular, by their junior year in high school, students often have completed much of their required coursework and have the opportunity to take more elective courses and explore their interests. A consequence of this increased autonomy and agency is that some students get off-track and opt out of advanced courses in core subjects, such as math, as the coursework becomes more challenging and non-academic domains of success like friendship, romance, sports, work and other extracurricular activities become more important (Csikzentmihalyi & Schneider, 2001; Lee, Smith, & Croninger 1997; Powell, Farrar, & Cohen, 1985). Adolescents' academic success and persistence in these trajectories are shaped, in part, by inputs from the home environment.

In a previous study, Cavanagh and colleagues explored the association between family instability and young people's academic trajectories in math only (2006). Overall, we found that family instability was associated with adolescents' academic status at the end of high school, and this link was stronger than the one observed at the start of high school. That family instability so clearly distinguished adolescents who were prepared to go to college from all others but had little effect on academic status in the early part of high school suggests that something about the school context matters for how and when the effects of family instability are expressed.

The Role of School Context

Why might school *context* matter to the association between family instability and academic course progression? More than a warehouse for young people undergoing change, the school is a *setting* for development—a space where young people can access important relationships, resources, and structured activities and are provided opportunities for learning and identity development (Eccles & Gootmann, 2001; Tseng & Seidman, 2007). These aspects of the school can foster a sense of belonging, of mattering, for adolescents that, in turn, guide their positive development and reduce opportunities to engage in behaviors that compromise it. Conversely, schools that lack such attributes can exacerbate the implications of family instability for young people in less stable homes.

To measure school context, we focus on the family structure history of students in a school. At the individual level, the family instability effect is explained, in part, by diminished social capital, including parent's time, attention, and affection, in the parent-child relationship and parental involvement in children's lives (Coleman, 1988). Coleman also describes social capital as productive, like other forms of capital, "making possible the achievement of certain ends that in its absence would not be possible" (1988, p.98). Without close parent-child relationships, parental communication and monitoring would be ineffective in promoting positive educational outcomes among adolescents. Thus, social capital resources can promote effective socialization

and social control of adolescents and influence positive academic progress (McLanahan & Sandefur, 1994). At the school level, social capital within and between families is likely associated academic functioning in schools (Pong, 1998). Evidence suggests that students at schools with a higher proportion of married parent families tend to be exposed to high-achieving, academically informed peers, better organized and more academically rigorous classrooms, and more politically powerful and involved parent networks. Conversely, adolescents at schools with a higher proportion of single parent families are exposed to lower-achieving peers and lower quality schools (Pong, 1998).

In this study, we seek to move beyond static measures of family status to measures that capture the dynamic family history of students at both the individual and school level. We explore two ways that the family structure histories of students, at the school level, might matter. First, a young person living in an unstable family might do better than expected if she or he attends a school with higher proportions of peers with stable family histories, with the additional social capital within the school offsetting whatever negative impact of her own family structure history might introduce. Conversely, this same student might do worse than expected in a school with higher proportions of peers in unstable family histories. Thus, this hypothesis suggests that being in a school with lower proportions of peers with family instability is good for all students, especially those in unstable families.

A second interpretation of the school level effect might find that a student living in an unstable family might do *worse* than expected if she or he attends a school with a lower concentration of peer with unstable family history. Assuming family structure experiences are a salient factor around which young people select and are selected as friends, young people who are different from others may be less integrated in the school context. Given recent evidence that the academic gains of attending high SES schools may be partially offset by lower SES adolescents' more problematic psychosocial adjustment and curricular positions in these schools (Crosnoe, 2009), young people in unstable families may be especially isolated from their peers. If so, they would gain less academic protection in such schools than other students. We will test for both sets of associations.

Data and Methods

The data for this study will come from Add Health, a nationally representative sample of adolescents who were in Grades 7–12 in 1995, and the AHAA transcript study. Add Health used a multistage, stratified, school-based, cluster sampling design to select 80 high schools in 80 communities and then to select an additional 52 schools (typically middle schools) that fed into these high schools. In each study school, Add Health collected in-school questionnaires from every student who attended on the day of administration (approximately 90,000 young people). About one year later, Add Health selected a nationally representative sample from this pool of students to participate in three in-home interviews. Wave I (n = 20,475) was conducted between April and December 1995. Parents of adolescents who participated in the in-home interview completed a separate survey instrument (n = 17,670). All Wave I adolescent respondents, except those in the 12th grade, were reinterviewed at Wave II, between April and September 1996 (n = 14,738). The Wave III interview, conducted between August 2001 and April 2002, captured respondents aged 18–26 (n = 15,170). Approximately 74 percent of the original Wave I sample completed the Wave III questionnaire.

The AHAA transcript study supplements Add Health with detailed information on educational careers. All Wave III respondents were asked to complete a high school Transcript

Release Form that authorized the study personnel to collect transcripts from the last schools the respondents attended. Approximately 91 percent of the Wave III respondents signed a valid Transcript Release Form and had transcript data collected. These data provide official grades, indicators of course-taking patterns at the student- and school level, and educational contexts within and among schools that can be linked to the data from the Add Health survey.

The analytic sample for this study includes young people who completed the Waves I and III in-home survey, had valid transcript data, and valid weights. Multiple imputation techniques will be used to minimize the bias that missing data can introduce.

Measures

Two measures will tap young people's academic careers. *Status in math and science* will be measured in 9th grade and at the end of high school. Because the math and science course sequences in American schools are largely standardized and follow a hierarchical structure, transcript data can be used to create math and science course sequences similar to those previously designed for NELS-88 and Add Health (Schiller & Hunt, 2003). The CSSC (Classification of Secondary School Courses) code for each class allows a standardized classifications across schools that can be collapsed into hierarchically ordered categories [(0 = no math, 1 = below Algebra I; 2 = Algebra I; 3= Geometry; 4 = Algebra 2 or higher) (0 = no science, 1 = survey science; 2 = earth science; 3 = biology; 4 = advanced science] for each year.

At the individual level, family instability is a count of the number of family structure transitions an adolescent experienced from birth to Wave I. It is based on a parent's (usually a mother's) self-reported union history and current union status from the in-home parent interview, the adolescent-reported household roster, and the adolescent's report of relationship with his or her non-coresident biological parent, if relevant. A transition is defined as a coresident parent's entry into or exit from a cohabiting or marital union. Transitions from cohabitation to marriage and from separation to divorce are not counted as additional transitions. In describing their union histories, parents report on their three most recent unions. In addition, parents report their union status at the time of their adolescent's birth. If the parent is single at birth and reports marrying or cohabiting with the adolescent's other biological parent later, that is counted as an additional transition. In total, an adolescent might have experienced up to nine reported changes in family structure by Wave I. Because a parent's union history is truncated at the third most recent union, the number of transitions is potentially underestimated. We aggregate individual-level family instability histories to develop a measure of the average amount of family instability experienced by adolescents in a school. The measure of instability used to present preliminary results here excludes some adolescents who will be included in the proposed analysis, and will be adjusted accordingly.

At the school level, we leveraged the school based design and calculated the average number of transitions for adolescents in each school. Our analytic sample includes students in 144 schools, and the number of students within each school ranges from 6 to 1,344, with most schools contributing between 80 and 160 students to the Wave I to Wave III sample. Table 1 summarizes the individual and school-level measures. On average, individual adolescents have experienced just under 1 transition (0.74 changes) in family structure by Wave I, with 42 percent experiencing at least one family structure change. At the school level (n = 144 schools), the average amount of instability in a school is .78 family structure transitions, and 20 percent of schools include students who have experienced at least one family transition, on average.

Related maternal and paternal characteristics and adolescent characteristics will be incorporated in these analyses to account for adolescents' differential opportunities to experience family structure change and academic differences in high school.

Analytic Plan

We will assess the influence of both individual-level and school-level factors on math and science trajectories using hierarchical linear modeling (HLM), which is well suited for multilevel data for several reasons. First, HLM explicitly takes into account that students are clustered within schools and are not statistically independent observations. Standard errors can be underestimated when this within-school clustering is not taken into account. An important aspect of this technique is distinguishing the variation that occurs among students within a school from the variation that occurs across schools. Second, in HLM, interactions between variables at different levels can be easily assessed and interpreted. One can first assess whether the relation between family instability and math course-taking is different between schools (i.e., a random slope). If it does, we will use the school-level measure of family structure history to see if this explains the linkages.

We will begin with extensive descriptive analyses among individual-level and school-level indicators. Then we will estimate unconditional models for each outcome to determine the amount of variation that occurs among students within schools and that which occurs between schools. Finally, we will explore the extent to which the family structure history composition of the school moderates the link between family instability and young people's academic careers.

Preliminary Findings

Table 1 displays descriptive statistics for key analytic variables. Table 2 documents the extent to which individual-level family instability at Wave I is concentrated within schools. The individual-level measure of family instability is summarized in three categories: no prior family structure transitions, one to two transitions, or three or more transitions. Adolescents who experienced no family instability attended schools where other students also experienced the fewest transitions: 0.73 family structure transitions in schools, on average. Adolescents who experienced one or two transitions attended schools with significantly higher levels of instability (mean = 0.83), and those who have experienced three or more transitions in their own family attended school with students who also experience higher levels of instability (mean = 0.87). All between-group differences are statistically significant at the $p<.05$ level in a Bonferroni post-hoc test based on a one-way analysis of variance.

As noted above, the focal association between cumulative family instability and math course taking trajectories has been established (Table 3). The next stage in the analysis is estimating HLM models to determine whether the observed link between family instability and educational careers at the individual level is conditioned by the family structure history of students within the school context.

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Table 1. Key analytic variables

Individual-level measures	
Math Outcomes	
Academic status in the ninth grade	
Completed at least Algebra I	65.46
Did not complete at least Algebra I	34.54
Academic status at the end of high school	
Dropped out of high school	12.49
Graduated from high school but did not complete Algebra II	29.98
Graduated from high school and completed at least Algebra II	57.53
Family structure transitions by Wave I	0.736
	(1.12)
Number of transitions	
0 transitions	58.5%
1-2 transitions	33.4%
3+ transitions	8.1%
School level measures	
Aggregate family structure transitions by Wave I	0.781
	(0.32)
Number of transitions	
<1 transition	80.5%
>=1 transition	19.5%

Table 2. Average number of transitions in a student's school, by student's own family instability history

Individual Levels of Family Instability	Mean Levels of Family Instabilty within Schools	
	Mean	SD
0 transitions	0.732	(0.23)
1-2 transitions	0.832	(0.24) [a]
3+ transitions	0.874	(0.24) [a, b]
F-statistic	251.2	

[a] Significantly different from 0 transitions at p<.05

[b] Significantly different from 1-2 transitions at p<.05

Table 3. Assocations Between Family-Structure History and Key Analytic Variables

	Family Instability from Birth Through Wave I				
	0	1	2	3	4+
Academic Status in the Ninth Grade					
Completed at least Algebra I	68.55	59.19	61.51	59.21	41.14
Did not complete at least Algebra I	31.45	40.81	38.49	40.79	58.86
Academic Status at the End of High School					
Dropped out of high school	9.36	16.52	17.64	19.94	21.11
Graduated from high school but did not complete Algebra II	27.08	31.45	36.31	39.09	40.78
Graduated from high school and completed at least Algebra II	63.56	52.03	46.05	40.97	38.11