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The Timing of School Transitions and Early Adolescent Problem Behavior

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Abstract

This longitudinal study investigates whether rural adolescents who transition to a new school in sixth grade have higher levels of risky behavior than adolescents who transition in seventh grade. Our findings indicate that later school transitions had little effect on problem behavior between sixth and ninth grades. Cross-sectional analyses found a small number of temporary effects of transition timing on problem behavior: Spending an additional year in elementary school was associated with higher levels of deviant behavior in the Fall of Grade 6 and higher levels of antisocial peer associations in Grade 8. However, transition effects were not consistent across waves and latent growth curve models found no effects of transition timing on the trajectory of problem behavior. We discuss policy implications and compare our findings with other research on transition timing.

Keywords

middle schools; restructuring; rural education; adolescence; education policy

Schools play a central role in helping young people successfully navigate the transition to adolescence. The quality of a student's connection and attachment to school, as well as school-level factors like school climate have been shown to protect against problem behavior and low academic achievement (Battistich & Hom, 1997; Goodenow, 1993; Henry, Swaim, & Slater, 2005; Maddox & Prinz 2003; Oelsner, Lippold, & Greenberg, 2011). Appreciating the importance of schools in the lives of early adolescents, policy makers and researchers have sought to understand the impact of schools' grade configuration (e.g., K-8, 6-8, 7-9), and thus the timing of the transition from elementary school into middle school or junior high, on promoting healthy adolescent development. To date, research on the topic has been limited both by sample and longitudinal design features and therefore has not adequately addressed these questions. The present longitudinal study adds new insights by investigating whether early adolescents who transition out of elementary school in the sixth grade have higher levels of risky behavior from sixth to ninth grade than their peers who transition out of elementary school in seventh grade. The grade configuration of a school and the timing of the transition to a new school are confounded; therefore, this study explores the association between spending an additional year of schooling (sixth grade) in elementary school and youth problem behaviors.

Problem Behavior During Adolescence

Adolescence is the period of normative onset for both substance use (DeWit, Adlaf, Offord, & Ogborne, 2000) and acts of delinquency (Tolan, 1987). Dual theories of *life-course-persistent* and *adolescence-limited antisocial behavior* suggest that while some individuals engage in problem, or antisocial, behavior consistently across the lifespan, there is a “normative and adjustive” uptick in antisocial behavior for a larger majority of individuals during adolescence (Moffitt, 1993; Moffitt, Caspi, Harrington, & Milne, 2002). The general trend of increased problem behavior during adolescence holds for both males and females (Moffitt, 1994; Moffitt & Caspi, 2001; Silverthorn & Fick, 1999).

Despite the fact that problem behavior may become normative over adolescence, the timing and onset of problem behavior may have important implications for youth adjustment. Early use of substances and early onset delinquency have been linked to later problems, such as adult alcohol use disorders, long-term criminal offending and more severe drug use (DeWit et al, 2000; Grant & Dawson, 1997; Loeber, 1996). Therefore, starting to engage in problem behavior during late childhood or early adolescence, the time when many youth may transition to a new school, may have long-term negative consequences for both the course and severity of these problems over time.

The configuration of a school may exacerbate, delay, or impede the development antisocial behaviors as school configuration directly impacts the pool of peers an adolescent interacts with-- and thus the kinds of expectancies to which they are exposed. Youth are likely to be exposed to new peer groups during school transitions and peers become a central influence on development as adolescents select, imitate, and share information with them (Berndt, 1992, 2002; Brown, 2004; Eccles, 2004; Eccles & Midgley, 1989). In fact, associations with deviant peers is one of the strongest predictors of adolescent problem behavior (Dishion, Piehler, & Myers, 2008). More studies are needed that explore how school structure and school transitions relate to the development of antisocial peers associations and problem behaviors during the adolescent transition.

The Importance of School Transitions

Effective planning of middle school transitions is important as earlier research has reported direct links between middle school transitions, increased problem behavior, and decreased academic achievement and motivation (Alspaugh, 1998; Eccles, 2004; Roeser & Eccles, 1998; Roeser, Eccles, & Sameroff, 2000). Studies suggest that students feel more disconnected from school during middle than elementary school (O'Donnell, Hawkins, Catalano, Abbott, & Day, 1995) and that, in general, students' attitudes towards school become increasingly negative between sixth and eighth grade (Simons-Morton, Crump, Haynie, & Saylor, 1999). The middle school transition also has been linked to lower self-esteem and higher rates of depression (Simmons & Blyth, 1987; Simmons, Blyth, Van Cleave & Busch, 1979; Wigfield, Eccles, MacIver, Reuman, & Midgley, 1991).

School transitions during early adolescence may be particularly challenging for girls as this transition coincides with a period when most girls are also experiencing significant hormonal and physical changes due to puberty. For example, research conducted by Simmons and colleagues (1979, 1987) shows that girls are more vulnerable than boys to decreases in self-esteem during the transition to middle school. Compared to boys, girls are more likely to experience depression during puberty which may further intensify the stress of changing schools (Meadows, Brown, & Elder, 2006). In addition, girls' friendships tend to be less stable than boys' friendships during middle school transitions (Hardy, Bukowski, & Sippola, 2002). Girls who experience the middle school transition with concurrent biological changes, early dating behavior, or residential mobility also display larger

decreases in self-esteem and academic outcomes during middle school than girls who faced fewer changes (Simmons et al., 1979, 1987).

Despite what is known about school transitions, questions remain regarding whether there are differential effects of transition in sixth grade (usually termed middle school) vs. in seventh grade (usually termed junior high) on youth social outcomes. Proponents of the sixth grade middle school transition point to the need to create a unique, developmentally supportive context that is both distinct from the culture and structure of elementary school and serves to protect early adolescents from the deleterious peer influences of older adolescents (Bedard & Do, 2005; Eccles, 2004). Eccles' stage-environment fit model argues that many middle schools may be ineffective; the increase in the number of teachers and focus on competition in middle schools may be a mismatch for adolescents' developmental needs (Eccles, 2004; Eccles, Midgley et al., 1993). Studies evaluating the effectiveness of middle schools and the middle school transition on youth outcomes rarely compare early adolescents attending middle schools to their peers schooled under different grade configurations (e.g., Eccles, 2004; Fedlauer et al., 1998) and most studies focus on academic, rather than social outcomes.

The Potential Benefits of Additional Years in Elementary School

Several studies suggest that remaining in elementary school settings up to eighth grade is beneficial for youth. Most of these studies focus on academic outcomes, and find that attendance in a K-8 school may be related to higher levels of student academic achievement and lower levels of drop-out than attending a middle or junior high school (Alspaugh, 1998; Byrnes & Ruby, 2007; Cook, MacCoun, Muschnkin, & Vigdor, 2008; Rockoff & Lockwood, 2010; Schewrdt & West, 2011; Weis & Baker-Smith, 2010). K-8 schools may have additional social benefits for youth as well. Early studies by Simmons and colleagues (1979) and Blyth, Simmons, and Bush (1978) found that girls transitioning from a K-6 to a junior high school had greater decreases in self-esteem from Grade 6 to 7 than girls that remained in a K-8 school. Boys who transitioned to a middle school also experienced more victimization from Grade 6–7. Eccles, Lord, and Midgley (1991) found that students in K-8 schools had higher academic grades, lower levels of school violence, and higher self-concepts than students in middle or junior highs. Moreover, Weis and Kipnes (2006) found that students in K-8 schools had higher levels of self-esteem than those in middle schools while Weis and Baker-Smith (2010) found evidence that youth who attend middle schools have more delinquent behavior in school than those who attend K-8 schools.

Understanding the benefits or risks of a sixth versus seventh grade transition on youth social outcomes is important, as many schools utilize either a middle or junior high school configurations. Although these studies shed light on how the middle or junior high school transition may be challenging for youth, they do not identify the best school configuration for early adolescents or the optimal time for adolescents to transition to a new school. Surprisingly, extant research on the timing of school transitions is limited, as most studies compare youth in middle school or junior high school settings to youth in K-8 schools. Many studies focus primarily on academic outcomes.

Few studies have explored whether remaining in elementary school one additional year is beneficial and the studies that do exist have yielded inconsistent findings. A recent cross-sectional study by Cook and colleagues (2008) suggests an additional year in elementary school may protect against disciplinary infractions; sixth graders in elementary schools had lower disciplinary infraction rates than sixth graders in middle schools. Bedard and Do (2005) compared the number of students completing high school on time in school districts before and after they transitioned from a junior high (Grades 7–9) to middle school system

(Grades 6–8). School districts with a higher proportion of their students attending middle schools (and thus transitioning in the sixth grade) had lower on-time completion rates. However, a few other studies suggest there may not be differences between youth who transition to an upper-level school before sixth or seventh grade (Eccles et al. 1991; Nottelmann, 1987). For example, Eccles and colleagues (1991) found no differences between early adolescents attending middle schools (Grades 6–8) and their peers attending junior highs (Grades 7–8 or 7–9) when youth were in Grade 8. However, it should be noted that this paper did not explore differences between middle and junior high schools prior to Grade 8, when transition effects may have been stronger. Further this paper did not account for potentially important school-level differences when comparing outcomes among youth in middle vs. junior high school configurations (although the authors did control for such differences in other analyses comparing K-8 to middle/junior high school configurations).

Methodological Limitations

A difficulty of studying the effect of school structure is the confounding of grade configuration and the transition itself. Recent studies indicate that it may be that the act of transitioning to a new school that influences adolescent outcomes, rather than the grade configuration of a school or when the transition occurs (Alspaugh & Harting, 1995; Byrnes & Ruby, 2007). Further, impacts on adolescent functioning after a school transition may be temporary. For example, Alspaugh and Harting (1995) found that all types of school structures (e.g., K-4, K-5, K-6, K-7, K-8) were associated with lower math and reading scores after the transition year with students' outcomes rebounding soon after. Likewise, Byrnes and Ruby (2007) found that the significant advantage afforded by K-8 schools on eighth grade reading and math scores became non-significant after accounting for the transition itself.

Research on school structure and the timing of school transitions is further complicated by differences in populations associated with school configurations. In some studies, middle schools are larger than K-8 schools and serve more youth in poverty (e.g., Byrnes & Ruby, 2007; Weiss & Kipnes, 2006), whereas other studies, such as Cook et al. (2008) report that middle schools have fewer students in poverty. Several studies have found that the relationship between school structure and youth outcomes is reduced when controlling for school and district characteristics (Byrnes & Ruby, 2007; Eccles et al., 1991). For example, Byrnes and Ruby (2007) found a negative relationship between being in a middle school (versus K-8 school) on academic achievement but the strength of this relationship was reduced when students' socioeconomic status, school size, school types, and rural/urban status were controlled in analyses. Advancing our knowledge on the effects of school structure requires more longitudinal studies that span the middle school period and utilize multilevel models to account for school district characteristics.

The Present Study

This five wave longitudinal study explores the association between the timing of school transitions and adolescent problem behavior over the middle school period. Specifically, we investigate differences in rates of adolescent substance use, association with antisocial peers, and delinquency from sixth to ninth grade between youth in rural areas and small towns who transition to a new school in sixth grade versus those who transition in seventh grade. This research adds to the literature in several important ways. First, we specifically explore the effects of spending one additional year (Grade 6) in an elementary school on youth problem behavior, an unanswered question in the education policy literature. Second, we examine longitudinal outcomes of youth across the middle school years, from Grade 6 to Grade 9, and thus can examine short- and longer-term effects of transition timing. Third, we focused

on psychosocial outcomes using adolescent self-report data. Self-report data removes the potential differences between schools or school districts in terms of policies related to reporting strategies, a potential confound of other studies (e.g., Cook et al., 2008). Self-report data also allows us to explore differences in serious problems as well as early indicators of problem behavior, such as antisocial peer associations or attitudes towards alcohol, tobacco, and drug use. Lastly, our study uses multilevel modeling, which allows us to control for the impact of school district-level variables on student outcomes. Multi-level models are recommended for use with nested data in order to obtain accurate model estimates and standard errors (Bryk & Raudenbush, 1987; Willet & Singer, 2003).

Following from past findings, we hypothesize that spending an additional year in elementary school will be protective; youth who transition in seventh grade will have lower rates of problem behavior than youth who transition a year earlier in sixth grade. Because studies suggest girls may have more difficulty with middle school transitions than boys, we expect the transitions in seventh grade will be associated with more problem behaviors for girls than boys (Simmons et al., 1979, 1987). Because research suggests students may rebound after a transition (Alspaugh & Harting, 1995), we expect that initial differences in behavior based on the timing of the transition will be reduced over time, as youth adjust to a new school.

Method

Data for this study come from the PROSPER Project (PRoMoting School-community-university Partnerships to Enhance Resilience). PROSPER is a large-scale randomized trial of preventive interventions involving 28 small towns and rural communities in Iowa and Pennsylvania. Communities were randomly assigned into the intervention or control condition. Schools in intervention communities implemented two evidence-based programs designed to reduce adolescent substance use: a school-based curriculum (delivered in the seventh grade to all students) and a family-based program (offered to all families of sixth graders). Schools selected programs from a menu of evidence-based interventions. In addition, districts were supported by community-based prevention teams (see Spoth, Greenberg, Bierman, & Redmond, 2004 for more information on the PROSPER project and the sample).

Participants

In order to specifically explore differences in problem behavior among youth who transition to a new school before sixth grade with those that transition before seventh grade, we removed all students in K-8 schools from our sample ($N=1,653$). Data for this study came from 14,926 adolescents (51% female). Participants were 79% White, 4% Black, 7% Hispanic, 4% Native American, 1% Asian, and; an additional 5% self-identified as other ethnicities. Of the total sample, 8,753 adolescents in 14 school districts transitioned at sixth grade and 6,173 students in 11 districts transitioned in seventh grade. Seven percent of the districts that transitioned to new schools in sixth grade have middle schools/junior high schools that include ninth graders, while 27% of the districts that transitioned in seventh grade have middle schools/junior high schools that include ninth graders. Seventy-five percent of our districts only contained only one middle or junior high school. The mean age of the students at the time of data collection in the fall of sixth grade was 11.9 years ($SD = 0.5$). Thirty-seven percent of participants qualified for free or reduced lunch.

Measures

All measures were based on adolescent self-reports. The current study utilizes longitudinal data from adolescents who participated in the school survey over five time points (Fall of

Grade 6; annually each Spring of Grade 6 through Grade 9). For more information on the measures used in this study see (Elliot et al., 1985; Elliott et al., 1989; Simons et al., 1994; Spoth, Redmond, & Shin, 2001; Spoth et al., 2007).

Deviant behavior—Four items assessed participants' involvement in four deviant behaviors ($\alpha = .72$), including: (a) taking something worth less than \$25, (b) beating up someone or physically fighting with someone out of anger, (c) purposely damaging or destroying someone else's property, (d) throwing objects such as rocks or bottles at people to hurt or scare them. Responses were coded: *Never* (0) or *Once or more* (1) and summed. The scale ranged from 0–4.

Antisocial peer behavior—Three items measured whether participants' closest friends engaged in antisocial behavior ($\alpha = .83$). One item, for example, read: “These friends sometimes get into trouble with the police.” Responses were scored on a 5-point Likert scale ranging from *Strongly Disagree* (1) to *Strongly Agree* (5). Conger and colleagues (1992).

Substance use expectancies—Positive beliefs about the use of alcohol, cigarettes, and marijuana were assessed using 11 items ($\alpha = .95$). Example items include: “Smoking cigarettes makes you look cool” and “Kids who use marijuana (pot) have more friends.” Agreement was recorded on a 5-point Likert scale: *Strongly Disagree* (1) to *Strongly Agree* (5).

Substance refusal intentions—Presented with a 5-item list ($\alpha = .89$) of various alcohol, tobacco, and drug substances, participants were asked to indicate the likelihood they would “say no” when “someone tries” to get them to use. These substances included: cigarettes; beer, wine, or liquor; marijuana or hashish; cocaine, methamphetamine, or other hard drugs; glue, paint, gas, or other things you inhale to get high. For these analyses, refusal intentions for each item were recorded on a 5-point scale: *Definitely would not say “no”* (5) to *Not sure* (3) to *Definitely would say “no”* (1).

Alcohol use—A cumulative index of participants' alcohol use was created using 6 items about various forms of beer, wine, and liquor consumption (e.g., more than just a few sips, ever had a drink, drunkenness). Items were coded to create an index ranging from 0 to 6 with higher scores indicating greater amounts of alcohol use.

Polysubstance initiation—Initiation of alcohol, tobacco, and drug use was assessed by asking participants to indicate whether they had ever used seven different substances (e.g., cigarettes, ecstasy, glue, Vicodin). Responses were coded *No* (0) or *Yes* (1) with the index ranging from 0 to 7 with higher scores indicating greater amounts of poly-substance use.

Covariates—Adolescents' age, race (1 = White, 0 = non-White) and poverty status (1 = Received free or reduced cost lunch, 0 = Did not) were controlled. In addition, the following district-level covariates were entered into our models: racial composition (percent White vs. non-White), poverty (percent Free or reduced cost lunch), rurality (percent rural), spending per student, school size (< 450 students vs. 450–1000 students vs. > 1,000 students), state of residence (Iowa vs. Pennsylvania), and inclusion of Grade 9 in the school (i.e., school with Grades 6–8 vs. 6–12). Because these data are part of a larger, randomized intervention study, intervention condition was also controlled.

Results

Plan of Analysis

To examine differences in problem behaviors among youth who transitioned in sixth grade versus seventh grade, we explored mean differences in problem behaviors at each wave, using cross-sectional multilevel Tobit models and binomial models that control for all of the individual- and district-level covariates using Stata 11 (Stata, 2007). Drawing from prior research which suggests there are differences in the onset and timing of problem behavior among genders (Chassin et al., 2003; Hawkins, Catalano, & Miller, 1992; Moffitt, 1993; Petraitis, Flay, & Miller, 1995; Putallaz, & Bierman, 2004), we also tested for significant gender moderation. Lastly, we used Tobit and binomial latent growth curve models to explore differences in trajectories of problem behavior over time based on transition timing using MPlus 6 (Muthén &, & Muthén, 1997–2011).

Descriptive Analyses

Descriptive statistics, by sex, for the outcomes are presented in Table 1. As expected, all risk behaviors show increasingly higher mean scores across early adolescence. Correlations examined the relations among the outcome variables.¹ As expected, participants' responses from the same questionnaire were more highly correlated in adjacent years, and were less related between more temporally distal time points. Similarly, correlations were higher within domain (deviant behavior, substance use, or substance expectation/refusal intentions) than across domain. In general, correlations between the same measure assessed at adjacent time points were moderate to strong (range $r = .31$ to $r = .85$), while correlations between the most distal time points were in the weak to moderate range ($r = .16$ to $r = .55$) indicating that there is both stability and significant temporal variation across the five waves of data.

At the individual-level, both boys and girls were significantly more likely to receive free or reduced cost lunch if they transitioned in sixth rather than seventh grade (Boys: $F(1,6820) = .683$, $p < .01$, Cohen's $d = .08$; Girls: $F(1,6827) = 26.95$, $p < .01$, Cohen's $d = .12$). Age and race were significantly different for girls (Age: $F(1,6845) = 7.45$, $p < .01$, Cohen's $d = .06$; Race: $F(1,6812) = 6.84$, $p < .01$, Cohen's $d = .07$), but not for boys (Age: $F(1,6834) = .27$, $p > .10$; Race: $F(1,6798) = 0.00$, $p > .10$), with girls who transitioned in sixth grade being slightly older and more likely to be White than girls who transitioned in seventh grade. However, the effect sizes for these mean differences were quite small ranging from .06 to .12 (Cohen, 1988, 1992). At the district-level, there were no significant differences in covariates between school districts with different transition timings, suggesting that there were no systematic differences in the types of communities with school districts that transition out of elementary school earlier or later. Correlations between the individual- and district-level covariates were also calculated. Only two correlations were above .40, with most having a correlation of $r < .10$, indicating that the covariates are non-redundant and control for unique variance in the models.

Missingness

Most participants (91.4%) had complete data on all covariates included in the models. The number of participants with missing outcome data at any time point varied from year to year and variable to variable, ranging from 9,325 to 10,115 participants with complete data. In order to account for missing data in our cross-sectional models, multiple imputation procedures were used to create five different datasets using ICE in Stata. The literature suggests that five imputations are often sufficient (Schafer & Graham, 2002). Results were

¹The large *correlation* table among all study variables is not shown due to space limitations. The correlation table can be obtained from the first author.

combined across these 5 imputed datasets using Rubin's Rules (Rubin, 1987; Schafer, 1997). For our latent growth curve models, missing data was handled using Full Information Maximum Likelihood (FIML) procedures (Schafer & Graham, 2002).

Cross-Sectional Models

Multilevel models were used to account for the non-independence that result from participants being grouped within school districts, and the fact that the predictor variable of interest is at the school district-level, while the dependent variable is at the individual-level. Because the dependent variables are censored, with a high number of respondents indicating no problem behavior (Tobin, 1958), multilevel random-effects Tobit and negative binomial models were run. A Tobit link function was used for the three dependent variables that used a Likert-type scale (i.e., antisocial peer behavior, substance refusal intentions, and substance use expectancies) while negative binomial models were used for the three count variables (i.e., delinquency, alcohol use, and polysubstance use).

Model 1 tested the main effect of transition timing within each wave of data (see Table 2). Model 2 added a gender by interaction term to test for a moderation effect of being male or female. Because of the number of models computed, only the regression coefficients for transition timing and, if present, gender by transition timing is presented at each wave.² All outcomes are coded such that higher scores indicate more risky behavior. Transition timing was coded as sixth grade = 1 and seventh grade = 0. Therefore, negative transition timing coefficients indicate that later transitions are related to more risky behavior (see Table 2). Models control for all individual and district covariates.

Fall of sixth grade—To examine whether there were initial differences between youth who transition in sixth vs. seventh grade, separate models were estimated for each dependent variable. One significant difference was found in Grade 6. Youth who transitioned to a new school in seventh grade had significantly higher levels of deviant behavior than those who transitioned in Grade 6 ($\beta = -.25, p < .05$). This effect was not moderated by gender.

Spring of sixth grade through Spring of ninth grade—Multilevel models were estimated for each outcome in the spring of adolescents' sixth grade through ninth grade years. These models were computed to examine: (a) differences after students had been in a new school for almost a full school year, compared with those students who remained in elementary school (spring of sixth grade outcomes), and (b) sustained differences at later time points (seventh to ninth grade outcomes). All models included students' sixth grade scores as covariates, as well as the individual and district-level covariates included in the previous models.

One significant transition effect was found between Spring of Grade 6 and 8 which contradicted our original hypotheses and suggest that students who transitioned at sixth grade show somewhat less risky behavior than those who transition later (Table 2, Model 1). In the Spring of Grade 8, youth who transitioned to a new school in sixth grade showed significantly lower levels of antisocial peer associations ($\beta = -.17, p < .05$). This result was not moderated by gender. Analyses show no statistically significant differences on any outcome in either sixth grade spring, seventh grade spring, or ninth grade spring between transition groups. These results suggest that there may be one small, transitory effects of transition timing that may emerge over the course of middle school. However, this difference was not sustained over time and there was no effect of transition timing on most of our dependent variables.

²Complete models including coefficients for all covariates can be obtained from the first author upon request.

Gender moderation: It should be noted that we also conducted analyses of models that examined whether transition timing was moderated by gender (See Table 2, Model 2). For seven dependent variables, we found a significant gender-by-transition timing interaction. For these variables, we conducted follow-up analyses for boys and girls separately, in order to test if there were simple effects of transition timing on problem behavior for either gender (results not shown). No significant transition effects were found for boys or girls for any of the follow-up analyses.

Longitudinal Models

No significant transition effects were found using latent growth curve models. Transition timing did not have a significant effect on the levels of risky behavior or their trajectory over time.³

Discussion

Our results suggest that whether students transition from elementary to middle or junior high school in Grade 6 or 7 is unlikely to have lasting effects on their problem behavior over time. Our cross-sectional models indicate that there were a small number of temporary effects of transition timing on risky behavior, but these differences were not consistent across time. For example, our cross-sectional models indicate that spending an additional year in elementary school was associated with greater deviant behavior in the Fall of Grade 6, and higher levels of antisocial peers in the Spring of Grade 8. However, these modest transition effects were inconsistent across waves and became non-significant before ninth grade. Furthermore, there was no evidence that transition timing affected the trajectories of problem behavior over time. Therefore, although a few temporary effects of transition timing were observed, the timing of school transitions did not have long-term effects on problem behavior.

Our findings differ from studies suggesting that early adolescents who stay in elementary school longer have lower rates of problem behavior (Cook et al., 2008; Weiss & Kipnes, 2006). Cook and colleagues (2008) argue that housing youth in elementary schools an additional year is protective against disciplinary infractions, as it may delay exposure to older youth and negative peer influences. Our findings suggest that among rural youth, a later transition is not protective against problem behavior either immediately or over the next few years, at least not when compared to transitioning one year earlier.

Several studies now suggest that students in K-8 schools have more positive academic outcomes than youth who transition to middle schools (Byrnes & Ruby, 2007; Rockoff & Lockwood, 2010; Schwerdt & West, 2011). Yet, in our study, spending one additional year in elementary school (sixth grade) does not incur the same benefits on problem behavior. It is possible that the advantage of remaining in elementary school longer becomes most apparent when students remain with younger students up until eighth grade, which means they may not only undergo one less school transition, but they may also attend smaller neighborhood schools closer to their homes. Alternately, the benefits of staying in elementary school longer may be stronger for academic outcomes than problem behavior outcomes. Unfortunately, we did not have enough K-8 schools in our data to compare students in K-8 schools with those who transition before the sixth or seventh grade. We also do not have scores on standardized tests for the youth in our sample.

³The growth curve model for deviant behavior did not converge as a three-level negative binomial model. However, analysis using a traditional three-level growth curve demonstrated no effects of transition timing on problem behavior.

The rural nature of our sample may have influenced our findings. Our sample included 25 rural communities and small towns in Iowa and Pennsylvania and the vast majority of students were White. Most studies on school structure have focused on urban populations (e.g., Rockoff & Lockwood, 2010; Weiss & Kipnes, 2006) or utilized state-level administrative data (Cook et al., 2008; Schwerdt & West, 2011). It is possible that school structure has a different impact on youth behavioral outcomes in urban rather than rural communities. Only one prior study, to our knowledge, explored potential differences in the effects of school structure by community type. Schwerdt and West (2011) found that attending a middle or junior high school was associated with a stronger decline in academic achievement for youth living in both rural and urban locations compared to those who attend K-8 schools. However, the effect of school structure on academic outcomes was much stronger among youth in urban areas than those in rural locations. Rural communities have a smaller number of schools than urban communities, making it more likely that youth will be transitioning into a new school with their same cohort of friends. In rural communities, school transitions may be less likely to disrupt existing friendship networks than transitions in larger communities. Lastly, rural youth may have fewer choices regarding which high school to attend than youth in urban areas. A recent study by Weis and Baker-Smith (2010) suggests that much of the long-term academic advantage of attending a K-8 school over a middle school may be explained by differences in the choice of high school. More studies are needed that explore the potential differences in the effects of school structure by community characteristics.

The differences in findings between some prior research and our findings may, in part, be explained by differences in measures or methods of analysis. Many studies that have explored the effects of school structure on psychosocial outcomes have been cross-sectional (e.g., Cook et al., 2008, Weiss & Kipnes, 2006) or have only followed youth over the transition year (e.g., Eccles et al., 1993; Simmons et al., 1979; Simmons et al., 1987). Collection of multiple years of data may have resulted in different findings from prior studies, especially as our study suggests that one small temporary transition effects on problem behavior may emerge near the end of the middle school period. In addition, most early studies on school structure did not utilize multilevel modeling techniques, which can account for important district-level differences. Furthermore, Cook et al. (2008) control for school-level covariates, such as race, ethnicity, parent education, and poverty. We were only able to control for these characteristics at the district level. Cook et al. also matched schools using propensity scores, which we were unable to do due to the small amount of districts in our sample. These methodological differences may also explain the discrepancy between our findings and some prior studies.

Second, we examined self-report of problem behaviors. In contrast, Cook et al. (2008) used school-reported disciplinary infractions and it is possible that their findings reflect differences in school policies or school reporting procedures rather than differences in actual behavior, a limitation they note. That is, middle schools being both larger and new to sixth graders may be more formal in their reporting policies for behavioral incidents. Cook et al. refuted this possibility, as differences in behaviors by school type were found when all students were in junior or middle schools. Thus, reporting biases are unlikely to explain their result. The self-report data used here eliminates possible effects of differences between schools in reporting procedures, as all youth in our study were asked the same questions over time. Our data is not limited to behaviors that are formally reported by schools, and therefore may contain information on behavior that school personnel are not aware of such as behaviors that occur outside of the school context. Future longitudinal studies that integrate both self-report and administrative data would help us understand how the source of data may impact study findings.

When interpreting these findings, a few limitations should be considered. First, our findings do not shed light on the specific aspects of schools, such as classroom size or school climate that may promote healthy development. While we attempted to control for systematic differences (e.g., poverty) between school districts that transition at different times, as with any non-experimental design, it is possible that an unmeasured variable may be influencing our findings. Our sample included youth who were living in small towns and rural communities and may not be generalizable to urban populations. There are limitations to relying on self-report data, as it may contain some reporter bias. Additional analysis on administrative data may have enhanced our findings.

Considered in tandem with the extant literature on school transitions, our data suggests the school structure debate is far from over. A growing body of literature suggests that youth may benefit academically from remaining in elementary school through Grade 8. However, less is known about the effects of remaining in elementary school for only one additional year. Further, most studies have focused on academic, rather than behavioral outcomes for youth. Our study suggests that transitioning to a new school in seventh grade (thus, spending sixth grade in an elementary school) may have a few temporary, negative consequences for youth behavior. However, transition timing did not have sustained effects on youth problem behavior over time. More studies are needed that explore possible differences in the effects of school structure on problem behavior based on urbanicity and other community characteristics. Large scale initiatives to change school structures to keep youth in elementary school longer may be premature.

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Biographies

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Table 1

Means and standard deviations of outcome variables.

	Range	Fall Grade 6		Spring Grade 6		Spring Grade 7		Spring Grade 8		Spring Grade 9	
		M	SD	M	SD	M	SD	M	SD	M	SD
<i>Girls</i>											
Deviant Behavior	0 – 4	0.28	0.67	0.33	0.77	0.47	0.91	0.60	1.01	0.60	1.00
Antisocial Peer Behavior	1 – 5	1.41	0.72	1.49	0.77	1.70	0.91	1.91	0.98	2.05	0.99
Substance Use Expectancies	1 – 5	1.26	0.45	1.28	0.54	1.38	0.61	1.49	0.68	1.68	0.77
Substance Refusal Intentions	0 – 4	0.14	0.48	0.20	0.50	0.33	0.64	0.50	0.76	0.67	0.83
Alcohol Use	0 – 6	0.38	0.81	0.66	1.12	1.15	1.55	1.85	1.90	2.64	2.13
Poly Substance Initiation	0 – 7	0.21	0.59	0.41	0.86	0.73	1.21	1.20	1.56	1.69	1.78
<i>Boys</i>											
Deviant Behavior	0 – 4	0.66	0.97	0.74	1.05	0.83	1.13	0.93	1.22	0.92	1.23
Antisocial Peer Behavior	1 – 5	1.59	0.87	1.65	0.87	1.82	0.96	2.02	1.00	2.16	1.03
Substance Use Expectancies	1 – 5	1.31	0.55	1.33	0.60	1.44	0.69	1.57	0.78	1.80	0.87
Substance Refusal Intentions	0 – 4	0.20	0.55	0.25	0.59	0.36	0.70	0.49	0.78	0.65	0.86
Alcohol Use	0 – 6	0.57	1.02	0.88	1.26	1.28	1.53	1.85	1.84	2.50	2.09
Poly Substance Initiation	0 – 7	0.33	0.75	0.57	1.03	0.85	1.28	1.22	1.53	1.60	1.73

Table 2

Results from cross-sectional multi-level models

	Model 1		Model 2					
	Main Model		Including a Gender by Timing Interaction Term					
	Transition Timing		Transition Timing		Gender		Gender × Timing	
	B	SE	B	SE	B	SE	B	SE
Antisocial Peer Behavior								
Fall, Grade 6	-0.13	0.08	-0.13	0.08	0.13*	0.04	0.00	0.04
Spring, Grade 6	-0.03	0.07	-0.03	0.07	0.06*	0.03	-0.03	0.04
Spring, Grade 7	0.01	0.05	0.01	0.05	0.01	0.02	0.02	0.03
Spring, Grade 8	-0.17*	0.07	-0.17*	0.07	0.02	0.03	0.00	0.03
Spring, Grade 9	-0.08	0.05	-0.08	0.04	0.01	0.02	0.03	0.03
Substance Use Expectancies								
Fall, Grade 6	-0.08	0.11	-0.08	0.10	0.05	0.03	-0.03	0.03
Spring, Grade 6	-0.14	0.09	-0.14	0.09	0.16	0.36	-0.01	0.02
Spring, Grade 7	0.04	0.06	0.04	0.06	0.00	0.02	0.03	0.02
Spring, Grade 8	-0.05	0.06	-0.05	0.06	0.03	0.02	0.02	0.02
Spring, Grade 9	-0.05	0.11	-0.06	0.12	0.06**	0.02	0.00	0.03
Substance Refusal Intentions								
Fall, Grade 6	-0.09	0.11	-0.08	0.09	0.11*	0.04	-0.07	0.04
Spring, Grade 6	0.01	0.06	0.01	0.07	0.02	0.02	0.00	0.03
Spring, Grade 7	0.01	0.07	0.01	0.07	-0.03	0.02	0.03	0.03
Spring, Grade 8	-0.05	0.07	-0.05	0.07	-0.05	0.05	0.05*	0.02
Spring, Grade 9	0.02	0.05	0.02	0.05	-0.07*	0.03	0.04	0.03
Alcohol Use								
Fall, Grade 6	-0.05	0.10	-0.05	0.11	0.11*	0.03	0.00	0.03
Spring, Grade 6	-0.09	0.16	-0.10	0.15	0.05†	0.02	0.03	0.03
Spring, Grade 7	-0.03	0.08	-0.03	0.08	-0.01	0.02	0.07*	0.03
Spring, Grade 8	-0.02	0.05	-0.02	0.05	-0.02†	0.01	0.02	0.02
Spring, Grade 9	-0.03	0.04	-0.03	0.04	-0.03*	0.01	0.01	0.01
Poly Substance Initiation								
Fall, Grade 6	-0.03	0.13	-0.02	0.13	0.13*	0.04	-0.06	0.05
Spring, Grade 6	-0.11	0.14	-0.11	0.14	0.00	0.04	0.09†	0.04
Spring, Grade 7	-0.19	0.12	-0.20	0.12	-0.01	0.02	0.09*	0.04
Spring, Grade 8	-0.12	0.07	-0.13	0.07	-0.02	0.02	0.04†	0.02
Spring, Grade 9	-0.11	0.09	-0.11	0.09	-0.05*	0.01	0.03	0.02
Deviant Behavior								
Fall, Grade 6	-0.25*	0.10	-0.24*	0.1	0.33***	0.03	-0.03	0.05

	Model 1		Model 2					
	Main Model		Including a Gender by Timing Interaction Term					
	Transition Timing		Transition Timing		Gender		Gender × Timing	
	B	SE	B	SE	B	SE	B	SE
Spring, Grade 6	-0.31	0.22	-0.32	0.22	0.20 **	0.03	0.00	0.04
Spring, Grade 7	-0.09	0.05	-0.04	0.09	0.14***	0.03	0.08 *	0.03
Spring, Grade 8	-0.17	0.09	-0.18 *	0.09	0.11***	0.03	0.08 *	0.04
Spring, Grade 9	-----		-----					

Notes.

Significant findings are in bold typeface. This table contains coefficients for school transition timing, gender, and their interaction only. All models control for individual- and school district-level covariates, including gender. Variables were coded such that positive coefficients indicate that students who transitioned at the beginning of sixth grade show riskier outcomes and negative coefficients indicate that students who transitioned at the beginning of seventh grade show riskier outcomes. Gender is effect coded such that girls = -1, boys = 1. A dash indicates that the model did not converge.

* $p < .05$.

** $p < .01$.

*** $p < .001$.