PEER AFFLIATION STABILITY, SENSE OF SCHOOL BELONGING AND ACADEMIC ACHIEVEMENT IN EARLY ADOLESCENCE: DOES GRADE CONFIGURATION MATTER?

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ABSTRACT

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Peer Affiliation Stability, Sense of School Belonging and Academic Achievement in Early
Adolescence: Does Grade Configuration Matter?
(Under the direction of Dr. Jill V Hamm)

This study focused on the middle school transition and how the social world of peers

affected the academic world of early adolescents. Specifically, it focused on the transition to

middle school and how it might disrupt peer groups and affect academic achievement. This

study included three rural samples from different regional studies. Study 1 was an

Appalachian sample with a middle school transition while Study 2 was a Midwest sample

where some students had a middle school transition and some did not. This research extends

the literature on peer group stability by creating a new individual-level peer group stability

indicator. Differences in peer stability were found in all three samples. However, mixed

results were found for peer stability across time and academic achievement indicators. No

significant differences were found by school grade configuration, indicating that the middle

school transition in Study 2 did not affect peer group stability.

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Introduction

Early adolescence is an important time in development with rapid physical, cognitive, and social changes. These changes affect how adolescents think about themselves and others as well as the decisions that they make for themselves. Peer influence and acceptance are more important during this time period than in any other (Berndt, 1999). Researchers speculate that the developmental changes lead adolescents to turn to peers for help in understanding and adapting to the changes in their life (Cook, Deng, & Morgano, 2007). On top of these developmental changes, early adolescents are also usually expected to transition from an elementary school into a middle school or a junior high school. The transition from elementary school to middle school can often be difficult due to individual changes in physical, intellectual, cognitive, and social development and school-level environment changes like combining multiple elementary schools into one school. Peer relationships can be volatile during this time, with rapid changes occurring at the clique and network level (Cairns & Cairns, 1994). During the middle school transition, students are introduced to new peers from other schools. These disruptions in peer groups can lead to students focusing on their social needs (i.e., "fitting in") instead of the academic goals of school (Kiefer & Ryan, 2008). The decisions that are made during the middle school transition can have long-lasting effects including academic failure and dropout (Cook, MacCoun, Muschkin, & Vidgor, 2008; Juvonen, Le, Kaganoff, Augustine, & Constant, 2004; Seidman, Aber, & French, 2004).

The modern dominant theoretical framework for looking at school transition is Eccles' et al. (1991, 1993) stage-environment fit theory. From this perspective, adolescence

is a period of time where changes are rapidly occurring in terms of physical, intellectual and emotional development, identity and social role redefinitions, and school transitions. Behavior, motivation, and mental health are influenced by the fit between the characteristics individuals bring to their social environments and the characteristics of those social environments. One environment shared by almost all early adolescents is school. According to Eccles et al. (1993), the mismatch between student development and their school environment is what leads to problems in academic motivation, performance, and achievement.

Changes due to school transition focus on three areas: procedural, academic, and social (Akos, 2002). Academic aspects involve concerns about increased homework and difficult courses; procedural concerns include the physical and organizational aspects of middle school (i.e., changing classes, lockers); and social aspects include making new friends. Little study has focused on the relationship between the academic and social concerns. However, studies have shown that peer support can aid in the transition to middle school. Students that perceived support through an established peer group were more successful in the transition period than students who did not perceive such support (Cauley & Jovanovich, 2006).

The middle school environment is usually different from the elementary school environment. Rather than being connected to one primary teacher like most elementary schools, students are expected to rotate to different teachers throughout the day. Adolescents may or may not have classes with their friends from elementary school in middle school. Students may have lots of different classmates throughout the day due to class schedules and academic tracking policies. Class sizes in middle schools are typically larger than in

elementary schools, since the middle schools draw students from multiple elementary schools (Juvonen et al., 2004; Wigfield, Byrnes, & Eccles, 2006).

As students move from one educational setting to another in early adolescence, studies have shown student declines in motivation, behavior and self-perception (Kingery & Erdley, 2007; Wigfield, Lutz, & Wagner, 2005). Environmental factors found in middle schools, such as classroom size and structure, school size, and student participation have been found to impact the peer group structure (Hardy, Bukowski, & Sippola, 2002). Changes to the peer group structure and lack of peer group support can lead to lowered level of school belonging, less positive feelings towards school and to academic disengagement (Hamm & Faircloth, 2005; Kingery & Erdley, 2007).

The role of peers is quite important to adolescent identity and most adolescents are characterized through their membership in cliques and groups (Cairns, Leung, Buchanan, & Cairns, 1995; National Research Council, 2004; Ryan, 2001). Peer influences become more important as adolescents move away from their families and are building unique personal identities. Peers are the standards by which these individuals judge themselves and model behavior for one another (Cook et al., 2007; Ryan, 2001; Wentzel, 2003). Some researchers contend that peer pressure can lead to delinquency and other negative outcomes (Cook et al., 2008; Kiefer & Ryan, 2008). Others contend that adolescents select the peer groups that best fit those characteristics that the adolescents themselves value and that these can be both positive and negative (Cook et al., 2007; Ryan, 2001). Students who feel that their peers support and care for them tend to be more engaged in academic classroom activities (Wentzel, 2003).

Since peers play a vital role in positive transitions to middle school, an important question is how peer group stability might alleviate the detrimental effects of school environmental change both through providing a shared history with peers and through socialization patterns within groups. That is, peer group stability might help students adjust throughout the middle school transition. Stable peer groups might lead to a greater sense of school belonging because of the security these groups can offer as well as the established values of the group. Peer group stability might also improve academic achievement outcomes, by enabling early adolescents to focus less attention on social concerns and more attention on academics, due to already established bonds with peers. However, positive impacts of peer group stability on academic achievement are complicated by the fact that not all groups have prosocial outcomes. Some groups defined themselves through academic failure, deviant behavior and other negative attributes (Kindermann, 1993; Ryan, 2001). Stable groups that have these more negative attitudes and behaviors may increase the adolescent's maladaptive behavior towards school and others, even while providing a sense of belonging within the school environment (Hamm & Faircloth, 2005).

Another important aspect in the transition to middle school is the adolescents' sense of school belonging. A sense of school belonging or connectedness to the school and the people within the school can lead to better adjustment to the transition as well as an increase in motivation (Osterman, 2000). School belonging has also been conceptualized as the representation of social bonds between students and adults in the school and the norms that govern those interactions (Goodenow, 1993). A strong sense of belonging leads to a stronger commitment to school goals and engagement in school activities (Goodenow, 1993). A strong sense of school belonging can lead to higher school motivation, effort and

participation and, in turn, lead to greater academic achievement (Goodenow, 1993; Hamm & Faircloth, 2005; Ostermann, 2000). Goodenow (1993) indicated that the sense of school belonging mediates academic achievement through motivation as well as other indicators.

There has been a significant amount of research that has focused on the middle school transition and the difficulties that it can produce. The issue of how the middle grades are best configured to alleviate these transition issues has been an important policy and reform issue for at least fifty years. These reforms continue to be advocated to better serve early adolescents' needs as well as to meet the pressures of academic accountability (Mac Iver & Mac Iver, 2006). Several different grade configurations are commonly used: middle school, junior high, and K-8. The typical configuration for most U.S. schools is middle school, in which an elementary school that serves kindergarten through fifth grade is followed by a middle school that serves sixth through eighth grades. In the case of the junior high configuration, a student would attend their elementary school until sixth grade and then transition into junior high in seventh grade. Typically, junior high schools serve seventh and eighth grades, but they can run through ninth grade as well. Finally, there are K-8 schools that serve kindergarten through eighth grade. Unlike the middle school or junior high model, there are no building transitions in these schools.

Some researchers contend that stage-environment fit mismatches can be reduced through changing how schools are configured, specifically by utilizing K-8 rather than middle school configurations (Eccles, Lord, & Midgley, 1991, Mac Iver & Epstein, 1993). Recent policies in urban areas such as the Philadelphia, Cleveland, and Baltimore city school systems have started converting middle schools into K-8 schools with the belief that these schools better foster student achievement (Byrnes & Ruby, 2007; Mac Iver & Mac Iver,

2006). However, these changes have usually been implemented without directly comparing student outcomes in these different school grade configurations (see Weiss & Kipnes, 2006 for an exception). These studies usually focus on aspects of the school structural environment rather than on student experiential factors such as how peer group stability is affected through different grade configurations, and its subsequent effect on student achievement. No research has focused on differences in peer group stability in K-8 versus middle schools and how the stability of peer groups might impact academic achievement.

Distinctions between school configurations, and their relevance to student achievement, are of particular relevance in rural areas. According to data from the National Center for Educational Statistics (NCES) for the school years 2005-06, 62% of schools designated as rural were K-8 or K-12, while the remaining 38% were middle school configuration (U.S. Department of Education, 2007). There is no one clear definition for rurality used by researchers. Rurality encompasses a broad diversity of communities and populations differing by geographical region, ethnic composition, occupational structure and access to cities (Crockett, Shanahan, & Jackson-Newsom, 2000). Rural schools tend to be small, scattered across a large geographical area and often have limited financial resources. Adolescents in rural areas may differ from adolescents in suburban and urban areas by being more inclusive, having denser social networks, feeling more confident and having more responsibility (Crockett et al., 2000). Middle school transitions which occur for the majority of students in suburban and urban areas do not occur for the majority of students in rural areas. A fundamental question is the extent to which a lack of a building change in middle school keeps changes in peers and academics from occurring, or if student adjustment in K-8 schools resembles adjustment in schools that have a middle school transitions.

The current investigation includes two studies that focused on the impact of peer group stability on academic achievement during early adolescence. Both studies are longitudinal and focused on a transitional point in students' lives from fifth to sixth grade and are drawn from rural populations. Most studies focus on grade configuration during the middle grades and academic achievement (Alspaugh, 1998; Bedard & Do, 2005; Byrnes & Ruby, 2007; Weiss & Kipnes, 2006; Wihry, Coladarci & Meadow, 1992) or middle school transitions and peer relations (Cauley & Jovanovich, 2006; Cook et al., 2007; Hardy et al., 2002; Kingery & Erdley, 2007). This study is unique in that it focused on relationships among academic achievement, peer group stability and grade configuration simultaneously within the same early adolescent population. Additionally, these relationships were studied to test the extent to which school belonging mediated the relationship between peer group stability and academic achievement. The first study investigated peer group stability across an elementary to middle school transition and determined the extent to which peer group stability played a role in academic achievement. In addition, the role of school belonging was also studied as part of the relationship between peer group stability and academic achievement. Higher levels of peer group stability were expected to cause higher levels of academic achievement in a direct way but academic achievement might also be indirectly affected through peer group stability strengthening a sense of school belonging. It was conceptualized that long term stability with peers was a critical element in early adolescents' sense of school belonging (Hamm & Faircloth, 2005). Additionally, a greater sense of school belonging would lead to higher academic achievement outcomes (Goodenow, 1993; Osterman, 2000). In the second study, schools with different school grade configurations – those with a middle school transition and those that did not have a middle school transition

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(i.e., K-8) were studied. Two aspects of this study included: a) seeing if there were different levels of peer group stability by school grade configuration type and b) assessing the relationship of peer group stability to academic achievement in both configuration types. As with Study 1, the second study also included the role of school belonging and this variable was expected to mediate the relationship between peer group stability and academic achievement in the same way as described above. No differences were expected in the mediation model by school grade configuration.

Review of Literature

This study focused on the relationships between peer group stability, school belonging and academic achievement indicators and how different school grade configurations may have different pattern of relationships among these variables. First, I assessed peer group stability and a sense of school belonging. Next, I addressed the relationship between peer group stability and school belonging and their impacts on academic achievement. Finally, I looked at how different school districts might organize the middle grades and how that might affect peer group stability and academic achievement.

Peer Group Stability

Peers play a dynamic role in social relations and student adjustment during the middle school transition (Cook et al., 2007). Researchers also suggest that peers have substantial influence on academic outcomes, including academic norms, motivation and achievement (Berndt, 1999; Kindermann, 1993; Kingery & Erdley, 2007). Peers influence adolescents' academic behavior in direct and indirect ways, through social approval, modeling, group reputation factors and assistance in academic goals (Cook et al., 2007). This influence can be exerted in both positive and negative ways (Ryan, 2001). Peer groups can shape the adolescent's motivation, expectations and values through shared norms and characteristics of the peer group. Thus, the peer group can influence the change or reinforcement of academic achievement behaviors.

The importance of peers and peer groups during early adolescence has been well documented (Berndt, 1999; Cook et al., 2007; Wentzel, 2003). However, little study has focused on how stable these peer groups are and the effects of that stability and instability on

adolescent students. This is due to the fact that peer group stability is difficult to measure and hard to interpret. Gifford-Smith & Brownell (2003) indicated that stability estimates vary widely across studies, related to methodological and contextual factors such as grade-level, timing of school transitions, and time of year and data collection method. An important aspect of stability is based on the data collection methodology used. Data on peer groups can be collected using sociometric nominations (rating all or some part of the student body) or social cognitive mapping procedures. Characteristics such as peer group size and the interconnectedness of the group can also impact stability measures. Most studies of stability focus on one of two methods. The primary one focuses on the individual level of peer stability using reciprocal best friend nominations, usually elicited through sociometric nominations (see Hardy et al., 2002; Kingery & Erdley, 2007; Wentzel, 2003). The second, less widely used assessment of peer group stability focuses on the entire peer group rather than individual stability over time (see Cairns & Cairns, 1994; Kindermann, 2007; Neckerman, 1996). Both of these methods fail to look at the role of multiple peer affiliations on the individual adolescent. The first method only focuses on the best friend and fails to understand the entire peer group. The second method is focused on the peer group but not the individual in and out movements that occur in the peer group and the effects of those movements.

It is unclear whether peer group stability or instability is most normative during early adolescence. The role of the peer group is multifaceted with both positive and negative elements that can occur from being part of any group. Peers can profoundly influence adolescents through direct and indirect ways that can affect academic achievement, behavior and other social interactions. Peer group stability alone does not indicate that the group has

'good' or 'bad' norms and behaviors. Longer interactions between group members lead to greater intensification of socialization with the peer group, but whether that has a positive or negative effect is dependent upon the group's values, norms and behaviors (Juvenon, 2007).

School Belonging

The need to belong to something larger than oneself has been identified as a fundamental human belief (Osterman, 2000). School belonging, as it is defined here, is each student's sense of acceptance, support and encouragement by teachers and peers in the school (Goodenow, 1993). This construct is based on the perceptions of the interactions that the individual has with teachers, administrators and peers in the classroom and throughout the school. The feeling of school belonging can lead to a reduction in stress and an increase in intrinsic motivation whereas lacking school belonging can lead to school alienation (Osterman, 2000). Belonging has been shown to explain a significant amount of the variance of academic motivation and achievement through explaining level of effort and motivation (Goodenow, 1993; Hamm & Faircloth, 2005; Osterman, 2000).

Peer Group Stability and School Belonging

An important component of school belonging is focused on peer acceptance and support. When adolescents are asked about their sense of belonging in school, one of the first aspects they describe is their affiliations with other peers (Hamm & Faircloth, 2005). One might contend that individuals who have a stable peer groups would tend to have more security, peer acceptance and support due to long standing affiliation and socialization between peer group members. Higher levels peer group stability might lead students to have higher levels of school belonging due to shared school history and support from their long-standing peers. Ladd (1990) reported higher achievement attitudes for those students who

had the same peers in their classroom the following year, contending that this was due to the shared socialization history and connection of attitudes that allow the student to feel more secure. However, his work has focused on elementary school students and has not been translated into the adolescent population. It has been hypothesized that low levels of stability within groups potentially affect student's ability to forge lasting relationships that support a sense of belonging. Additionally, school belonging within peer groups has been shown to become more homogeneous across the school year (Hamm & Faircloth, 2005). It is important to determine how individuals' peer group stability level might strengthen school belonging.

Peer Group Stability and Middle School Adjustment and Achievement

Typically, the transition to middle school creates changes in the school environment, including changes to relationships with teachers and peers (Cairns & Cairns, 1994; Eccles et al., 1993). Elementary schools tend to be smaller schools where students interact with one or a few teachers and with the same classroom of peers throughout the day. Few changes to the peer group structure occur during the elementary school years. However, peer groups are susceptible to change during the middle school transition because of school and classroom environmental changes (Hardy et al., 2002; Kingery & Erdley, 2007; Wentzel, 2003). Middle schools often combine several elementary schools into one school and students meet many new peers. Also, middle schools typically have students changing classrooms throughout the school day, which may lead students to lose contact with established peers due to a lack of proximity to those students.

School transitions can disrupt peer group stability through influx of new peers. These peers may be more proximal and/or more similar to adolescents compared to members of

their original peer group members, leading individuals to leave their original peer group for a new group. Evidence from two studies suggests that most peer groups are disrupted during the middle school transition. In one study, sociometric nominations were assessed to analyze the pattern of nominations before (spring of 5th grade) and after (spring of 6th grade) the transition to middle school. Only one third of students nominated the same students as friends at the two time points (Hardy et al., 2002). Another study found that over a one-year period, peer groups remained more stable when the classroom was promoted as a unit than when it was not (Neckerman, 1996). Little study has focused on how academic achievement may or may not be affected when there are peer group disruptions. There is an indication that adolescents with disrupted peer groups spend part of their class time building new affiliations rather than focusing on academic goals (Kiefer & Ryan, 2008).

School Belonging and Academic Achievement

Studies of peer groups have shown that high academic achievement was correlated with positive peer relations (Cook et al., 2007; Ladd, 1990; Wentzel, 2003). There is little indication that school belonging is directly related to academic achievement. However, school belonging is related to other variables such as engagement, motivation and effort, that have a strong impact on academic achievement (Goodenow, 1993; Hamm & Faircloth, 2005; Wentzel et. al., 2003). Some researchers have identified sense of belonging as an underlying element in the relationship between engagement, motivation and achievement. Thus, it mediates the relationship between these variables.

School Type: History of the Middle Grades

Prior to the 1940's, most students in America were educated in K-12 or K-8 schools in which diverse age groups of students interacted with one another (Bedard & Do, 2005). Beginning in the 1940's, educational reformers began the task of creating a "junior high" for students. Junior high schools were expected to be less like elementary schools and more like high schools. However, these students were not expected to interact with older high school peers (Juvenon et al., 2004). Junior high schools operated like high schools with students changing classrooms, a focus on ability tracking, and an increased emphasis on academic achievement. In the 1970's, school systems move away from junior high schools and the number of middle schools began to increase. Unlike junior highs, middle schools were created to reflect the awareness that the transition into this level of schooling is an important point in the academic trajectory (Mac Iver & Epstein, 1993). Middle schools, unlike junior highs, were tasked with emphasizing integrated team teaching, approaching instruction from an early adolescence perspective, and other practices geared towards early adolescence. However, the reality is that many schools just renamed their junior high schools into middle schools (Mac Iver & Epstein, 1993). Starting in the 1980's, researchers and policy makers started to question the utility of middle schools and to study the transition from elementary to middle school. Seidman et al. (2004) questioned if the academic, behavioral and social problems that occur for some during adolescence are triggered, in part, by the transition to middle school. Currently, a majority of schools serving middle grades are middle schools or junior high schools but this trend is different in rural areas, where the majority of schools are K-8 (U.S. Department of Education, 2007). An important question that this study addresses is how experiencing a middle school transition versus no building transition affects the

stability of early adolescents' peer relationships and in turn, their school belonging and achievement outcomes.

Grade Configurations

Some researchers and policymakers have endorsed that positive early adolescent adjustment is best supported through a K-8 configuration. These researchers claim that early adolescents' needs are better served in smaller, community-oriented school environments (Anfara & Buehler, 2005; Mac Iver & Mac Iver, 2006). Others indicate that it is not the grade spans that improve the effectiveness of the school but the underlying school characteristics (Barber & Olson, 2004; Wihry et al., 1992). Typically, K-8 schools have smaller class sizes and fewer teachers. However, few direct comparisons between K-8 and middle schools exist in the literature. Alpaugh (1998) studied three different types of school districts: a) K-8; b) a single elementary school, transitioning into a single middle school; and c) multiple elementary schools feeding into one middle school. In those districts where transitions occurred (types b and c), significant achievement losses were found, and those losses were the greatest for middle schools where multiple elementary feeder schools were integrated into one middle school (type c). Wihry et al. (1992) analyzed schools configured as either K-8 schools, middle schools, junior high schools, or combined junior-senior high schools and examined these school grade characteristics on eighth grade achievement. When comparing test scores across school types, the results indicated the highest achievement scores were found in K-8 schools. Weiss & Kipnes's (2006) study sought to answer three questions: a) do eighth grade outcomes vary on the type of school a student attends? b) if there are outcome differences, are they due to student demographic differences? c) do self-esteem effects vary by school type? In this study, middle schools and K-8 schools did not

differ on academic outcome variables but did differ on nonacademic variables such as student self-esteem and perceived threat. Byrnes & Ruby (2007) assessed whether significant differences occurred between K-8 and middle school schools in terms of academic achievement. Byrnes and Ruby found that K-8 schools had the highest levels of academic achievement but that this was due to differences in demographics, class size and grade size among the schools. Finally, Mac Iver & Mac Iver (2006) analyzed schools where some schools were long-established K-8 schools, some were recently converted K-8 schools, and some were traditional elementary to middle school configurations. Standardized test scores were higher in the established K-8 as compared to the other two school types. Indications were that the higher achievement levels might be due to a lack of the transition as found in the established K-8 schools. Taken together, these five studies' findings suggest that established K-8 schools tend to have greater academic achievement levels. However, it is unclear why these differences occur and the role of peer group affiliations in these differences. Additionally, it is important to note that three of the five studies were conducted on the same school system (Philadelphia) and that only two studies involved rural schools.

Long Term Impact of Grade Configurations

Finally, a different theoretical and methodological approach to middle school transitions has been proposed through long-term assessment of the middle school transition. There are a limited number of these studies, but they provide a different lens through which to view the middle school environment and transition issues. These researchers contend that the movement to middle schools was primarily a policy decision and did not fully base the decision on the developmental, social and academic needs of early adolescents (Cook et al., 2008). Additionally, each transition point into middle school and high school is believed to

be risky to students since drops in self-esteem, academic achievement, and other attributes have been measured (Cook et al., 2008; Eccles et al., 1993; Seidman et al., 2004). Moreover, from this perspective, these transitions are cumulative in effect in that the more school environment changes students are expected to withstand, the more detrimental the effect. Both Bedard and Do (2005) and Cook et al. (2008) found a significant drop in academic achievement followed the transition into middle school that continued to be found throughout middle school and high school. These studies indicate that grade configuration is important not only at the transition point but throughout the rest of students' public K-12 schooling experiences.

School environment plays an important role in both peer group stability and academic achievement. The transition from elementary school to middle school appears to lead to peer group instability, to a lack of school belonging and to declines in academic achievement. Studies that have compared different school configurations have found that K-8 schools tend to show the greatest level of academic achievement during the middle grades. This may be due, in part, to the fact that these students do not encounter a building transition that can undermine their peer groups. It is important to study the effects of the middle school transition because of this evidence that long-lasting trajectories might ensue from this transition that can detrimentally impact a students' academic, behavioral and emotional well-being.

The Present Study

The primary research objective of this study was to determine how the transition to middle school might disrupt peer group stability and consequently, affect academic achievement through the mediation of school belonging. To assess the relationships among these indicators, the following questions were addressed in the study. First, what is the effect of the middle school transition on peer group stability? Second, to what extent is peer group stability associated with school belonging and academic achievement during the middle school transition? Third, does school belonging mediate the relationship between peer group stability and academic achievement? Fourth, do students who transition to a middle school differ from students who do not have a transition (e.g., K-8) in terms of peer group stability, school belonging and academic achievement and relationships among these variables? Specifically, do K-8 students have more stable peer groups that lead to greater school belonging and academic achievement?

Two studies of early adolescents in rural schools were conducted to assess these questions. The first study focused on students in a traditional elementary school to middle school transition and investigated peer group stability and its relationships to school belonging and academic achievement indicators across the transition year. The second study analyzed the same factors as those described in Study 1 to see if the same peer group stability patterns existed within the two school grade configurations; either a middle school transition or a K-8 configuration with no transition. The purpose was to see if the same peer group stability patterns occur over time across these different school types, and to assess the

relationship between peer group stability, school belonging and academic achievement, and how these interactions were or were not found across differing school grade configurations.

It is theorized that the transition to middle school leads to peer group disruption, which leads to a disconnection with at school, which can be measured through school belonging. This combination of peer group instability and the corresponding lack of school belonging can lead to a decline in academic achievement. In contrast, K-8 schools, with their lack of a building transition, are expected to have fewer peer group disruptions, less change in school belonging and no significant change in academic achievement. In order to assess these questions, hypotheses have been stipulated for each study and are listed below.

Study 1 (Middle School Transition)

Hypothesis 1. **There will be less peer group stability during the transition from fifth to sixth grade (time 1 to time 2) than during the sixth grade year (time 2 to time 3).** This hypothesis will be tested by assessing differences in the peer group stability indicators for time 1 to time 2, and for time 2 to time 3. Peer group stability was expected to be disrupted during the middle school transition due to changes in the school environment as well as the influx of new peers (Eccles et al., 1993).

Hypothesis 2. **There will be a positive association between peer group stability and school belonging, with higher levels on the peer group stability index related to higher levels of school belonging.** Both peer group stability indicators (Time 1 to Time 2 and Time 2 to Time 3) will be analyzed with the school belonging score at Time 3. Studies have indicated that peer acceptance and support play an important role in students' adjustment and feelings of belonging in middle and high school (Goodenow, 1993; Hamm &

Faircloth, 2005). It is believed that students with long lasting peer relationships will be more likely to have strong and secure ties to the school.

Hypothesis 3. **There will be a positive association between school belonging and academic achievement with higher levels of school belonging related to higher levels of academic achievement.** School belonging at Time 3 will be analyzed with academic achievement at Time 3, controlling for prior academic achievement at Time 1. Prior research has indicated that there is a weak positive relationship between school belonging and academic achievement (Goodenow, 1993; Osterman, 2000).

Hypothesis 4. **There will be a positive association between peer group stability and academic achievement, with higher levels of peer group stability related to higher levels of academic achievement.** Both peer group stability indicators (Time 1 to Time 2 and Time 2 to Time 3) will be analyzed with academic achievement at Time 3, controlling for prior achievement at Time 1. Although peer influence on academic achievement has been studied (Cook et al., 2007; Crosnoe, Riegle-Crumb, Field, Frank, & Muller, 2008), little study has focused specifically on peer group stability and its impact on academic achievement.

Hypothesis 5. **The positive relationship between peer group stability and academic achievement will be partially mediated through school belonging. That is, school belonging will partially account for the relationship between peer group stability and academic achievement.** Following Barron & Kenny (1986), three regression models will be assessed in order to test for mediation. First, the mediator (school belonging) will be regressed on the independent variable (peer group stability). This step will be conducted as part of Hypothesis 2. Then, the dependent variable (academic achievement) will be

regressed on the independent variable (peer group stability). This step will be conducted as part of Hypothesis 4. Finally, for Hypothesis 5, academic achievement will be regressed on both of the independent variables (peer group stability from time 1 to time 2 and time 2 to time 3) and the mediator (school belonging). See Figure 1 below for a graphical depiction of the relationship between the three variables. The independent variables will be analyzed with academic achievement at Time 3, controlling for prior achievement at Time 1. It is expected that the relationship between peer group stability and academic achievement will weaken with the addition of school belonging (Barron & Kenny, 1986; Goodenow, 1993). Changes in the relationship between academic achievement and peer group stability will be assessed by the direct effect of peer group stability as well as the indirect effect of peer groups stability through school belonging.

Figure 1. Model between Peer Group Stability, School Belonging and Academic Achievement
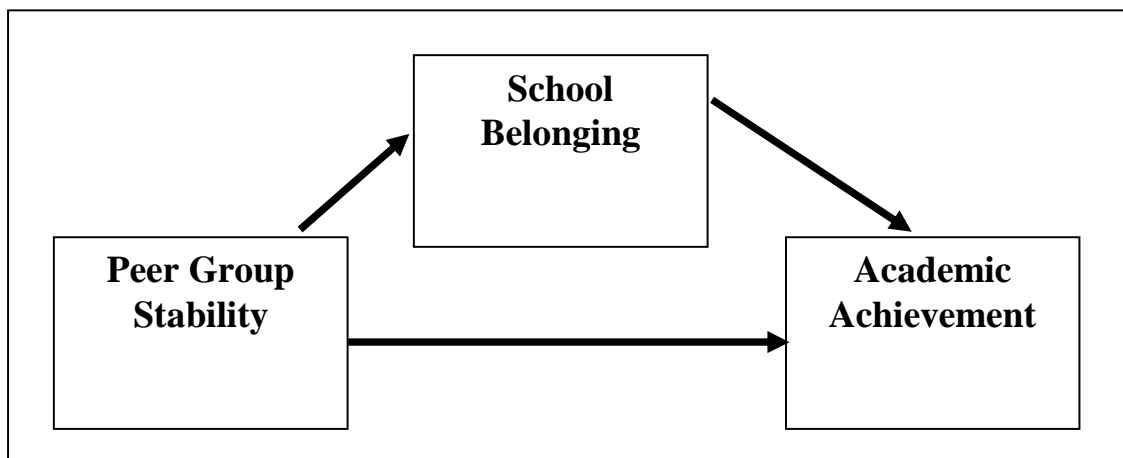
Study 2: Different School Grade Configurations

Data for Study 2 will include student participants that attended either a middle school in sixth grade or a K-8 school in sixth grade. Parallel hypotheses to the five hypothesis

described above are proposed for both sets of students; those who attend a middle school and experience a middle school transition (Hypotheses 6 through 10), and for the students who do not experience a transition to middle school because they attend a K-8 school (Hypotheses 11 through 15). In other words, Hypotheses 6 through 10 attempt to generalize the findings from Hypothesis 1 through 5 by showing that the transition to middle school impacts the social and academic worlds in similar ways through the disruption of peer group stability and a corresponding decline in academic achievement.. Hypotheses 11 through 15 attempt to further generalize the study's findings by examining how peer group stability and academic achievement may or may not be different across school grade configurations. The final two hypotheses (16 and 17) for the study as a whole compare the findings of Study 2 across these school grade configurations (middle school transition versus K-8).

Hypothesis 16. **There will be a significant difference between peer group stability over time by school grade configuration, with higher levels of peer group stability across time for K-8 schools.** This hypothesis will be assessed by comparing the means of the peer group stability indicators by school grade configuration and time points. Both peer group stability indicators (Time 1 to Time 2; Time 2 to Time 3) will be tested by school grade configuration (K-8 or middle school). It is expected that students in K-8 schools, which do not have a transition to a new schooling environment, will have less disruption in peer group stability between Time 1 to Time 2 than will those entering middle school (Eccles et al., 1993).

Hypothesis 17. **There will be a difference in magnitude found in the relationship between peer group stability and academic achievement by school grade configurations. Stronger positive relationships between peer group stability and academic achievement**

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will be found in the K-8 schools compared with the middle schools in Study 2. This

hypothesis will be assessed by comparing the regression coefficients found in Hypothesis 9

(middle school transition) and Hypothesis 14 (K-8 school configuration). The regression

coefficient for the K-8 school is expected to be significantly higher than the regression

coefficient for the middle school. Results have indicated that K-8 schools are more

successful in terms of academic achievement, but reasons for these differences remain

unclear (Alspaugh, 1998; Mac Iver & Mac Iver, 2006; Wihry et al., 1992). Little research

has focused on peer group stability and its impact on academic achievement. This hypothesis

focuses on the extent to which peer group stability differs between school grade

configurations and how that might affect academic achievement.

Methods

Both studies used data from an ongoing longitudinal intervention study examining the behavioral, academic, and social adjustment of rural youth as they transition into adolescence. The schools participating in this study were part of a randomized control group design in which half of the schools received professional development for their teachers which focused on issues of early adolescent development and the other schools were matched controls. Although detecting intervention effects was not part of the purpose of the current study, they will be assessed as control variables in each model. As described previously, two different data sets were used to answer these questions. One data set focused on students in a traditional elementary to middle school transition. The other data set included both traditional elementary to middle school transition environments as well as a K-8 school configuration. All available schools and students were asked to participate. Academic achievement, school belonging, and peer relationships were assessed on each consented student at each school site. Time 1 collection occurred in the Spring of 5th grade, time 2 collection occurred in the Fall of 6th grade and time 3 collection occurred in the Spring of 6th grade.

Participating Schools

Study 1. Participants attended schools in rural communities in the Appalachian region of the United States. Schools in Study 1 were designated as locale 6 by the National Center for Education Statistics (NCES): "Place not within a consolidated metropolitan statistical area or a metropolitan statistical area with a population of at least 2500 but less

than 25000." The schools ranged from 55% and 68% of students receiving free and reduced lunch (U.S. Department of Education, 2007).

In Study 1, all students transition from their fifth grade elementary school to a middle school in sixth grade. In fifth grade, a student might be part of two different configurations, an elementary school that served pre-kindergarten to fifth grade or an intermediate school that served third to fifth grade. On average, the intermediate schools were larger than the elementary schools. The largest school that fifth graders attended had 334 students while the smallest had 174 students. Larger schools typically had smaller class sizes while smaller schools tended towards larger class sizes. The smallest class size was 17 students while the largest class size was 24 students. See Table 1 for more detailed information on school and class size at Time 1.

Table 1: School Size, Type and Number of Consented Participants at Time 1 – Study 1

School	School Grades	School Size	Average Class Size	Total Population	Consented Participants
School A	3 to 5	328	19	69	60
School B	PK to 5	174	24	19	17
School C	PK to 5	221	19	28	25
School D	3 to 5	334	21	93	67
School E	3 to 5	219	17	22	22
School F	PK to 5	191	23	10	6

All students, whether they attended an elementary school or an intermediate school, transitioned into one of the two middle schools that served sixth through eighth grades. Both

schools are larger than any of the elementary schools or intermediate schools with school

sizes of 632 and 572 respectively. However, smaller class sizes tend to occur as students

progress from fifth to sixth grade. The class size for the sixth graders in these two schools

was 17, which was also the lowest class size in the fifth grade. See Table 2 for more

information about school size and class size at Time 2 and Time 3.

Table 2: School Size, Type and Number of Consented Participants at Time 2 – Study 1

School	School Grades	School Size	Average Class Size	Total Population	Consented Participants
School K	6 to 8	632	17	262	213
School L	6 to 8	572	17	266	224

Study 2. Participants attended schools in rural communities in the Midwest region of

the United States. Schools in Study 2 were designated as locale 7 by the National Center for

Education Statistics (NCES): "Any territory designated as rural by the Census Bureau that is

outside a CMSA or MSA of a Large or Mid-size City." The schools ranged from 36% to

46% of students receiving free and reduced lunch (U.S. Department of Education, 2007).

In Study 2, there were four schools that comprised the fifth grade sample. Two were

K-8 schools, while the other two schools transitioned to middle school in sixth grade. One of

those schools was an elementary school, serving kindergarten to fifth grades while the other

was an intermediate school serving third to fifth grades. The largest school was a K-8 school

with a population of 297 students while the smallest school was the intermediate school that

served 176 students. There was no discernable pattern in class size by school grade

configuration or school size. The smallest class size was 18 while the largest class size was

26 students. Both the smallest and largest class sizes were found in K-8 schools. For more

information about specific school and class information, see Table 3.

Table 3: School Size, Type and Number of Consented Participants at Time 1 – Study 2

School	School Grades	School Size	Average Class Size	Total Population	Consented Participants
School G	K to 8	272	18	67	51
School H	K to 8	297	26	66	46
School I	3 to 5	176	20	52	47
School J	K to 5	250	24	46	35

Students in Study 2 either transitioned into a middle school in sixth grade or stayed in

their K-8 school. The middle schools in Study 2 were substantially smaller in size compared

to the K-8 schools. As before, the largest school was a K-8 school with 297 students while

the smallest school was a middle school with 133 students. However, class size did not differ

across the schools, with three of the four schools averaging 23 to 24 students. One of the

middle schools had a sixth grade class size of 15 students. For more specific information

about each individual school, see Table 4.

Table 4: School Size, Type and Number of Consented Participants at Time 2 – Study 2

School	School Grades	School Size	Average Class Size	Total Population	Consented Participants
School G	PK to 8	272	23	65	47
School H	K to 8	297	24	64	45
School M	6 to 8	195	15	43	32
School N	6 to 8	133	24	55	47

Student Participants

Study 1 included data from 380 students (43% male), and 83% of the population was identified as European-American, 16% as African-American and the rest identified as Asian or Hispanic. All students were in the 5th grade at Time 1 and in the 6th grade at Times 2 and 3. Study 2 included data from 171 students (46% male), and 96% was identified as European-American. Students at Time 1 were in fourth, fifth or sixth grade and in Times 2 and 3 were in fifth, sixth or seventh grade. In this study, most of the analyses treat Study 2 as two separate samples by school grade configuration. Of the 171 consenting participants, 78 (46%) were part of the middle school sample and 92 (54%) were part of the K-8 sample. The middle school and K-8 samples had the same percentage of male (45%) and female (55%) students. The middle school sample participants were 94% European-American while the K-8 sample included 100% European American participants. In addition, the middle school sample had only fifth graders participating, whereas the K-8 schools included fourth, fifth and sixth graders. Consent was obtained from 80% of the parents and children. Participants were included if they had consented and had peer network data at all collection points.

Procedures

Student surveys were conducted in a group administration format. Before completing the survey, participants were told that their answers would be kept confidential. Additionally, students were informed that participation was voluntary and that they could stop taking part in the survey at any time. During the survey, a test proctor read all instructions and questions aloud while trained assistants provided mobile monitoring to assist participants as needed. Participants were asked to complete questions about themselves, their peers and their school. Students were given a small item (e.g., pen) for completing the survey.

Measures

Measures used for these analyses assessed school type, school belonging, academic achievement and peer stability.

School type. Schools were defined by the intervention project as either K-8 schools or elementary schools with a transition to middle school, with at least one elementary school feeding into each middle school.

School belonging. School belonging was measured by Hagborg's (1998) Psychological Sense of School Membership – Brief (PSSM-B) scale. Designed as a short version of Goodenow's (1993) PSSM, the PSSM-B includes 11 items that focus on the sense of belonging students feel towards their schools. Students rate their agreement with statements such as "I am treated with as much respect as other students" on a five point response scale where 1 is completely false and 5 is completely true. An average of the student's responses to the items is computed as an index of school belonging where higher scores indicate a higher level of perceived belonging. See Appendix A for information about

the entire measure. Cronbach's alpha for this scale has been reported to be .71 to .88 among diverse samples of middle school youth (Hagborg, 1998; Hamm, Farmer, Robertson, Dadisman, Murray, Meece, & Song, under review).

Academic achievement. Several different measures were used to assess achievement. Administrative data from the schools were collected on each of the consented students from the school. This includes curricular grades in language arts, math, science, and social studies as well as standardized end-of-grade test scores in reading and mathematics. The administrative data were collected separately from the student survey data. In the Study 1 sample, a substantial proportion of the 380 respondents did not have course grades (33%) or end-of-grade test results (47%) at Time 1 and/or Time 3. For Study 2, there was a difference in missing data by school grade configuration. The K-8 schools submitted complete course grade and end-of-grade test scores at Time 1 and Time 3 on all respondents. The middle school subset also had almost complete (99%) achievement data on course grades at Time 1 and Time 3. Unfortunately, all of the end-of-grade at Time 1 test scores for the middle school sample was missing. To handle the problems of missing data, listwise deletion was used so that only cases that had all academic achievement data were used in the analyses. Thus, the use of end-of-grade test scores within the analyses was limited.

Peer networks. Peer networks were assessed using the Social Cognitive Mapping procedure developed by Cairns, Perrin, and Cairns (1985). This procedure is based on the assumption that each participant is able to observe and understand the entire schools' social world even if the adolescent is not an active participants in all represented groups. Students were asked about social networks within their grade at their school, beginning with the question: "Are there some kids here in your grade who hang around together a lot?"

Respondents were then instructed to write the names of the children who hang around together, naming all the groups that they could. Participants were not presented with any class lists to prompt memory or recall (See Appendix B for a copy of the SCM measure that was used). A composite social cognitive map of the network of peer groups was then formed by using computer software (SCM Version 4.0) to combine information across all subjects. This program aggregates the data from all of the students by constructing three matrices. First, a recall matrix is generated by listing all of the groups named by each participant. From the recall matrix, a second matrix, called the co-occurrence matrix, is constructed that lists the number of times each student is nominated with all of the other students in the class, grade or school. It is assumed that students who belong to the same peer group will have higher co-occurrence levels with one another than with others. Finally, another matrix, a correlational matrix, is generated from the co-occurrence matrix. This matrix is used to check the student profiles with their peer groups. Students whose profiles are significantly correlated ($r \geq .40$) with at least 50% of the members of a group are considered to be in the same group. To ensure reliability and validity, a 50% participation rate at grade level has been established as a standard for using this procedure (Cairns, Leung, Buchanan, & Cairns, 1995). Three week coefficient of stability indicators for this measure were high ($\alpha = .90$) suggesting high reliability over short intervals. Validity has been established through observational studies that find students interact four times more frequently with members of their peer group as those students outside their groups (Cairns et al., 1985).

Peer group stability. Most researchers that use the social cognitive mapping procedures usually define stability at the group level, determining the percentage of the group that continues to affiliate with one another over time. (Cairns et al., 1995; Neckerman, 1996).

The current study used a different stability procedure that more precisely determines each individual's affiliation with other peer group members across time. First, for each time point, the number of peers in an individual's group, not including the individual, was counted. Then, a count of the number of members who stayed in the same group with the individual across each time points was calculated. This indicator was created at two time points: number of the same members from Time 1 to Time 2 and the number of same members from Time 2 to Time 3. For use in the analysis, a stability percentage was calculated for both of the time points. The Time 1 to Time 2 stability index was created by taking the number of members who stayed in the same group from Time 1 to Time 2 and dividing by the number of group members at Time 1. The Time 2 to Time 3 stability index was created by taking the number of members who stayed in the same group from Time 2 to Time 3 and dividing by the number of group members at Time 2. For example, if Person A's network had five peers at Time 1 and three of them were still affiliated with Person A at Time 2, person A would have a peer group stability index from Time 1 to Time 2 of 0.6. Higher scores indicate greater peer group stability between time points.

Analysis Strategies

The first component of the analysis will involve the use of descriptive statistics to describe core characteristics of the sample. Information about the pertinent variables will be assessed through univariate statistics including means, standard deviations, skewness, and kurtosis as well as bivariate statistics including correlation. These variables will be screened by time point within Study 1 and Study 2. All analyses (where appropriate) will include gender, school, intervention site and prior academic achievement as control variables. Each hypothesis is listed below with the analyses that will be used to answer the hypotheses.

Hypothesis 1

There will be less peer group stability during the transition from fifth to sixth grade (Time 1 to Time 2) than during the sixth grade year (Time 2 to Time 3). This hypothesis will be tested by assigning differences in the peer group stability indicators for Time 1 to Time 2 and for Time 2 to Time 3. The peer group stability indicators measures the difference in peer group membership between peer groups at Time 1 and Time 2 as well as the difference in peer group membership between peer groups at Time 2 and Time 3. These difference indicators will be used to assess the relative stability of the peer group over time. Differences in mean peer group stability indicators between Time 1 to Time 2 and Time 2 to Time 3 will be analyzed using a paired t-test. A significant t indicates a difference in peer group stability between Time 1 and Time 2 as compared to Time 2 and Time 3. Once a significant t is found, assessment of the differences in those indicators will be made through the examination of the mean scores at the two time points.

Hypothesis 2

There will be a positive association between peer group stability and school belonging, with higher levels on the peer group stability indicators related to more strongly positive school belonging. Peer group stability indicators from Time 1 to Time 2 and from Time 2 to Time 3 will be analyzed with the school belonging score at Time 3. A series of regression analyses will be conducted between each of the peer group stability indicators (independent variable) and school belonging at Time 3 (dependent variable) as well as a full model that includes both peer group stability indicators. A number of variables will be included as statistical controls in the analyses including gender, intervention site and school, each of which was dummy coded.

Hypothesis 3

There will be a positive association between school belonging and academic achievement with higher levels of school belonging related to higher levels of academic achievement. School belonging at Time 3 will be analyzed with academic achievement at Time 3, controlling for prior academic achievement at Time 1. A regression analysis between school belonging at Time 3 as the independent variable and academic achievement at Time 3 as the dependent variable will be conducted. A number of variables will be controlled for in this analysis including gender, school, intervention site (all dummy coded) as well as prior academic achievement level at Time 1.

Hypothesis 4

There will be a positive association between peer group stability and academic achievement, with higher levels of peer group stability related to higher levels of academic achievement. Both peer group stability indicators (Time 1 to Time 2, and Time 2

to Time 3) will be analyzed with academic achievement at Time 3, controlling for prior achievement at Time 1.   A series of regression analyses will be conducted between both of the peer group stability indicators (independent variables) and academic achievement at Time 3 (dependent variable). In addition, both peer group stability indicators will be included together in a model with academic achievement. Several variables will be controlled for in all of the analyses including gender, school, intervention site (all dummy coded) and prior academic achievement at Time 1.

Hypothesis 5

There will be a positive relationship between peer group stability and academic achievement that will be partially mediated through school belonging. Thus, school belonging is expected to partially account for the relationship between peer group stability and academic achievement. Following Barron & Kenny (1986), three regression models should be assessed in order to test for mediation. First, the mediator (school belonging) will be regressed on the independent variable (peer group stability). This will be conducted as part of Hypothesis 2. Then, the dependent variable (academic achievement) will be regressed on the independent variable (peer group stability). This will be conducted as part of Hypothesis 4. Finally, within this hypothesis, the dependent variable (academic achievement) will be regressed on both the independent variable (peer group stability) and the mediator (school belonging). All three peer group stability indicators as well as school belonging at Time 3 will be analyzed with academic achievement at Time 3, controlling for prior achievement at Time 1.

To assess mediation, a series of regression analyses will be conducted between both of the peer group stability indicators (Time 1 to Time 2 and Time 2 to Time 3) as well as

both of the indicators together with school belonging at Time 3 as the independent variables and academic achievement at Time 3 as the dependent variable. If mediation works as expected, there will be a set of predicted findings. First, there will be a statistically significant positive relationship between both peer group stability indicators and school belonging at Time 3. Next, there will be a statistically significant positive relationship between the peer group stability indicators and academic achievement at Time 3. Finally, the relationship between the peer group stability indicators and academic achievement at Time 3 will be weakened or become nonsignificant when school belonging is added to the model. Several variables will also be controlled for in the analyses including gender, school, intervention site (all dummy coded) and prior academic achievement at Time 1.

Study 2: Different School Grade Configurations

After completing Study 1, the same analyses will be conducted with the Study 2 data (that was collected in another school system in another state from Study 1). Study 2 includes data from middle schools and K-8 schools and the dataset will be split into these two separate grade configurations. Hypotheses 6 through 10 will assess the same five hypotheses in Study 1 for the Study 2 schools that have a transition from elementary school to middle school. Hypotheses 11 through 15 will assess the five hypotheses in Study 1 for the Study 2 schools that are K-8 schools. Analyses for Hypotheses 6 through 15 will follow the same pattern described for Hypotheses 1 through 5. Additionally, there are two hypotheses that compare the findings in Study 2.

Hypothesis 16. **There will be a significant difference between peer group stability over time by school grade configuration, with higher levels of peer group stability across time expected in K-8 versus middle schools.** This difference will be assessed by

comparing the means of the peer group stability indicators by school grade configuration and time points. Both peer group stability indicators (Time 1 to Time 2 and Time 2 to Time 3) will be tested for differences by school grade configuration (K-8 or middle school). It is expected that K-8 schools, that do not have a transition to a new schooling environment, will have greater peer group stability between Time 1 to Time 2 than those entering middle school. This hypothesis will be assessed through a split plot repeated design (Ware, 2009). In this design, the split plot part of the design will be the school grade configuration (middle school or K-8) and the repeated measure will be peer group stability (Time 1 to Time 2; Time 2 to Time 3). For this analysis, the expected result will include a significant main effect by school configuration. If an interaction is found between the two factors (school grade configuration and peer group stability), follow up analysis may be warranted.

Hypothesis 17. **There will be a difference in magnitude found in the relationship between peer group stability and academic achievement by school grade configurations. Stronger positive relationships will be found in the K-8 schools compared with the middle schools in Study 2.** This will be assessed by comparing the regression coefficients found in Hypothesis 9 (middle school transition) and Hypothesis 14 (K-8 school configuration). It is expected that the regression coefficient found for the K-8 school would be significantly higher than the one found for the middle school. This hypothesis will be analyzed by assessing the confidence intervals between the unstandardized regression coefficient (B) found in the two different regression models in Study 2 (Cohen, Cohen, West, & Aiken, 2003). The expected result is that there would be a significant difference between the two regression coefficients, and that the B for the K-8 schools would be higher than the B

for the middle school transition schools, indicating a stronger predictive relationship between

peer group stability and academic achievement.

Results

Results of descriptive analyses and hypotheses testing are reported below. Results were

computed using the statistical software program, SPSS, version 16.0. Because the first five

hypotheses were tested with two other samples, all of those results were reported together. Thus,

the analysis under hypotheses one include the results of hypotheses 1 (Study 1), results from

hypotheses 6 (middle school subset of Study 2) and hypotheses 11 (K-8 subset of Study 2).

Results are described under each hypothesis. An important aspect of this study was the

mediation model between peer group stability and academic achievement that was hypothesized

to be partially mediated through school belonging (Hypothesis 5). The results of the mediation

are reported separately under Hypotheses 5.

Descriptive Statistics

    Study 1. Means, standard deviations, skewness and kurtosis for the independent and

dependent variables used in Study 1 are reported below. The mean peer group stability value

from Time 1 to Time 2 indicated that most students affiliated with few of the same individuals

from Time 1 at Time 2. Upon further analysis, 45% of the participants did not affiliate with any

of the same group members at Time 2 that they affiliated with at Time 1. Only 6% of students

were part of the exact same group from Time 1 to Time 2. The mean peer group stability value

for Time 2 to Time 3 was higher than what was found at Time 1 to Time 2. This indicates that

more students continue to affiliate with the same group members from Time 2 to Time 3 than

they did from Time 1 to Time 2. Additionally, a small proportion of students (32%) did not have

any stable affiliations from Time 2 to Time 3, and more students (13%) had completely intact

and stable peer groups from Time 2 to Time 3.

School belonging at Time 3 indicated that most students had a relatively positive sense of

school belonging. The mean course grade indicated that students were performing above average

(B-level) work. Normality was assessed through skewness and kurtosis. Kline (1998) indicated

that skewness values below 3 and kurtosis values below 10 are normal. Using those criteria,

there are no problems with skewness and kurtosis in this data. See Table 7 for all descriptive

statistics for all three samples: Study 1, Study 2 – Middle School and Study 2- K-8 School.

Additionally, a correlation matrix of these variables was calculated. Both stability

indicators were only marginally correlated with one another across time. Neither of the peer

group stability measures was correlated with school belonging. Course grades at Time 3 were

marginally correlated with peer group stability from Time 2 to Time 3 and more strongly

correlated with school belonging at Time 3. See Table 5 for all of the correlation coefficients

among these variables for Study 1.

Table 5: Study 1 Correlations

Variables	1	2	3	4
Peer Stability-t1t2	--			
Peer Stability-t2t3	.146**	--		
School Belonging	.035	.044	--	
Course Grades	.107	.169**	.307**	--

** *p*<.0001

Study 2 (middle school transition). The same descriptive statistics that were conducted

for Study 1 were conducted for the middle school subset of Study 2. The mean peer group

stability value for Time 1 to Time 2 indicated that some students belonged to different groups at Time 2 compared to Time 1 and that some group member affiliations continued from Time 1 to Time 2. Similar proportions of students had either none of the same member affiliations at Time 2 compared to Time 1 (19%), or completely intact and stable groups with the exact same individuals at Time 1 and Time 2 (18%). The mean peer group stability value for Time 2 to Time 3 indicated that a high level of stability was found among most individuals across the entire network. Only 7% of students did not affiliate with any of the same group members that they were linked to at Time 2 when assessed at Time 3. Additionally, 46% of the sample had completely stable peer groups from Time 2 to Time 3.

School belonging at Time 3 indicated that most students had a relatively positive sense of school belonging. The mean course grade indicated that students were performing above average (B-level) work. There were no problems with skewness and kurtosis in this data. See Table 7 for all descriptive statistics from this study.

Additionally, a correlation matrix of these variables was calculated. Peer group stability indicators were moderately correlated with one another. None of the stability measures were significantly correlated with school belonging. Course grades at Time 3 were moderately correlated with school belonging at Time 3 but not with either of the peer group stability indicators. See Table 6 for the correlation coefficients among these variables for the middle school sample of Study 2.

Table 6: Study 2: Middle Schools: Correlations

Variables	1	2	3	4
Peer Stability-t1t2	--			
Peer Stability-t2t3	.369**	--		
School Belonging	.108	-.052	--	
Course Grades	.010	-.036	.312**	--

** $p<.0001$

Study 2 (K-8 school). The same descriptive statistics that were conducted above were conducted for the K-8 school subset of Study 2. The mean peer group stability value for Time 1 to Time 2 indicated that some students belonged to different groups at Time 2 compared to Time 1 and that some group member affiliations continued from Time 1 to Time 2. Only 11% of participants had all new group members at Time 2 compared to Time 1. Sixteen percent of the sample had completely stable group membership between Time 1 and Time 2. The mean value for Time 2 to Time 3 was higher than Time 1 to Time 2 indicated that the majority of students continued to affiliate with the same peers from Time 2 to Time 3. Only six percent of students did not affiliate with at least one of their peers at Time 2 when measured at Time 3. Additionally, 52% of the sample had completely stable group membership between Time 2 and Time 3.

School belonging at Time 3 indicated that most students had a relatively positive sense of school belonging. The mean course grade indicated that students are doing above average (B-level) work. There were no problems with skewness and kurtosis in this data subset. See Table 7 for means and standard deviations for all of the variables used by this study.

Table 7: Descriptive Statistics

	Study 1		Study 2: MS		Study 2: K-8	
	M	*SD*	*M*	*SD*	*M*	*SD*
Peer stability-t1t2	0.27	0.30	0.54	0.33	0.57	0.32
Peer stability-t2t3	0.43	0.37	0.81	0.29	0.75	0.34
School Belonging	3.67	0.77	3.64	0.86	3.84	0.68
Course Grades	86.50	7.43	83.30	9.75	8.71	7.28

Additionally, a correlation matrix of these variables was conducted. There was no correlation between the two peer group stability indicators and neither of the stability indicators were correlated with school belonging. Course grades were moderately correlated with school belonging at Time 3 but not with either of the peer group stability indicators. See Table 8 for all the correlation coefficients for the K-8 sample of Study 2.

Table 8: Study 2 - K-8: Correlations

Variables	1	2	3	4
Peer Stability-t1t2	--			
Peer Stability-t2t3	.202	--		
School Belonging	-.151	.012	--	
Course Grades	-.101	.148	.401**	--

** *p<.0001*

Hypothesis 1

Students will be less affiliated with the same individuals across 5th to 6th grade (Time 1 to Time 2) than across the 6th grade year (Time 2 to Time 3).

Study one (middle school transition). To assess the differences in peer group stability across time, a one-tailed paired *t*-test was conducted. There was a significant difference in mean stability between Time 1 and Time 2 compared to Time 2 to Time 3. Peer stability was lower from Time 1 to Time 2 than from Time 2 to Time 3 indicating that there was a disruption in peer group stability from the fifth grade to the sixth grade that was significantly greater than the disruption to peer group membership during the sixth grade year. See Table 9 for the results of the paired *t*-test for all three samples.

Study two (middle school transition and no transition). Comparable analyses were conducted on the Study 2 sample. The Study 2 sample was split into 2 categories – those students who experienced a middle school transition and those students who did not (K-8 school). In the middle school transition sample, there was a significant difference in mean stability between Time 1 and Time 2 compared to Time 2 to Time 3. As was the case for the middle school sample analyzed for Study 1, peer stability was lower from Time 1 to Time 2 than from Time 2 to Time 3. As well, the K-8 sample had a significant difference in mean stability between Time 1 and Time 2 compared to Time 2 to Time 3. Peer stability was lower from Time 1 to Time 2 than from Time 2 to Time 3. These findings support the hypothesis that during the middle school transition, peer group stability will be disrupted. Additionally, the findings indicate that those students without a transition to middle school might also experience some disruptions to their peer groups as well.

Table 9: Paired *t*-tests across all studies

Study	*t*	*p*	Mean – Peer Group Stability t1t2	Mean – Peer Group Stability t2t3
Study 1	6.58	<.0001	0.26	0.41
Study 2 – MS	6.48	<.0001	0.55	0.80
Study 2 – K-8	4.22	<.0001	0.58	0.77

Hypothesis 2

There will be a positive association between peer group stability (Time 1 to Time 2 and Time 2 to Time 3) and school belonging at Time 3, with higher levels on the peer group stability index related to higher school belonging. To test this hypothesis, a regression analysis was conducted between both peer group stability indicators as independent variables on sense of school belonging at Time 3, controlling for school at sixth grade and gender. Because a positive relationship was hypothesized, all *F* and *t* test results will be reported as one-tailed tests. The results of this analysis are reported in two steps – first, regression results are reported with only the control variables included in the model, and then, the regression model with the independent variables included along with the control variables will be reported. Additionally, each peer group stability indicator was individually assessed in its own regression model with school belonging and the significant results of these analyses are reported as well. Results are reported below on Study 1, Study 2 (Middle School subset) and Study 2 (K-8 subset).

Study 1. The baseline model was tested, with school belonging at Time 3 regressed on the control variables (school in the sixth grade and gender) was not significant ($F (2, 287) = 1.84$, $p=.08$). In addition, when both of the peer group stability indicators were added to the regression model, no significant changes in the R^2 statistic were found as demonstrated by the non-

significant F statistic (F (5, 285) = 0.36, p=.35). None of the individual regressions between

peer group stability and school belonging were significant. The non-significant findings do not

support the hypothesized relationship between school belonging and peer group stability.

Results of the regression model including R^2 and regression coefficients used to investigate

school belonging at Time 3 and the peer group stability indicators are found in Table 10.

Table 10: Hypothesis 2 Regressions - Study 1

Dependent Variable = School Belonging	R^2	Change R^2	β
Baseline model (with control variables)	.01		
School			-.043
Gender			.102
Model 1 (Both)	.02	.003	
Peer group stability – t1t2			.027
Peer group stability – t2t3			.038
Model 2	.01	.001	
Peer group stability – t1t2			.050
Model 3	.01	.002	
Peer group stability – t2t3			.043

Study 2 (middle school transition). The baseline model was tested, with school belonging

at Time 3 regressed on the control variables (school in the sixth grade and gender) was not

significant (F (2, 68) = 0.95, p=.20). In addition, when the peer group stability indicators were

added to the model, no significant change in the R^2 was found (F (4, 66) = 0.35, p=.35). None of

the individual regressions between peer group stability and school belonging were significant.

Similarly to Study 1, there was no support for the hypothesized relationship between school

belonging and peer group stability. Results of the regression model used to investigate school

belonging at Time 3 and the peer group stability indicators including R^2 and regression

coefficients are found in Table 11.

Table 11: Hypothesis 2 Regressions - Study 2: Middle Schools

Dependent Variable = School Belonging	R^2	Change R^2	β
Baseline model (with control variables)	.03		
School			.141
Gender			.088
Model 1 (Both)	.04	.010	
Peer group stability – t1t2			.083
Peer group stability – t2t3			-.098
Model 2	.03	.002	
Peer group stability – t1t2			.053
Model 3	.03	.005	
Peer group stability – t2t3			-.077

Study 2 (K-8 school). The baseline model was tested, with school belonging at Time 3

regressed on the control variables (school in the sixth grade and gender) and it was not

significant ($F (2, 58) = 2.09$, $p=.07$). When both peer group stability indicators were added to

the model, no significant improvement to the model resulted ($F (4, 56) = 1.83$, $p=.09$). However,

the independent addition of peer group stability from Time 1 to Time 2 to the regression model

substantially contributed to the fit of the model, as evidenced by a significant F statistic ($F (3,

57) = 3.70$, $p<.05$), contributing an additional 5.7% to the variance in school belonging at Time

3. However, the relationship between school belonging and peer group stability was negative,

not positive, as expected. Thus, in this sample, lower peer group stability over time leads to

higher levels of school belonging while higher levels of peer group stability over time lead to a

lowered sense of school belonging. These results run counter to the expected positive

relationship between school belonging at Time 3 and peer group stability. These findings do not

support the hypothesized relationship for higher school belonging levels from more stable peer

groups. Results from the regression models used to investigate school belonging and peer group

stability for the K-8 school sample of Study 2 are found in Table 12.

Table 12: Hypothesis 2 Regressions - Study 2: K-8 Schools

Dependent Variable = School Belonging	R^2	Change R^2	β
Baseline model	.07		
(with control variables)			
School			-.245
Gender			.044
Model 1 (Both)	.12	.057	
Peer group stability – t1t2			-.254
Peer group stability – t2t3			.015
Model 2	.12	.057	
Peer group stability – t1t2			-.251
Model 3	.07	.001	
Peer group stability – t2t3			-.032

Hypothesis 3

There will be a positive association between school belonging and academic

achievement with higher levels of school belonging related to higher levels of academic

achievement[1]. To test this hypothesis, a regression analysis was conducted with school

belonging at Time 3 as the independent variable on course grades at Time 3, controlling for

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[1] All analyses were first conducted on course grades and end-of-grade test scores. However, all findings using the end-of-grade test scores as a dependent variable were non-significant across all of the independent variables assessed. In addition, there was more missing data on the end-of-grade test score variables than on the course grade variables. Thus, only course grades were reported in this study.

school in sixth grade, gender and prior course grades at Time 1. Because a positive relationship

was hypothesized, all F and t test results will be reported as one-tailed tests. The results of this

analysis are reported in two steps – first, regression results are reported with only the control

variables included in the model, and then, the regression model including the independent

variables along with the control variables will be reported.

Study 1. The baseline model was tested, with course grades at Time 3 regressed on the

control variables (school in sixth grade, gender, course grades at Time 1). This model was

significant (F (3,256) = 120.04, $p<.0001$) and explained 59% of the variance in course grades.

Each of the control variables independently contributed to the model fit, with significant t-test

results. Gender was statistically significant, and being female indicated higher course grades at

Time 3 (t (258) = 2.59, $p<.01$). There was also a difference between the two middle schools in

the Study 1 sample and course grades at Time 3 (t (258) = 3.64, $p<.0001$) with School K reported

higher average grades compared to School L. The most significant factor in determining course

grades at Time 3 was course grades at Time 1 (t (258) = 18.51, $p<.0001$).   After controlling for

school, gender and course grades, the addition of school belonging at Time 3 contributed to the

model fit (F (4, 255) = 4.60, $p<.05$) and explained an additional 0.7% of the variance found in

course grades. The findings from these regression analyses support the expected relationship

between course grades at Time 3 and school belonging. However, the unique contribution of

school belonging to the model accounts for a very small percentage of variance in course grades.

Results of the regression model used to investigate course grades at Time 3 and school belonging

including R^2 and the regression coefficients are found in Table 13.

Table 13: Hypothesis 3 Regressions - Study 1

Dependent Variable = Course Grades	R^2	Change R^2	β
Baseline model (with control variables)	.59		
School			-.147
Gender			.105
Course Grades – T1			.747
Model 1	.59	.007	
School Belonging – T3			.089

Study 2 (middle school transition). The baseline model was tested, with course grades at Time 3 regressed on the control variables (gender, school and prior achievement). This relationship was significant ($F_{(3, 65)} = 58.93$, $p<.0001$) and explained 73% of the variance. Each of the control variables independently contributed to the model, with significant *t*-test results. Gender was statistically significant and being female indicated higher course grades at Time 3 ($t_{(68)} = 2.44$, $p<.01$). There was also a difference between the two middle schools in Study 2 and course grades ($t_{(68)} = 2.80$, $p<.01$). The most significant factor in determining course grades at Time 3 was course grades at Time 1 ($t_{(68)} = 12.51$, $p<.0001$). The addition of school belonging at Time 3 to the regression model contributed to the model fit, $F_{(4, 64)} = 3.68$, $p<.05$) and explained an additional 1.5% of the variance found in course grades. The findings from this sample, like the findings from Study 1, support the expected positive relationship between course grades and school belonging. Results of the regression models for the middle school sample of Study 2 including R^2 and the standardized regression coefficient are found in Table 14.

Table 14: Hypothesis 3 Regressions - Study 2: Middle Schools

Dependent Variable = Course Grades	R^2	Change R^2	β
Baseline model (with control variables)	.73		
School			.181
Gender			.157
Course Grades – T1			.807
Model 1	.75	.015	
School Belonging – T3			.126

Study 2 (K-8 school). The baseline model was tested, with course grades at Time 3 regressed on the control variables (gender, school and prior achievement) and this relationship was significant (F (3, 80) = 136.20, $p<.0001$), explaining 84% of the variance. However, of the control variables, only prior course grades contributed to this model (t (83) = 18.31, $p<.0001$). The addition of school belonging at Time 3 to the regression model did not add to the model over and above what the control variables contributed (F (4,79) = .218, $p=.32$), indicating that there was no relationship between school belonging and course grades. Thus, no relationship was found between course grades at Time 3 and school belonging in the K-8 school sample. Results of the regressions models used to investigate course grades at Time 3 and school belonging for the K-8 sample of Study 2 are found in Table 15.

Table 15: Hypothesis 3 Regressions - Study 2: K-8 Schools

Dependent Variable = Course Grades	R^2	Change R^2	β
Baseline model (with control variables)	.84		
School			.022
Gender			.068
Course Grades – T1			.893
Model 1	.84	.000	
School Belonging – T3			.024

Hypothesis 4

There will be a positive association between peer group stability and academic achievement with higher levels of peer group stability related to higher levels of academic achievement. To test this hypothesis, a hierarchical regression analysis on course grades at Time 3 was conducted using both peer group stability indicators as independent variables, and controlling for school in sixth grade, gender and prior course grades at Time 1. Because a positive relationship was hypothesized, all *F* and *t* test results will be reported as one-tailed tests. The results of this analysis are reported in two steps – first, regression results will be reported with only the control variables included in the model, and secondly, the regression model with the independent variables along with the control variables will be reported. Additionally, both peer group stability indicators were independently analyzed in their own regression model with course grades at Time 3 and significant findings are reported.

Study 1. The baseline model was tested, with course grades at Time 3 regressed on the control variables (school in sixth grade, gender and course grades at Time 1). This model was significant ($F_{(3, 264)} = 125.69$, $p<.0001$) and explained 59% of the variance. Each of the control variables independently contributed to the model, with significant *t*-test results. Females earned higher course grades at Time 3 ($t_{(258)} = 2.82$, $p<.01$) and there was also a difference between the two middle schools in Study 1 and course grades ($t_{(258)} = 3.57$, $p<.0001$). The most significant factor in determining course grades at Time 3 was course grades at Time 1 ($t_{(258)} = 18.93$, $p<.0001$). The addition of both peer group stability indicators as to the regression model contributed to a significant R^2 change, demonstrated in a change in the *F* statistic ($F_{(5, 262)} = 2.68$, $p<.05$). Peer group stability from Time 1 to Time 2 did not contribute to the model

fit but peer group stability from Time 2 to Time 3 did (t (256) = 1.94, $p<.05$) explaining an additional 0.8% of the variance in course grades.

Both peer group stability indicators were also assessed independently in their own models. The model that included only the Time 1 to Time 2 stability indicator did not account for a significant R^2 change (F (4, 263) = 1.57, $p=.11$). However, the regression model which included the peer group stability indicator from Time 2 to Time 3 significantly contributed to the model fit (F (4, 263) = 4.44, $p<.05$) explaining an additional 0.7% of the variance of course grades. Findings for this expected relationship were mixed, with non-significant findings for the stability indicator from Time 1 to Time 2 and significant findings for peer group stability from Time 2 to Time 3. Thus, having the same peer networks across the sixth grade year may lead to higher course grades throughout the year. However, only 1.5% of the variance in the model was explained by peer group stability. Results from the regression models used to investigate course grades at Time 3 and peer group stability are found in Table 16

Table 16: Hypothesis 4 Regressions - Study 1

Dependent Variable = Course Grades	R^2	Change R^2	β
Baseline model (with control variables)	.59		
School			-.141
Gender			.111
Course Grades –Time 1			.748
Model 1 (Both)	.60	.008	
Peer group stability – t1t2			.038
Peer group stability – t2t3			.077
Model 2	.59	.002	
Peer group stability – t1t2			.050
Model 3	.60	.007	
Peer group stability – t2t3			.083

Study 2(middle school transition). The baseline regression model was tested, with course grades at Time 3 regressed on the control variables and this relationship was significant (F (3, 66) = 61.35, $p<.0001$) explaining 74% of the variance. Each of the control variables independently contributed to the model, with significant *t*-test results. Females earned higher course grades (t (68) = 2.47, $p<.01$) and there was also a difference between the two middle schools in Study 2 and grades at Time 3 (t (68) = 2.95, $p<.01$). The most significant factor in determining course grades at Time 3 was course grades at Time 1 (t (68) = 12.97, $p<.0001$). The addition of both peer group stability indicators as independent variables in the regression model did not lead to a significant R^2 change demonstrated through the non-significant F statistic (F (5, 64) = .145, $p=.43$). Both peer group stability indicators were then individually assessed in their own regression models with course grades. In both of these models, the individual peer group stability indicators did not contribute significantly to the model fit, as assessed through a change in R^2. Counter to the expected findings, the regression analyses' results do not support a relationship between course grades at Time 3 and the peer group stability indicators. Results of the regression models including the R^2 the standardized regression coefficients are found in Table 17.

Table 17: Hypothesis 4 Regressions - Study 2: Middle Schools

Dependent Variable = Course Grades	R^2	Change R^2	β
Baseline model (with control variables)	.74		
School			.187
Gender			.156
Course Grades –Time 1			.823
Model 1 (Both)	.74	.001	
Peer group stability – t1t2			-.039
Peer group stability – t2t3			.000
Model 2	.74	.001	
Peer group stability – t1t2			-.039
Model 3	.74	.000	
Peer group stability – t2t3			-.012

Study 2 (K-8 school). The model with course grades at Time 3 was regressed on the control variables (gender, school in sixth grade, course grades at Time 1); was significant (F (3, 57) = 108.17, $p<.0001$) and explained 85% of the variance. Only prior course grades at Time 1 predicted course grades at Time 3 (t (59) = 16.30, $p<.0001$). The addition of both peer group stability indicators as independent variables into the regression model did not contribute to the model findings (F (5, 55) = 1.65, $p=.10$). Both stability indicators were then individually assessed in their own regression models.. The addition of peer group stability from time 1 to time 2 to the regression model contributed to the model findings (F (4, 56) = 3.21, $p<.05$) explaining an additional 0.8% of the variance. When the Time 2 to Time 3 stability indicator was entered into its model, no significant contribution was made to the model fit (F (4, 56) = .518, $p=.238$). Thus, there was some limited support for Hypothesis 4 within the Study 2 – K-8 sample findings. Although the Time 2 to Time 3 stability indicator was not statistically significant when assessed in the model, the stability indicator from Time 1 to Time 2 was

significant. However, only 0.8% of the variance was explained by peer group stability when it is included in the model. For more information on the results of the regression models for the K-8 sample of Study 2, see Table 18.

Table 18: Hypothesis 4 Regressions - Study 2: K-8 Schools _____

Dependent Variable = Course Grades	R^2	Change R^2	β
Baseline model	.85		
(with control variables)			
School			-.017
Gender			.001
Course Grades –Time 1			.917
Model 1 (Both)	.86	.008	
Peer group stability – t1t2			-.092
Peer group stability – t2t3			-.021
Model 2	.86	.008	
Peer group stability – t1t2			-.097
Model 3	.85	.001	
Peer group stability – t2t3			-.041

Hypothesis 5

There will be a positive relationship between peer group stability and academic achievement that will be partially mediated through school belonging. As part of this study, it was assumed that there was a positive relationship between peer group stability and academic achievement that was partially mediated through school belonging. Stated another way, school belonging was expected to partially explain the relationship between peer group stability and academic achievement. This was an extension of earlier findings that indicated the fundamental role of peer relationships to early adolescents' sense of school belonging (Hamm & Faircloth, 2005; Osterman, 2000). There are three regression models that need to be conducted to assess

mediation. In this study, the first regression conducted was the mediator (school belonging) on the independent variable (peer group stability) which was assessed in Hypothesis 2. The second regression model was the dependent variable (course grades) regressed on the independent variable (peer group stability) that was reported under Hypothesis 4. Finally, during this hypothesis, course grades was regressed on both the mediator (school belonging) and the independent variable (peer group stability). It was expected that the relationship between peer group stability and academic achievement will weaken with the addition of school belonging

To test this hypothesis, a regression analysis was conducted on course grades at Time 3 with both peer group stability indicators and school belonging as independent variables, controlling for school in 6th grade, gender and prior course grades at Time 1. Because a positive relationship was hypothesized, all F and t test results will be reported as one-tailed tests. The regression will be reported in two steps – first, regression results will be reported with only the control variables included in the model, and second, the regression model, including the independent variables (both peer group stability indicators and school belonging at Time 3) along with the control variables will be reported. Additionally, both of the peer group stability indicators were independently analyzed with school belonging at Time 3 in their own regression model with course grades at Time 3.

Study 1. The baseline regression model on course grades at Time 3 was conducted with the control variables (gender, school and prior achievement) and it was significant (F (3, 256) = 120.04, $p<.0001$) explaining 59% of the variance. Each of the control variables independently contributed to the model, with significant t-test results. Females earned higher course grades (t (258) = 2.59, $p<.01$) and there was also a difference between the two middle schools and course grades (t (258) = 3.64, $p<.0001$). The most significant factor in determining course grades at

Time 3 was course grades at Time 1 (t (258) = 18.51, $p<.0001$). The addition of both peer group indicators and school belonging at Time 3 to the regression model contributed to the model findings with a significant F statistic (F (6, 253) = 3.158, $p<.05$) and altogether the independent variables explained an additional 1.5% of the variance. When analyzing all three independent variables, school belonging at Time 3 contributed to the model (t (258) = 2.13, $p<.05$) and peer group stability from Time 2 to Time 3 also contributed to the model (t (258) = 1.77, $p<.05$) but peer group stability from Time 1 to Time 2 did not (t (258) = 1.03, $p=.15$).

Both peer group stability indicators were also assessed independently with school belonging at Time 3 on course grades. The model with peer group stability from Time 1 to Time 2 and school belonging at Time 3 contributed a significant change in the model fit (F (5, 233) = 3.146, $p<.05$) explaining about 1% of the variance However, school belonging was the only independent variable that contributed to this model (t (258) = 2.15, $p<.05$). The model with peer group stability from Time 2 to Time 3 with school belonging at Time 3 also contributed a significant R^2 change (F (5, 253) = 4.21, $p<.01$) and the independent variables explained 1.3% of the variance. School belonging again significantly contributed to the model (t (258) = 2.12, $p<.05$) as well as peer group stability at Time 2 to Time 3 (t (258) = 1.94, $p<.05$). Of the independent variables that made up this model, both school belonging at Time 3 and peer group stability from Time 2 to Time 3 contributed significantly to the understanding of course grades at Time 3. However, these independent variables altogether only contributed 1 to 1.5 percent of the variance in course grades. Although these findings support the contributions of peer group stability and school belonging in understanding the variance in course grades, they do not support the expected mediating relationship. This is due to the fact that the relationship between school belonging and peer group stability that was expected in Hypothesis 2 was not significant,

making mediation implausible. Results of the regression models used to investigate course

grades at Time 3 for the Study 1 sample are found in Table 19.

Table 19: Hypothesis 5 Regressions - Study 1_____

Dependent Variable = Course Grades	R^2	Change R^2	β
Baseline model (with control variables)	.59		
School			-.147
Gender			.105
Course Grades – t1			.747
Model 2	.60	.010	
Peer group stability – t1t2			.052
School belonging – t3			.089
Model 3	.60	.013	
Peer group stability – t2t3			.078
School belonging – t3			.088
Model 4	.60	.015	
Peer group stability – t1t2			.041
Peer group stability – t2t3			.072
School belonging – t3			.088

     Study 2 (middle school transition). The baseline model was tested, with course grades at

Time 3 regressed on the control variables (gender, school and prior achievement). This

relationship was significant ($F (3, 63) = 56.77$, $p<.0001$) and explained 73% of the variance.

Each of the control variables independently contributed to the model, with significant *t*-test

results. Females earned higher course grades ($t (65) = 2.47$, $p<.01$)and there was also a

difference between the two middle schools in Study 2 ($t (65) = 2.81$, $p<.01$). The most

significant factor in determining course grades at Time 3 was prior course grades at Time 1 (t

$(65) = 12.36$, $p<.0001$). The addition of both peer group stability indicators and school

belonging at Time 3 as independent variables in the regression model did not contribute to the

model fit (F (5, 60) = 1.24, p=.15). Both stability indicators were also assessed independently

with school belonging at Time 3 on course grades. In both of these regressions, no R^2 change

was found.   These findings do not support the hypothesized relationship between peer group

stability, school belonging and academic achievement since no significant relationship between

the variables was found. See Table 20 for more information regarding the R^2 and the

standardized regression coefficients for the regression models for the middle school sample of

Study 2.

Table 20: Hypothesis 5 Regressions - Study 2: Middle Schools_____

Dependent Variable = Course Grades	R^2	Change R^2	β
Baseline model (with control variables)	.73		
School			.184
Gender			.161
Course Grades – t1			.811
Model 2	.75	.016	
Peer group stability – t1t2			-.039
School belonging – t3			.128
Model 3	.74	.014	
Peer group stability – t2t3			.000
School belonging – t3			.126
Model 4	.75	.016	
Peer group stability – t1t2			-.044
Peer group stability – t2t3			.013
School belonging – t3			.128

Study 2 (K-8 school). The baseline regression model with course grades at Time 3 was

regressed on the control variables (school in sixth grade, gender, course grades at Time 1) and

was significant (*F* (3, 56) = 108.00, *p*<.0001) explaining 85% of the variance. The only factor in

determining course grades at Time 3 was course grades at Time 1 (*t* (58) = 16.30, *p*<.0001). The

addition of both peer group stability indicators and school belonging at Time 3 as independent

variables in the model did not contribute to the fit of this model (F (6, 50) = .93, p=.22). Both

stability indicators were also assessed independently with school belonging at Time 3 on course

grades at Time 3. In both of these regressions, there was no change in R^2 statistic. As with the

middle school sample of Study 2, the regressions between peer group stability, school belonging

and academic achievement were not significant. These results do not support the hypothesized

relationship between peer group stability, school belonging and course grades. For more

information on the results of the regression models used to investigate course grades at Time 3

and peer group stability indicators along with school belonging for the K-8 sample of Study 2,

see Table 21.

Table 21: Hypothesis 5 Regressions - Study 2: K-8 Schools_____

Dependent Variable = Course Grades	R^2	Change R^2	β
Baseline model (with control variables)	.85		
School			-.053
Gender			.002
Course Grades – t1			.907
Model 2	.86	.007	
Peer group stability – t1t2			-.089
School belonging – t3			.006
Model 3	.85	.002	
Peer group stability – t2t3			-.034
School belonging – t3			.023
Model 4	.86	.007	
Peer group stability – t1t2			-.085
Peer group stability – t2t3			-.018
School belonging – t3			.006

Hypothesis 16

**There will be a significant difference between peer group stability over time by school grade configuration, with higher levels of peer group stability across time for K-8 schools.** To assess the differences in peer group stability across time and school configuration, a split plot factorial MANOVA was conducted on the Study 2 dataset. The separate plots were school grade configuration, that is, middle school and K-8. The factorial component included both peer group stability indicators (Time 1 to Time 2 and Time 2 to Time 3). There was a significant interaction between peer group stability over time and school grade configuration (F $(1,169) = 24.23$, $p<.0001$; $\eta^2= .125$). Although the middle school sample had a lower peer group stability value at Time 1 to Time 2 (55% (MS) versus 58% (K-8)) by Time 2 to Time 3, they had a higher peer group stability value (80% (MS) versus 77% (K-8)). However, the peer group stability differences between the school grade configurations were quite small. See Figure 2 for the graphical display of peer group stability over time by school grade configuration. These findings do not support the hypothesized proposal that K-8 schools would have significantly higher levels of peer group stability from Time 1 to Time 2 compared to the middle school sample. In fact, peer group stability indicators were remarkably similar across school grade configuration for Study 2.

Figure 2: Peer Group Stability Over Time by School Grade Configuration
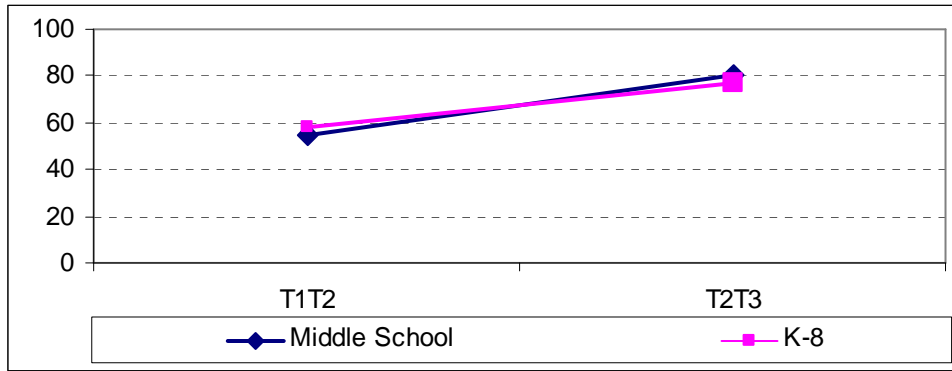
Although not part of the formal analyses, differences between Study 1 and Study 2 peer group stability indicators were also assessed. Similar values in peer group stability were found in the two samples within Study 2, however, the peer group stability indicators for Study 1 were much lower at both time points as compared to Study 2. Although the stability values are much lower in Study 1 than Study 2, it appears that the same patterns in peer group stability occur in all three samples. Figure 3 graphically indicates the peer group stability over time for all three samples.

Figure 3: Peer Group Stability Across All Three Study Samples
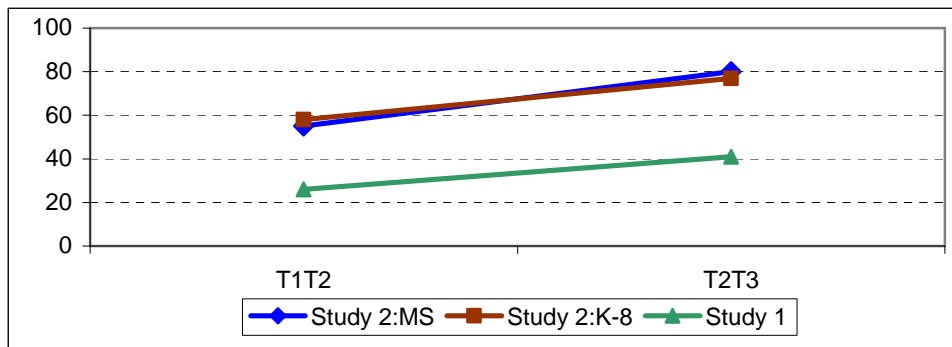
Figure 3: Peer Group Stability Across All Three Study Samples

Hypothesis 17

There will be a difference in magnitude found in the relationship between peer group stability and academic achievement by school grade configuration. To assess the differences in the magnitude of the relationships between peer group stability and academic achievement found in Study 2 (Hypothesis 4), a comparison of the unstandardized regression coefficients (B), their standard errors and confidence intervals were assessed. The unstandardized regression coefficient for peer stability from Time 1 to Time 2 in the middle school sample was -1.1 with a confidence interval from -5.4 to 3.2 compared with the K-8 sample where the coefficient was -2.1 with a confidence interval from -4.6 to 4.3. Although the coefficients may appear to be significantly different, the confidence intervals intersect, suggesting that these coefficients do not differ in any meaningful way. Similarly, the unstandardized regression coefficient for peer stability from Time 2 to Time 3 in the middle school sample was 0.01 with a confidence interval from -4.7 to 4.7 compared with the K-8 sample where the coefficient was -0.45 with a confidence interval from -2.9 to 2.0. As before, the confidence intervals intersect, suggesting that these understandized regression coefficients do not significantly differ. The nonsignificant findings do not support the hypothesized difference in magnitude in the relationship between peer group stability and academic achievement by school grade configuration.

Discussion

Early adolescence is a dynamic developmental period with rapid physical, cognitive and social changes, and with some adolescents also having to transition from elementary school to middle school. School transitions can negatively impact students in several ways including problems adjusting to social and academic changes. These transitions are critical times for adjustment in that trajectories for the rest of an adolescent's life might begin during this transition. Thus, problems that occur during the transition to middle school can lead to problems that persist throughout the adolescent's school life and beyond. The primary focus of this study was to determine how the transition to middle school might disrupt peer group stability and consequently affect academic achievement through school belonging.

This study contributes and extends the stage environment fit theory in that it focuses on the interaction of the social and academic realms. Originally, stage environment fit theory focused more on teachers and parents as agents of change during the transition to middle school but not on the power of peers to help with adjustment and achievement. In addition, most studies have focused on peer effects on psychosocial adjustment and not academic achievement (for an exception, see Ryan, 2001). Specifically, the current study is unique in that it directly focused on how peer group stability predicts academic achievement. Across the three studies, there were mixed findings regarding peer group stability and academic achievement. In Study 1, there was a small positive relationship between peer group stability over the sixth grade year and course grades at the end of the year, with higher levels of peer group stability over time predicting higher course grades. In the K-8 sample of Study 2, there was a small positive relationship

between peer group stability from the fifth to sixth grade year and course grades at the end of the sixth grade year with higher levels of peer group stability predicting higher course grades. Thus, understanding the stability of the peer group is important to educators who want to maximize the academic achievement of early adolescents who attend their school.

Peer Group Stability Indicator

This study also extends the literature on peer group stability. At first, studies on peer group stability focused on the mutual relationship with a best friend; that is, does your best friend also see you as their best friend? In more recent years, stability has focused on the entire peer group clique and the stability of the whole group across time. Therefore, if a peer group had six members and five stayed in the group over time, the group would be considered relatively stable. However, both of these stability indicators lack precision about individual-level stability with peers across time. The first measure only takes one person, the best friend, into account, and thus, stability over time is a dichotomy. This measurement does not take the broader peer group context into account. Students may change best friends but their larger peer group may be stable across time. The second measure, which studies peer group-level stability, doesn't focus on individual change in the peer group. Peer groups may stay relatively stable over time, but it is not possible to discern the trajectory for individuals who leave a peer group or who newly join a peer group that they have not belonged to previously.

This study included the creation of a new peer group stability indicator that corrects weaknesses found in the two stability measures described above. First, unlike the best friend measure, this stability measure captures all affiliations within the peer group. Second, unlike the peer group-level measure, this measure focuses on individual adolescents and the change to individual's peer affiliates over time. Stated another way, this measure focuses on the individual

level changes in the peer group, not on peer group level changes. This indicator assesses how many peers early adolescents continue to affiliate with across time. All peer affiliates are studied to create a total stability level for each individual across time.

Peer Group Stability Across Time

The current study focuses on middle school transition and how the social world of peers affected the academic world of early adolescents. One of the main objectives of the study was to see how peer group stability changed over time during the transition to middle school. Another aspect of the study of peer group stability was to investigate the extent to which peer group stability differed by school grade configuration. It was expected that students in schools without a transition to middle school would have higher levels of peer group stability over time than students in schools who had a transition to middle school.

The current thesis project focused on three different samples in two studies: two middle school samples and one K-8 sample. The data for Study 1 included an elementary to middle school transition and was collected in the Appalachian region of the United States, while Study 2 included both a middle school transition and a K-8 schools where no transition took place and was collected in the Midwest region of the United States. For all three samples, peer group stability was lower from Time 1 to Time 2 compared to stability from Time 2 to Time 3. This indicates that there was more disruption in peer group stability from fifth grade to sixth grade than during the sixth grade year. These findings support the idea that peer group membership changes over time, regardless of school grade configuration. However, peer group stability did not differ by school grade configuration. Study 2 specifically included schools that did have a middle school transition and those schools that did not. No significant differences were found by school grade configuration across time in terms of peer group stability.

Unexpectedly, differences in the levels of peer group stability were found between the three samples, with differences in stability over time found between Study 1 and Study 2. Compared to both samples of Study 2 across time, Study 1 had lower peer group stability levels. These different stability levels were found to persist across both time points (time 1 to time 2 and time 2 to time 3). However, both studies had similar increases in peer group stability over time; it was just that Study 1 had a much lower level of peer stability between the end of fifth grade and the beginning of sixth grade. This may be due to some unknown differences in these schools by region, with the Study 1 sample being drawn from Appalachia and the Study 2 sample being drawn from the Midwest. However, this may also be due to differences in how each study sample transitioned to middle school and specifically, the adjustment to the influx of new peers and its impact on peer group stability over time. In Study 1, several elementary schools transitioned into one middle school. In Study 2, one sample did not have a transition to middle school (K-8 sample). The other sample within Study 2 that did have a middle school setting transitioned from a single elementary school into a single middle school. Neckerman (1996) found that peer groups were more stable when students were promoted as a classroom, indicating that peer stability, in part, rises from students' familiarity with one another. In Study 2, students were promoted into a new grade in the same school (K-8) or as a grade cohort all from one school into a middle school. This is contrasted with Study 1, where several different school cohorts were combined all together in a new middle school setting. Thus, the differences in peer group stability between Study 1 and Study 2 might not be due to the environmental transition to middle school but, rather, due to the influx of new peers into the middle schools of Study 1. Although most of the middle school transition literature focuses on environmental changes between elementary school and middle school, perhaps the influx of new and unfamiliar peers

intensify the social needs and changes during the transition. It is important to continue to

analyze the role that the social environment, especially peers, play in schooling transitions.

Peer Group Stability, School Belonging and Academic Achievement

Another aspect of this study focused on the hypothesized mediation of school belonging,

on the relationship between peer group stability and academic achievement. Having stable peer

affiliations was expected to raise a student's sense of school belonging, since peers and social

interactions play an important role in adolescent's adjustment and enjoyment of school.

However, there was no significant relationship found between the mediator, school belonging

and the independent variable, peer group stability in this study. Thus, the predicted mediation

model was not supported in this sample. There are several possibilities why this might be the

case. School-level attributes, such as the size of the school and classroom, may play a more

important role in school belonging in rural samples. Additionally, in smaller schools, the role of

teachers and administrators may play a more significant role than peers do.

In addition, there were only weak relationships found between school belonging, peer

group stability and academic achievement in this study. The regression models explained a large

percentage of the variance in course grades at Time 3, however, little of that variance was

explained by school belonging and / or peer group stability at any given time point. Although

the findings were limited, there does appear to be a relationship between peer group stability and

academic achievement, with greater levels of peer group stability leading to higher course

grades. This was especially apparent in the Study 1, where overall peer group stability levels

were lower. Those students who had higher levels of peer group stability were more likely to

have higher levels of academic achievement.

Rurality and Generalizability

Rurality encompasses a broad diversity of communities and populations that differ by geography, ethnicity, occupational structure, economics and access to cities among other characteristics (Crockett et al., 2000). Generalization across rural areas is difficult, because the individual contexts can differ widely. The diversity found within rural areas was evident in this study. For instance, rural schools can have widely different school grade configurations. Some schools consolidate students over long distances while others hold to local, village or city districts that only serve a small local area. This may mean that schools can be rather large as with the consolidated schools or very small as with the village schools. Schools can also include different grade configurations from K-12 schools to very small numbers of grades like junior high schools (7th – 8th) and intermediate schools (3rd – 5th). Different schools transition to middle school at different points during early adolescent development, and it is unclear how these different transition points impact students and their peers. Within the current study, these differences made the findings hard to generalize across schools and the entire sample. Thus, every school was unique and could be a complete study itself.

The transition to middle school described by Eccles et al. (1991, 1993) and the comparisons of the middle school versus K-8 school configurations (Alspaugh, 1998; Byrnes & Ruby, 2007; Mac Iver & Mac Iver, 2006; Weiss & Kipnes, 2006; Wihry et al., 1992) may not operate in the same ways across schools in rural areas. Regardless of school grade configuration, it was unclear whether these schools were operated like typical K-8 schools or middle schools. Some K-8 schools contain middle school halls, where sixth through eighth grades are contained (Anfara & Buehler, 2005). In rural areas, a middle school may not contain ability tracking and,

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in fact, students may change teachers and classrooms on a very limited basis (Crockett et al., 2000).

Peer group affiliations may also differ from those found in urban and suburban areas. Studies have indicated that rural areas might be more inclusive and have denser social networks which may lead to higher levels of peer group stability (Crockett et al., 2000). Two reasons for denser social networks might be smaller network sizes in the first place (i.e., only a certain number of individuals to affiliate with in the first place) and more overall stability in the network overall, with fewer members migrating in and out of the area. Differences in rural areas may alter how early adolescents experience the transition to middle school in ways that earlier studies that focused on larger, more urban areas cannot predict.

Limitations of the Current Study

Limitations of the present study include issues with the data used such as the small sample size and missing data, as well as characteristics of these rural schools, including school size, class size, school grade configuration and different transition patterns. All three samples used had sufficient sample sizes for the analyses conducted. However, larger sample sizes would have increased statistical power and some of the results that trended towards significance may have been found to be, in fact, significant if there were more participants. This was especially true for the Study 2 sub-samples where the available sample sizes were much smaller than the Study 1 sample.

Another potential limitation was problems with missing data, especially in regard to the academic achievement data. A substantial proportion of the course grade data and end-of-grade test score data were missing. This meant that those cases had to be deleted from the sample. Again, the missing data, like small sample sizes, lead to a reduction in statistical power. In

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addition, it is unknown whether there is a difference between those students with known academic achievement data and those without academic achievement data in terms of academic achievement. For instance, if a school did not report lower achieving students academic results for this sample, it could indicate that the results reported here were biased towards higher achievement.

The current study focused on rural schools and rural populations. An area of inquiry in this study focused on school grade configuration. The results of this study were expected to show that peer groups would be more stable in environments where school transitions do not occur, compared to the disruption that occurs when transitions happen. Although this was a unique aspect of the study that allowed for different school grade configurations to be studied, it was not without its problems. In some of these schools, students have already transitioned once to a new school in the third grade before transitioning to middle school in sixth grade. It is unclear what impact this earlier transition has on students and how it might affect the transition to middle school. Perhaps students will have an easier time transitioning to middle school because they have already changed schools once before. However, Seidman et al. (2004) indicated that multiple transitions during adolescence can lead to 'double jeopardy' with each transition adding to academic and social risk. Perhaps the transition to third grade has implications for greater risk patterns and could begin a trajectory of problem behavior.

Future Directions

The results of this study suggest several areas for further investigation. This study was a preliminary exploration of peer group stability and its relationships with school belonging and academic achievement. One future direction is to expand this sample to the total 16 schools that make up the larger intervention study. Increasing the sample size will add statistical power to

these analyses. Thus, findings that demonstrated trends towards significance may be significant when a larger sample size is used. Additionally, the differences found between schools might be diluted through increasing the number of schools. It is possible that by increasing the sample, more generalizable results would be found. This would help in the interpretation of findings.

The current study focused on peer group stability. The peer group stability indicator assessed if an adolescent continued to affiliate with the same peers over time but did not determine if the relationship among peers favored higher achievement or not, only if the same individuals continue to hang out with one another. Thus, peer group stability could be a benefit or a liability on values and behaviors based on the peer group context. Peers can influence adolescents in direct and indirect ways that can affect academic achievement, behaviors and other areas of concern. Longer interactions between group members, which can be measured by higher levels of peer group stability, lead to greater intensification of group norms, values and behaviors. Some peer group associations are prosocial, helping students achieve academic success (Cook et al., 2007; Crosnoe et al., 2008; Wentzel, 2003). However, some stable peer groups are associated with deviant and maladaptive behaviors regarding school (Kiefer & Ryan, 2008; Ryan, 2001). Both peer groups may be stable but can lead to very different outcomes such as academic achievement.

This analysis of peer group stability does not take into account the group's 'good' or 'bad' norms and behaviors. One way to further this work is to include indicators that characterize the peer group. These variables might include indicators available in the current study such as: peer norms on academic achievement, aggression, social status and prominence, group centrality and school involvement. Several lines of inquiry might follow from the intersections between peer group characteristics and peer group stability over time. Therefore, a

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future study could identify what types of characteristics lead to peer group stability and peer group instability. In addition, those characteristics could be used as moderators in future studies of peer group stability and academic achievement. Thus, a broader exploration of peer group stability and what stability over time contributes to peer influence can be more richly described by adding peer group characteristics to the study.

Conclusion

The current study introduced a new measure to assess peer group stability across time, to investigate how stability changes during the transition to middle school. Stability was also measured in different school grade configurations, like a K-8 school where students do not have a transition to middle school. The findings indicate that regardless of school configuration, there is greater peer group stability during the sixth grade year as compared with the end of fifth grade and beginning of sixth grade time span.

The current study also focused on the relationship between peer group stability and academic achievement. In schools where whole grade peer group stability was lower, students with higher levels of peer group stability tended to have higher course grades. However, in those schools where peer group stability was quite high, no relationship between stability and grades was found. The primary focus of this study was the expected mediation model between peer group stability over time, school belonging and academic achievement. High peer group stability levels were expected to cause a higher sense of school belonging, since peer relationships tend to help adolescents adjust and relate to the school environment. However, higher peer group stability did not lead to higher levels of school belonging. Perhaps group-level characteristics on school belonging, peer norms and school involvement moderate the individual level relationship between individual level peer group stability and school belonging.

Although these findings add to our understanding of peer group stability, school belonging and academic achievement that occur over the course of the transition to middle school, this study also generated a series of new questions for future investigations. A key question that remains is how different types of peer group members relate to school context variables and how that is or is not consistent with the entire group-level aggregation of these variables.

This study focused on an important transition period in early adolescence. Changes in peer group membership can change peer influence, and consequently, adolescents' values and behaviors. One important attribute is academic achievement. Future work is warranted to link individual-level attributes, group-level attributes and peer influence on academic achievement. This work can help educators better understand the role of peers in school on academic achievement.

1. I feel a real part of my school.

   □————□————□————□————□
   Completely False   Completely True

2. People notice when I'm good at something.

   □————□————□————□————□
   Completely False   Completely True

3. Other students in this school take my opinions seriously.

   □————□————□————□————□
   Completely False   Completely True

4. Most teachers at my school are interested in me.

   □————□————□————□————□
   Completely False   Completely True

5. There's at least one teacher or adult in this school I can talk to if I have a problem.

   □————□————□————□————□
   Completely False   Completely True

6. People at this school are friendly to me.

   □————□————□————□————□
   Completely False   Completely True

7. I am included in lots of activities at my school.

   □————□————□————□————□
   Completely False   Completely True

8. I am treated with as much respect as other students.

   □————□————□————□————□
   Completely False   Completely True

9. The teachers here respect me.

   □————□————□————□————□
   Completely False   Completely True

10. People know I can do good work.

   □————□————□————□————□
   Completely False   Completely True

11. Other students like the way I am.

   □————□————□————□————□
   Completely False   Completely True

Appendix B: Social Cognitive Map Measure
Friends and Groups

Are there any kids in your grade who hang around together a lot? **Yes / No**

Please write their names on the lines below. Include each person's last name. Name all the groups that you can think of.

Group 1: _____

_____

_____

Group 2: _____

_____

_____

Group 3: _____

_____

_____

Group 4: _____

_____

_____

Group 5: _____

_____

_____

Are there some kids who don't seem to have a particular group, who tend to stay by themselves a lot?

_____

_____

_____

IF YOU NEED MORE SPACE, TURN THE PAPER OVER. REMEMBER, YOU DON'T HAVE TO FILL IN ALL THE LINES.

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