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New Students' Peer Integration and Exposure to Deviant Peers: Spurious Effects of School Moves?*

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Abstract

School moves during adolescence predict lower peer integration and higher exposure to delinquent peers. Yet mobility and peer problems have several common correlates, so differences in movers' and non-movers' social adjustment may be due to selection rather than to causal effects of school moves. Drawing on survey and social network data from a sample of 7th and 8th graders, this study compared the structure and behavioral content of new students' friendship networks to those of not only non-movers, but also of students about to move schools; the latter should resemble new students in both observed and unobserved ways. The results suggest that the association between school moves and friends' delinquency is due to selection, but the association between school moves and peer integration may not be entirely due to selection.

Keywords

Peers; school transitions; networks; delinquency

School and residential moves are common events in the lives of adolescents. Between one-fifth and one-fourth of U.S. adolescents change schools (apart from normative grade promotions), residences, or both during middle or high school (Gasper, DeLuca, & Estacion, 2010; Haynie, South, & Bose, 2006b; Rumberger, 2003; Rumberger & Larson, 1998). From a developmental perspective, these moves are important in part because they disrupt adolescents' friendships, and adolescents might find it challenging to join new, prosocial peer groups at their destination schools or neighborhoods (Hagan, MacMillan, & Wheaton, 1996; Haynie et al., 2006b; Langenkamp, 2014). Yet mobile adolescents often already faced other difficulties that put them at risk for a variety of adjustment problems (Gasper et al., 2010; Porter & Vogel, 2014). It thus is possible that any social or peer problems experienced by these adolescents began even before they moved. If this is true, then school moves may not be as harmful to adolescent social development as we might expect. Instead, mobility may “flag” adolescents who are at risk for peer problems, but efforts to improve those

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adolescents' social adjustment should target the background factors that lead to both peer problems and moving.

This study examines whether students who are new to a school are less socially integrated or join more deviant peer groups than students who do not change schools. It also examines whether any differences are likely to be attributable to the move itself. To do this, we use survey and social network data covering early adolescence and a unique comparison group: students who would soon leave a school. We reason that the likely similarities – both observed and unobserved – between students who are entering and exiting a school make the latter group a particularly good reference point for understanding the unique social consequences of school moves. We compare the two groups against each other and against non-mobile students on risk factors for mobility as well as peer network outcomes.

Potential Negative Social Consequences of Adolescent Moves

Past theoretical accounts highlight two major ways in which moving might harm adolescents' social lives. First, by severing preexisting social ties and immersing adolescents in unfamiliar peer contexts, moving might remove key sources of social support and control (Pribesh & Downey, 1999). If it then takes time to integrate into new friendship networks, adolescents may experience periods of social isolation and marginalization (Haynie et al., 2006b; Langenkamp, 2014). Such possible deficits in the size or cohesiveness of movers' friendship networks follow from social capital perspectives on the harmful effects of moving. These theoretical perspectives emphasize the disruptiveness of moves and the lack of social connections in explaining movers' outcomes (Coleman, 1988; Hagan, MacMillan, & Wheaton, 1996; Haynie et al., 2006b). Such a lack of network integration would be problematic in a number of ways. For example, it would limit the availability of friendship-based resources, such as information and emotional support, to mobile adolescents (Haynie et al., 2006b). It also could increase mobile adolescents' risk for negative outcomes associated with low peer integration, such as psychological stress and depression (Gilman et al., 2003; Haynie et al., 2006a).

Second, moving theoretically could increase adolescents' ties to peers who engage in problematic behavior. Due to social competition, recent movers may experience trouble gaining access to friendship groups composed of high-achieving and prosocial peers (Haynie & South, 2005; South & Haynie, 2004). They may find deviant peer groups more accepting because those groups tend to have more fluid boundaries and to be less exclusive (South & Haynie, 2004). If this is true, then recent movers may be at an increased risk for befriending peers who are involved in problem behavior, such as substance use or delinquency (Haynie, et al., 2006b). These possible connections to deviant peers are important because they could increase movers' own risk for school or behavior problems. Such potential differences in the behavioral characteristics of movers' friendships are especially relevant in the context of differential association and social learning theories, under which the content rather than the structure of ties influences adolescent outcomes (Warr, 2002).

Few studies have tested these theoretical effects of moving on adolescents' friendship networks. The available evidence suggests that moving may be associated with both the

structure and the behavioral content of those networks. Regarding the associations of moves with social integration, compared to non-movers, adolescents who recently moved report less contact with friends and less intimate friendships (Vernberg, 1990). They tend to have smaller and less central friendship groups (South & Haynie, 2004). They are less likely to talk with friends about school issues, and less likely to talk with their parents about their friends (Pribesh & Downey, 1999; South & Haynie, 2004). In addition, individuals who moved during adolescence have fewer close friends as adults (Myers, 1999). Regarding the associations of moves with peer deviance, adolescents who recently moved have friends who perform worse in school and who are more involved in deviant behavior (Haynie et al., 2006b). Even adolescents who moved several years ago have more deviant friends (Haynie et al., 2006b). These studies suggest that moving could harmfully impact adolescents' social lives during a critical developmental period.

Selection in the Association of Moving with Friendships

Despite these findings of negative associations between moves and adolescents' social adjustment, the causal nature of these associations is unclear. A potential alternative explanation is that recent movers have fewer and more deviant friends because they were at risk for those things to begin with, not because of the event of moving. School and residential mobility and peer problems have several precursors in common, such as poor parenting (Dishion, 1990; Patterson, 1982), poor school performance (Kreager, 2007; Meijs et al., 2010), child behavior problems (Gasper, DeLuca, & Estacion, 2012; Kreager, 2007), and family socioeconomic disadvantage (Adler, Kless, & Adler, 1992; Kreager, Rulison, & Moody, 2011; Long, 1992; South, Crowder, & Trent, 1998). Some parents transfer their children to other schools for reasons directly related to preexisting social difficulties, such as peer rejection or not "fitting in" at school (Carson, Esbensen, & Taylor, 2013; Rumberger & Larson, 1998). In past studies, regression controls for factors such as school and family problems have substantially attenuated the adverse "effects" of moving, though significant associations generally have persisted. If soon-to-be movers already have a collection of liabilities that predispose them to social problems, then the apparent social effects of moving may actually be artifacts of selection bias.

There is some evidence that this is the case for the association of moving with adolescents' own behaviors. Several studies have found that adolescents who move are themselves more involved in delinquency and substance use (Haynie & South, 2005; Hoffman & Johnson, 1998), have more psychological difficulties (Gilman, Kawachi, Fitzmaurice, Buka, & 2003; Haynie, South, & Bose, 2006a), and have lower grades, test scores, educational expectations, and educational attainment (Pribesh & Downey, 1999; Rumberger and Larson, 1998; South, Haynie, & Bose, 2007; Sutton, Muller, & Langenkamp, 2013, Swanson & Schneider, 1999). Yet three studies that specifically addressed selection bias via within-individual analyses and propensity score models found that under those methods school and residential moves were not associated with adolescents' own delinquency and substance use (Gasper et al., 2010; Porter & Vogel, 2014), and school moves were only weakly associated with school dropout (Gasper et al., 2012). In addition, data from the experimental Moving to Opportunities study and from the quasi-experimental Yonkers Project suggest that residential moves have mixed

effects on youths' academic, psychological, and behavioral problems (Fauth, Leventhal, & Brooks-Gunn, 2005; Gennetian et al., 2012).

To our knowledge, only one study has specifically examined the role of selection in the association of school moves with adolescents' peer relations. Langenkamp (2014) found that relative to non-mobile students, students who would soon change schools were less likely to report having any friends at their school of origin. Post-move, those students also were less likely to report having any friends at their destination school, even net of preexisting social, academic, and family risk factors (Langenkamp, 2014). The association between moving and having any post-move school friends was greatly reduced, though still visible, in propensity score models versus regression models that controlled for preexisting risk factors.

Current Study

The current study examines whether school moves negatively influence the structure and behavioral content of new students' friendship networks, or whether any apparent effects result from pre-move characteristics. Examinations of the potential effects of adolescents' moves on characteristics of their friendship groups are complicated by two main methodological issues. First, tests of move-related change ideally would use longitudinal data, because such data would provide information on peer integration and behavior prior to the move (e.g., Langenkamp, 2014). Second, tests of peer-related outcomes ideally would use independent measures obtained through social network information, because adolescents are poor reporters of their peers' support for and involvement in deviant behaviors (e.g., Haynie et al., 2006b). Combining these two design strengths in a single study essentially would require respondents to have moved between two schools that both participated in a longitudinal social network study. Thus, some of the quasi-experimental designs that best account for unobserved heterogeneity, such as fixed effects analyses (e.g., Gasper et al., 2010), may not be feasible for this research question.

Drawing on longitudinal social network data from a sample of rural seventh and eighth graders, we address the issue of selection in two ways. Like past studies, we use regression models that include extensive control variables capturing adolescents' family structure and relations, socioeconomic status, attachment to school, and attitudes (Haynie et al., 2006b; Langenkamp, 2014; South & Haynie, 2004). In addition, we attempt to capture the counterfactual condition by comparing a group of recent movers to a group of students who would soon move out of their school. That is, we use future movers as a proxy for what mobile adolescents' friendship networks looked like before they moved. Our first hypothesis is that future movers' background characteristics will resemble the background characteristics of recent movers more closely than they resemble the background characteristics of non-movers. Our second hypothesis is that recent and impending school moves will have comparable associations with adolescents' social outcomes. If these hypotheses are confirmed, then it would indicate that selection may provide an adequate account of the apparent effects of moving. We examine as outcomes network-based measures of both social integration and adolescents' ties to peers who are involved in problem behavior.

Method

Data

Sample—We use survey and social network data from the PROSPER study, a place-randomized trial of a model for delivery of substance misuse interventions conducted in 28 public school districts in rural Pennsylvania and Iowa (Spoth et al., 2004; Spoth et al., 2007). PROSPER’s sample consists of two successive cohorts of students who were first interviewed in the fall of 6th grade with follow-ups conducted each spring from 6th through 9th grade. At each wave, students completed in-school surveys which assessed various aspects of their development, including their social lives, family experiences, and involvement with substance use and delinquency. Also at each wave, study staff collected complete rosters of all students enrolled in each grade at each study school.

Our social network data come from peer nominations assessing friendship ties. At each wave, respondents nominated up to seven friends in their school and grade. The PROSPER staff was able to match over 83% of friendship nominations to students on the school rosters. Most (86%) of the unmatched nominations resembled no name on the class rosters and presumably were not respondents’ grademates. Since the entire grade was targeted for participation in the study, these data allowed us to construct complete within-grade school friendship networks. To create the peer measures described below, we calculated measures of each respondent’s network position, and we linked each respondent to his or her friends’ scores on relevant survey items.

This study analyzes data from respondents who participated in the 7th or the 8th grade surveys. At these grades, we could identify which respondents had just entered or were about to exit their school because we had school rosters for the previous and following grades. We analyzed data from the 7th and 8th grade surveys separately because combining the data across grades masked some heterogeneity in the results. Where results differed by grade, we note this in the text. Our interest was in three subsets of the schools’ populations at these waves/grades: respondents who were first enrolled in their schools at the indicated wave (e.g., at 7th grade), respondents who would last be enrolled in their schools at that wave, and respondents who were continuously enrolled at their schools across all waves of data collection. The first and second groups by definition would be composed of different respondents in the analyses of 7th grade data versus the analyses of 8th grade data. The third group attended their schools at both 7th and 8th grades; thus, some of the same individuals were in both grades’ analyses.

We used the same process to choose both the 7th grade and the 8th grade analytical samples. To create the 7th grade sample, we began with the 7th grade survey data from the 6,598 control school respondents who participated at that wave/grade. We focused on respondents who were enrolled in control schools to prevent the experimental intervention from influencing our results. We first excluded 1,218 7th grade observations from respondents who skipped the last two pages of the survey at that wave, because that section collected the friendship information which was the source of our dependent variables. Next, we excluded 12 7th grade respondents who were left back a grade during the examined waves, because such within-school “moves” could affect social outcomes. Next, we excluded 617 7th grade

respondents who entered or exited their school in 6th or 9th grade or exited their school temporarily and reentered it at a later grade. These respondents could not be classified neatly as movers or as long-term members of the school population, and that classification was the basis for our focal independent variables. Finally, we excluded 354 7th grade respondents who were missing data on one or more analytical variables. The final 7th grade analytical sample included 4,397 respondents.

To create the 8th grade sample, we began with the 8th grade survey data from the 6,793 control school respondents who participated at that grade. Applying the same exclusion criteria resulted in the exclusion of 1,291 8th grade respondents who skipped the last two pages of the survey, 21 respondents who were left back, 797 respondents who entered or exited their school temporarily or in 6th or 9th grade, and 513 respondents with item-missing data. The final 8th grade analytical sample consisted of 4,171 respondents. As noted above, there was some overlap between the 7th and 8th grade analytical samples. Specifically, both samples included the 3,140 respondents who never changed schools and met the exclusion criteria at both grades. We used those respondents' 7th grade and 8th grade data in the 7th and 8th grade analyses respectively.

Measures

School mobility—The focal independent variables are measures of school moves. The PROSPER study is unusual in that it is school-based and continually recruits new students (i.e. youth who move into a study school) at each wave. We used school roster information to classify respondents into one of three mutually exclusive categories. *Non-movers* are respondents who were continuously enrolled at their school from 6th through 9th grades. *Recent movers* are respondents who had newly enrolled at their school at that wave/grade. *Future movers* are respondents who would exit the school's population at the following wave/grade. Normative school transitions (e.g., the transition from middle to high school within the same school district) were not counted as moves.

Social integration—Three of our dependent variables are indicators of respondents' social network status. *Social isolation* is a dichotomous indicator of whether the respondent neither made nor received any friendship nominations (0 = sent or received at least one nomination; 1 = did not make or receive any nominations). *Indegree centrality* is a measure of the number of students who named the respondent as a friend, which ranges from 0 to 20 in the current sample. In order to reduce skewness and ensure equal variance across school-cohort combinations, this measure was transformed by taking the square root of each respondent's score. *Betweenness centrality* is the proportion of "shortest paths" between otherwise unconnected students in the network that pass through the respondent. This measure of connectivity thus provides information about whether a student links other students to each other through his or her friendships. We transformed this measure to account for the fact that its variance was positively skewed and highly dependent on school/grade cohort size. This was done by (1) multiplying each respondent's betweenness centrality score by the ratio of their school/grade cohort size to the mean school/grade cohort size across all cases and then (2) taking the cube root of that product.

Friends' deviance—Our other three dependent variables are measures of respondents' friends' attitudes toward and involvement in deviant behaviors. Using the social network data, we identified students who named the respondent as a friend or were named as a friend by the respondent (i.e. the undirected or send-or-receive network). This allowed us to directly measure each friend's characteristics using their own survey answers. *Peer positive substance use expectancies* is friends' average score on an 11-item substance use expectancies scale adapted from Botvin et al. (1983) that assessed agreement with statements such as “teens who smoke cigarettes have more friends” and “drinking alcohol makes you look cool” (original range: 1 = strongly disagree; 5 = strongly agree; $\alpha = .95$). Each item was standardized before scale creation. *Peer substance use* is friends' average score on a scale composed of four standardized items tapping past-month frequency of cigarette use, alcohol use, getting drunk, and marijuana use (original range: 1 = not at all; 5 = more than once a week; $\alpha = .82$). *Peer delinquency* is friends' average score on a 12-item scale adapted from Elliott et al. (1989) that assessed the past-year frequency of behaviors such as purposely damaging or destroying property, beating someone up or physically fighting someone, and carrying a hidden weapon (original range: 1 = never; 5 = five or more times; $\alpha = .88$). We used item response theory scaling to combine these items to prevent more trivial items from dominating the measure (Osgood, McMorris, & Potenza, 2002).

Covariates—To account for potential sources of spuriousness, we included a number of individual- and school-level control variables in our analyses. Individual-level controls included demographic characteristics such as *male* gender (0 = no, 1 = yes), *White* race (0 = Hispanic, African American, Asian, Native American, or other non-White race, 1 = White), and students' eligibility to receive *free or reduced-cost school lunch* (0 = no, 1 = yes). Family structure was measured as a set of dummy variables with indicators for households containing *two biological parents* (0 = no, 1 = yes) and *one-biological parent and one-step parent* (0 = no, 1 = yes), with *other family structure* (0 = no, 1 = yes) serving as the reference category. We included three variables capturing respondents' deviant attitudes and behaviors, namely their *positive substance use expectancies*, *substance use*, and *delinquency*. These variables were constructed using the same items and scaling methods that were used to create the analogous measures of friends' behavior (see above). We also included several variables capturing respondents' school and family characteristics. *School grades* was a single item that asks respondents about their grades in the past school year (1 = mostly less than Ds, 5 = mostly As). *School attachment* was the mean of eight items adapted from Simons et al. (1991) that assessed the extent to which respondents agreed with statements such as “I like school a lot,” “I get along well with my teachers,” and “I try hard at school” ($\alpha = .82$; higher scores indicate stronger attachment). *Positive family relations* was a composite measure constructed by averaging four standardized subscales that captured parent-child joint activities, affective quality, parental supervision, and family cohesion ($\alpha = .82$; Redmond et al. 2009). *Consistent parental discipline* was the mean of five items measuring the extent to which respondents' parents utilized consistent parenting practices when the respondent misbehaved ($\alpha = .75$; Redmond et al. 2009). *Church attendance* was an 8-point scale measuring how often respondents attended religious services in the past month (1 = never, 8 = more than once a week). *Sensation seeking* was the mean of three items from the Sensation Seeking Scale (Zuckerman, 1994) that assessed respondents' preference for

risky and/or sensational experiences (e.g., doing what feels good regardless of the consequences; $\alpha = .77$). Finally, we included two school-level control variables that may impact opportunities for new students to make friends: *School size* is the number of students in each school-cohort and *percent new students* is the percentage of students in each school-cohort who moved into the school-cohort that year.

Analytical Strategy

We conducted separate but identical analyses of the 7th grade and 8th grade data. For each, we estimated a series of linear and logistic regression models predicting peer network outcomes from school mobility status and the control variables. For each model, the indicators for recent movers and future movers were entered into the equation with non-movers serving as the reference category. The coefficients for the recent and future mover variables indicate whether those groups differed from non-movers on levels of social integration or exposure to deviant peers. We used post-hoc Wald's tests to determine whether the coefficients for recent movers and future movers differed significantly from one another. Where they did not, recent and future movers had statistically indistinguishable levels of social integration or exposure to deviant peers. It is important to note that our Wald's tests are equivalent to tests of whether the mean value on the outcome for recent movers and the mean value on the outcome for future movers are statistically different from each other.

We used random intercept models to account for correlated residual error among respondents nested within the same school-cohort combination (Raudenbush & Bryk, 2002). First, we estimated an unconditional model for each dependent variable to determine whether levels of the given outcome varied across school-cohort combinations. With the exception of social isolation, we found that all outcomes varied significantly across higher-level units. Thus, for all outcomes except social isolation, random intercept models were estimated using the mixed modeling package available in Stata (StataCorp, 2012).

Results

Descriptive Differences between School Movers and Non-Movers

We first examined differences between non-movers, respondents who had recently changed schools, and respondents who were about to change schools on several demographic, family, and school factors. Tables 1 and 2 show descriptive statistics on these factors separately for the three groups in 7th grade and in 8th grade. Non-movers had significantly more favorable scores than the mover groups on nearly every factor examined, including intact family structure, free lunch eligibility, substance use attitudes and delinquency, school grades and attachment, family relations and discipline, and religious service attendance. Where recent and future movers differed from each other on these factors, the differences favored respondents who had already moved. For example, among both samples, recent movers had less positive attitudes toward substance use, lower rates of substance use, better grades, higher school attachment, and better parental discipline than future movers. Among the 8th grade respondents recent and future movers resembled each other on most other background

factors, but among the 7th grade respondents recent movers had more favorable scores on factors such as free lunch eligibility, delinquency, family relations, and sensation seeking.

We next examined group differences in respondents' relationships with friends and their friends' involvement in deviance. Relative to movers, non-movers were less socially isolated, received more friendship nominations, and were more central in the peer network, and their friends were less involved in delinquency and substance use and expected fewer positive consequences of substance use. Differences between recent and future movers on peer characteristics favored recent movers, whose friends were less delinquent (in the 7th grade sample), used substances less often (in the 8th grade sample), and expected fewer positive consequences of substance use (in both samples). Differences between recent and future movers in social integration were mixed, with recent movers somewhat advantaged among 7th grade students and future movers advantaged among 8th grade students.

Predicting Social Integration from School Mobility Status

Table 3 displays the results of logistic models and random intercept models examining whether moving is associated with social isolation, indegree centrality, and betweenness centrality in both the 7th and 8th grade, net of controls. We found that recent movers were less integrated in their school's social networks compared to non-movers. This was observed across all three outcome variables and at both grades. For the models examining social isolation, the logistic coefficients for recent school moves were positive and significant among both 7th ($b = 1.22, p < .01$) and 8th grade students ($b = 1.12, p < .001$).

Exponentiating these coefficients reveals that relative to non-movers, recent movers had 238 and 208 percent higher odds of being socially isolated in the 7th and 8th grade respectively (e.g., $[\exp(1.22)-1]*100=237.8$). In terms of indegree centrality, the coefficients for recent movers were negative and significant in 7th ($b = -0.21, p < .001$) and 8th grade ($b = -0.35, p < .001$), indicating that recent movers received fewer friendship nominations than non-movers. The models examining betweenness centrality also indicate that recent movers held less central positions in their school's peer network in 7th ($b = -0.02, p < .001$) and 8th grade ($b = -0.05, p < .001$).

These findings confirm the association of moving with social integration. Examination of future movers indicated that parts of this association were due to selection. Compared to non-movers, future movers received fewer friendship nominations than non-movers in both 7th ($b = -0.29, p < .001$) and 8th grade ($b = -0.29, p < .001$) and scored lower on betweenness centrality in 8th grade ($b = -0.03, p < .001$), though they were not more likely to be isolates at either grade. The key test, however, is to determine whether recent movers were less integrated into their school's peer networks than future movers. Wald's tests of the contrasts between the coefficients for recent moves and future moves at 8th grade indicated that recent moves were more strongly associated with isolation and low centrality in the school's network; the differences at 7th grade, though similar in size, were not significant ($p = .085$ and $p = .065$ for the contrasts in the isolation and betweenness centrality models, respectively). In addition, the differences between the coefficients for recent and future moves in predicting indegree centrality were not significant in 7th ($\chi^2 = 1.44, p > .05$) or 8th

grade ($\chi^2 = 0.71, p > .05$), suggesting that movers may have fewer friends overall even before they move.

Predicting Friends' Deviance from School Mobility Status

Table 4 displays the results of random intercept models examining whether moving predicted higher peer substance use expectancies, peer substance use, and peer delinquency in the 7th and 8th grade, net of controls. The 7th grade results show that across all three outcomes, neither group of movers differed significantly from the non-mover group net of the controls. In analyses not shown, we found that in comparison with mover coefficients from bivariate models, the introduction of controls for free school lunch status, family relations, and consistent discipline reduced the recent mover and future mover coefficients by 67% and 50% respectively and to non-significance. This suggests that the association of moving with peer deviance stemmed from preexisting socioeconomic and parenting factors.

The 8th grade results suggest that relative to non-movers, recent movers' friends engaged in more delinquency ($b = 0.06, p < .05$), but they did not engage in more substance use ($b = 0.10, p > .05$) or hold significantly elevated substance use expectancies ($b = 0.03, p > .05$). In addition, contrasts between the coefficients for recent and future movers revealed evidence consistent with self-selection. For example, compared to non-movers, and unlike recent movers, future movers' friends did hold higher substance use expectancies ($b = 0.06, p < .01$). Once again, however, the key test is to determine whether recent movers have more deviant friends compared to future movers. Wald's tests revealed that the coefficients for these two variables were statistically indistinguishable across all three outcomes (i.e. for peer substance use expectancies, $\chi^2 = 0.50, p > .05$; for peer substance use, $\chi^2 = 0.01, p > .05$; and for peer delinquency, $\chi^2 = 0.40, p > .05$). Thus, the 8th grade results suggest that although moving is associated with elevated peer delinquency, the association is likely due to pre-existing characteristics of movers.

Discussion

Moving has the potential to disrupt social relationships, including friendships, family relationships, and neighborhood and school ties. The speed and ease of mobile adolescents' acceptance into destination peer networks, and the characteristics of the peer groups they join, thus could have important developmental implications. Moves during early adolescence in particular might be problematic because they occur at an age when friends increase in importance and parents' ability to assist in children's social integration declines (Brown, 2004; Myers, 1999; Pettit, 2004; South & Haynie, 2004). This study examined whether school moves negatively influence the structure and behavioral content of early adolescents' school-based friendship networks, or whether differences between movers and non-movers' friends result from selection.

Our results suggest that school moves may have a harmful causal effect on adolescents' social integration. Relative to non-mobile students, new students were more often socially isolated, had fewer friends, and were less socially prominent in their schools' peer networks. We thus conclude that at least in their first year at a new school, new students do appear to have some difficulty integrating into new friendship networks (Haynie et al., 2006b;

Langenkamp, 2014). Yet we also found some evidence that these associations were spurious rather than causal, because adolescents who were about to change schools already had fewer friends and were somewhat less socially prominent. One potential explanation for this finding is that adolescents who are less socially engaged may have other background characteristics that predispose them to changing schools; we discuss this possibility further below. Another potential explanation is that adolescents may purposefully begin to disengage from school networks before they actually move, in anticipation of changing schools. Like Langenkamp (2014), we conclude that adolescents who change schools are likely to have more than their share of social difficulties both before and after the change.

Our analyses of friends' delinquency, substance use, and attitudes toward substance use indicated that the association of these outcomes with school moves is an artifact of selection. First, background factors such as family socioeconomic status and poor family relations were much of the reason why new students had more deviant friends. This finding mirrors those of Pribesh and Downey (1999), who found that family socioeconomic status explained much of the association of moves with youths' school performance. Second, our comparisons of future movers with non-mobile students indicated that students who move schools are likely to have more deviant friends even before the move takes place. This suggests that students who are at risk for changing schools, but who have not yet changed schools, may already have trouble gaining access to prosocial friendship groups (cf. Haynie & South, 2005; South & Haynie, 2004). This means that moving does not increase movers' risk for school or behavior problems by connecting them with deviant peers. This is consistent with recent works showing that moving's association with behavior problems also is an artifact of selection (Gasper et al., 2010; Porter & Vogel, 2014).

The expectation that recent movers will have more deviant peers follows from the theoretical proposition that deviant peer groups are socially marginalized and thus easy to join (South & Haynie, 2004). Yet other theorists have proposed that deviant peers temporarily become more popular during adolescence (e.g., Moffitt, 1993). If the latter is true, then deviant groups may not necessarily be the easiest point of entry into the destination social networks. There could be other behaviors that signal that peer groups will be especially accepting or easy to join, and that thus shape the destination friendship networks of adolescents who move. Future studies of adolescent moves should examine other friends' behaviors that might index social integration or exclusivity, for example extracurricular activity involvement.

Our descriptive analyses of students who would soon move versus students who had just moved indicated that the former had higher scores on several background risk factors. Some of these, such as low grades and low attachment to school, could have prompted their parents to move them to different schools (cf. Gasper et al., 2012; Rumberger & Larson, 1998). Others, such as inconsistent parental discipline, may have been associated with the general family disruption that precedes moves (cf. Pribesh & Downey, 1999). Under either possibility, these results indicate that the period leading up to school changes could carry its own risks for adolescent development. Interventions that address academic and family problems, especially among subgroups that are likely to change schools frequently (e.g.,

youths from families with low socioeconomic status), could improve adolescents' adjustment both before and after they move.

Overall, our conclusions were consistent across the 7th and 8th grade samples. However, our bivariate descriptive results revealed some differences between 7th and 8th grades in movers' exposure to potentially harmful peer contexts. Across both grades, recent movers fared worse than non-movers on all three measures of social integration. However, only in our 8th grade descriptive results did they fare worse on the peer behavior outcomes. Two of the three latter associations were no longer visible net of the control variables, indicating that they were spurious to some of our observed confounds (e.g., family relations). Although we found little evidence of causal effects of moving on adolescents' exposure to peer deviance at either grade, it is possible that the common risk factors behind student mobility and affiliation with deviant friends could change across grades. Future research could usefully examine changes across early adolescence in the background factors that might predispose youth to harmful outcomes.

This study had the strengths of combining independent information on adolescents' social integration and friends' behavior with the use of a comparison group that was likely to resemble recent school movers on a range of observed and unobserved characteristics. Still, the fact that we did not examine the same adolescents before and after they moved meant that we could not examine differences in the characteristics or quality of their origin and destination schools. It is possible that school or residential moves are beneficial when the move is an 'upgrade' (e.g., if a student trades a low cohesion peer context for one that is highly cohesive) and detrimental when the move is a 'downgrade'. Although they would be difficult to carry out in the context of a social network study, studies examining within-individual change in students' friendship networks would shed light on whether the nature of any moving effect is dependent on contextual changes.

Our study had other limitations. First, our measure of mobility captured school moves. It is possible that some of our "non-movers" moved residences within their community even though they did not change schools. While such moves may be less likely to disrupt social ties at school, they could have other social effects, such as changes in after-school peer affiliations. Scholars thus should continue to study a variety of types of adolescent moves. Second, our network data were restricted to friendship nominations made within the respondent's school and grade level, so we could not assess older, younger, or non-school friends. This could be problematic if recent movers are more likely to form friendships outside of school. Most PROSPER communities were served by one public middle school, so it is unlikely that respondents had a large peer population outside of their school from which to select friends. Even so, future research should examine ties to out-of-school and out-of-grade peers. Third, because the school rosters we used to define moves were collected once at each wave, we may have missed some midyear moves (e.g., if some 7th grade "recent movers" actually moved at the end of 6th grade). Such measurement error in our indicators of moving may have made our results conservative. Despite this, we found bivariate associations between moving and each of our outcomes. Still, future research should examine alternative ways to measure moves. Fourth, our study used data from communities in rural Pennsylvania and Iowa which were predominately White with large

proportions of low-income families; this could limit the generalizability of our findings. Future research should consider addressing this research topic among a more geographically and demographically diverse sample.

In sum, although early adolescents who change schools may have some trouble integrating into their new schools' social networks, they do not appear to be pushed into deviant peer networks. This is reassuring given how common moving is during adolescence. Yet recent and upcoming school moves still could serve as signals that adolescents may be experiencing other problems or stressors that themselves can manifest as social difficulties. We suggest that whereas many network studies examine the consequences of low social integration, there also is utility in understanding the life experiences that produce less integrated individuals. Like past works, this study showed that adolescents with peer problems tend also to have socioeconomic, family, and school difficulties – difficulties that likely are associated with many disruptive life events besides school moves. A better understanding of the mechanisms behind such associations would enhance efforts to improve at-risk adolescents' social adjustment.

Biographies

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Table 1

Seventh Grade Descriptive Statistics by School Mobility Status (N = 4,397)

	Non-Movers N = 3,830		Recent Movers N = 396		Future Movers N = 171		Test	Contrast
	Mean	SD	Mean	SD	Mean	SD		
<i>Control variables</i>								
Male	0.47		0.49		0.51		1.5	
White	0.82		0.76		0.73		12.3**	N > R & F
Two biological parents	0.66		0.67		0.34		65.6***	N & R > F
One biological parent	0.14		0.15		0.30		32.4***	N & R < F
Eligible for free lunch	0.26		0.30		0.47		43.3***	N < R < F
Positive substance use expectancies	1.41 (0.67)		1.45 (0.64)		1.58 (0.78)		14.1***	N < R < F
Substance use	-0.10 (0.65)		-0.15 (0.50)		0.12 (0.97)		21.6***	N & R < F
Delinquency	0.18 (0.74)		0.26 (0.75)		0.55 (0.94)		46.2***	N < R < F
School grades	4.13 (0.87)		4.11 (0.93)		3.43 (1.12)		113.3***	N & R > F
School attachment	3.76 (0.76)		3.79 (0.71)		3.54 (0.86)		15.1***	N & R > F
Family relations	0.01 (0.49)		0.01 (0.45)		-0.17 (0.58)		24.0***	N & R > F
Consistent discipline	3.63 (0.96)		3.62 (0.89)		3.35 (1.04)		13.3**	N & R > F
Church attendance	4.98 (2.60)		5.29 (2.44)		4.26 (2.78)		15.7***	N & R > F
Sensation seeking	2.11 (0.99)		2.06 (0.93)		2.38 (1.09)		14.9***	N & R < F
School size (x100)	1.87 (1.06)		1.84 (1.06)		2.12 (1.26)		5.1**	N & R < F
School's percent new students	11.95 (4.99)		15.72 (6.51)		11.90 (4.94)		95.9***	N & F < R
<i>Outcome variables</i>								
Social isolate	0.01		0.03		0.02		8.5*	N < R
Indegree centrality	1.95 (0.80)		1.76 (0.85)		1.53 (0.80)		65.4***	N > R > F
Betweenness centrality	0.20 (0.09)		0.18 (0.10)		0.19 (0.10)		21.6***	N > R
Friends' positive substance use expectancies	1.43 (0.36)		1.42 (0.36)		1.51 (0.40)		9.4**	N & R < F
Friends' substance use	-0.16 (0.60)		-0.20 (0.73)		-0.07 (0.67)		5.0	
Friends' delinquency	0.23 (0.41)		0.23 (0.46)		0.29 (0.46)		8.0*	N & R < F

NOTE: Tests are omnibus Wald's χ^2 and are adjusted for clustering of respondents within schools.

All contrasts are significant at $p < .05$.

SD = standard deviation; N = non-movers; R = recent movers; F = future movers

Source: PROSPER Peers Study

* $p < .05$;

** $p < .01$;

*** $p < .001$ (two-tailed).

Table 2

Eighth Grade Descriptive Statistics by School Mobility Status (N = 4,171)

	Non-Movers N = 3,732		Recent Movers N = 246		Future Movers N = 193		Test	Contrast
	Mean	SD	Mean	SD	Mean	SD		
<i>Control variables</i>								
Male	0.47		0.54		0.47		5.7	
White	0.81		0.71		0.83		17.7***	N & F > R
Two biological parents	0.64		0.43		0.42		72.2***	N > R & F
One biological parent	0.15		0.25		0.23		23.7***	N < R & F
Eligible for free lunch	0.25		0.33		0.39		27.2***	N < R & F
Positive substance use expectancies	1.51 (0.73)		1.65 (0.76)		1.79 (0.84)		32.8***	N < R < F
Substance use	0.05 (0.87)		0.10 (0.92)		0.45 (1.36)		35.9***	N & R < F
Delinquency	0.31 (0.81)		0.59 (0.85)		0.57 (0.91)		40.9***	N < R & F
School grades	4.09 (0.87)		3.74 (0.94)		3.51 (1.03)		109.1***	N > R > F
School attachment	3.67 (0.76)		3.50 (0.77)		3.31 (0.89)		49.2***	N > R > F
Family relations	-0.10 (0.50)		-0.17 (0.51)		-0.23 (0.61)		14.1***	N > R & F
Consistent discipline	3.60 (0.92)		3.53 (0.92)		3.22 (1.10)		33.1***	N & R > F
Church attendance	4.71 (2.65)		4.09 (2.69)		4.04 (2.69)		22.0***	N > R & F
Sensation seeking	2.24 (1.01)		2.29 (0.93)		2.46 (1.11)		8.6*	N < F
School size (x100)	1.90 (0.98)		2.13 (1.11)		1.85 (0.92)		6.4**	R > F
School's percent new students	8.76 (3.30)		10.39 (3.01)		8.98 (3.06)		28.0***	N & F < R
<i>Outcome variables</i>								
Social isolate	0.02		0.07		0.03		21.3***	N < F < R
Indegree centrality	1.90 (0.78)		1.46 (0.77)		1.53 (0.78)		107.3***	N > R & F
Betweenness centrality	0.20 (0.10)		0.16 (0.11)		0.17 (0.10)		71.2***	N > F > R
Friends' positive substance use expectancies	1.54 (0.41)		1.64 (0.57)		1.72 (0.49)		42.9***	N < R < F
Friends' substance use	0.12 (0.87)		0.36 (1.41)		0.50 (1.22)		38.5***	N < R < F
Friends' delinquency	0.35 (0.47)		0.53 (0.61)		0.53 (0.58)		43.1***	N < R & F

NOTE: Tests are omnibus Wald's χ^2 and are adjusted for clustering of respondents within schools.

All contrasts are significant at $p < .05$.

SD = standard deviation; N = non-movers; R = recent movers; F = future movers

Source: PROSPER Peers Study

* $p < .05$;

** $p < .01$;

*** $p < .001$ (two-tailed).

Table 3
Logistic and Linear Estimates Predicting Adolescents' Social Integration from School Mobility

Predictor	Social Isolation ^a						Indegree Centrality ^b						Betweenness Centrality ^b							
	Seventh Grade		Eighth Grade		SE		Seventh Grade		Eighth Grade		SE		Seventh Grade		Eighth Grade		SE			
	b	SE	b	SE	b	SE	b	SE	b	SE	b	SE	b	SE	b	SE	b	SE		
Recent mover	1.22***	(0.35)	1.12***	(0.30)	-0.21***	(0.04)	-0.35***	(0.05)	-0.02***	(0.00)	-0.05***	(0.01)	-0.02***	(0.00)	-0.05***	(0.01)	-0.02***	(0.00)	-0.05***	(0.01)
Future mover	0.06	(0.62)	0.00	(0.49)	-0.29***	(0.06)	-0.29***	(0.06)	-0.01	(0.01)	-0.03***	(0.01)	-0.01	(0.01)	-0.03***	(0.01)	-0.01	(0.01)	-0.03***	(0.01)
Wald's χ^2 for difference	$\chi^2 = 2.96$		$\chi^2 = 4.25^*$		$\chi^2 = 1.44$		$\chi^2 = 0.71$		$\chi^2 = 3.39$		$\chi^2 = 5.34^*$									
<i>Control variables</i>																				
Male	1.02***	(0.29)	1.35***	(0.26)	-0.28***	(0.02)	-0.29***	(0.02)	-0.01***	(0.00)	-0.01***	(0.00)	-0.01***	(0.00)	-0.01***	(0.00)	-0.01***	(0.00)	-0.01***	(0.00)
White	-0.04	(0.32)	-0.06	(0.26)	0.07*	(0.03)	0.08**	(0.03)	0.01**	(0.00)	0.00	(0.00)	0.01**	(0.00)	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)
Two biological parents	0.31	(0.34)	-0.14	(0.27)	0.03	(0.03)	-0.00	(0.03)	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)	-0.01	(0.00)	0.00	(0.00)	-0.01	(0.00)
One biological parent	0.02	(0.44)	-0.20	(0.35)	-0.00	(0.04)	-0.08*	(0.04)	0.01*	(0.00)	0.00	(0.00)	0.01*	(0.00)	0.00	(0.00)	0.00	(0.00)	0.00	(0.01)
Eligible for free lunch	0.73*	(0.29)	0.51*	(0.24)	-0.26***	(0.03)	-0.18***	(0.03)	-0.01***	(0.00)	-0.02***	(0.00)	-0.01***	(0.00)	-0.02***	(0.00)	-0.01***	(0.00)	-0.02***	(0.00)
Positive substance use expectancies	-0.58*	(0.28)	0.17	(0.16)	0.02	(0.02)	0.03	(0.02)	0.01*	(0.00)	0.00	(0.00)	0.01*	(0.00)	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)
Substance use	0.09	(0.28)	0.07	(0.13)	-0.01	(0.02)	-0.00	(0.02)	-0.00	(0.00)	-0.00	(0.00)	-0.00	(0.00)	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)
Delinquency	-0.67**	(0.24)	-0.01	(0.17)	0.06**	(0.02)	0.05*	(0.02)	0.01	(0.00)	0.01**	(0.00)	0.01**	(0.00)	0.01**	(0.00)	0.01**	(0.00)	0.01**	(0.00)
School grades	-0.27	(0.15)	-0.01	(0.13)	0.08***	(0.02)	0.09***	(0.02)	0.00	(0.00)	0.01***	(0.00)	0.00	(0.00)	0.01***	(0.00)	0.01***	(0.00)	0.01***	(0.00)
School attachment	-0.07	(0.22)	-0.20	(0.18)	-0.01	(0.02)	0.05*	(0.02)	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)	0.01***	(0.00)	0.01***	(0.00)	0.01***	(0.00)
Family relations	-0.65*	(0.30)	0.32	(0.26)	-0.01	(0.03)	-0.02	(0.03)	-0.00	(0.00)	-0.00	(0.00)	-0.00	(0.00)	-0.00	(0.00)	-0.00	(0.00)	-0.00	(0.00)
Consistent discipline	-0.26*	(0.13)	-0.25*	(0.11)	0.02	(0.01)	0.04**	(0.01)	0.00	(0.00)	0.00*	(0.00)	0.00*	(0.00)	0.00*	(0.00)	0.00*	(0.00)	0.00*	(0.00)
Church attendance	-0.16**	(0.05)	-0.05	(0.04)	0.02***	(0.00)	0.01**	(0.00)	0.00*	(0.00)	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)
Sensation seeking	-0.12	(0.15)	-0.22	(0.13)	0.07***	(0.01)	0.08***	(0.01)	0.01***	(0.00)	0.01***	(0.00)	0.01***	(0.00)	0.01***	(0.00)	0.01***	(0.00)	0.01***	(0.00)
School size (x100)	0.00	(0.00)	0.00*	(0.00)	-0.00	(0.00)	-0.00	(0.00)	0.00***	(0.00)	0.00***	(0.00)	0.00***	(0.00)	0.00***	(0.00)	0.00***	(0.00)	0.00***	(0.00)
Percent new students	-0.07*	(0.03)	-0.02	(0.04)	0.01	(0.00)	0.00	(0.01)	0.00	(0.00)	0.00	(0.01)	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)
Intercept	-3.99***	(0.42)	-4.50***	(0.29)	1.89***	(0.04)	1.81***	(0.04)	0.19***	(0.00)	0.20***	(0.00)	0.19***	(0.00)	0.20***	(0.00)	0.19***	(0.00)	0.20***	(0.00)
Random effects	Var	SD	Var	SD	Var	SD	Var	SD	Var	SD	Var	SD	Var	SD	Var	SD	Var	SD	Var	SD

Predictor	Social Isolation ^a				Indegree Centrality ^b				Betweenness Centrality ^b			
	Seventh Grade		Eighth Grade		Seventh Grade		Eighth Grade		Seventh Grade		Eighth Grade	
	b	SE	b	SE	b	SE	b	SE	b	SE	b	SE
Level 2	--	--	--	--	0.08	0.02	0.07	0.02	0.01	0.00	0.00	0.00
Level 1	--	--	--	--	0.76	0.01	0.74	0.01	0.09	0.00	0.10	0.00
N	4,397		4,171		4,397		4,171		4,397		4,171	

NOTES: b = estimate; SE = standard error; Var = variance; SD = standard deviation.

Source: PROSPER Peers Study

^a Logistic regression coefficients shown

^b Linear random effects coefficients shown

* $p < .05$;

** $p < .01$;

*** $p < .001$ (two-tailed).

Table 4
 Linear Random Effects Estimates Predicting Adolescents' Friends' Substance Use and Delinquency from School Mobility

Predictor	Friends' Positive Substance Use Expectancies			Friends' Substance Use			Friends' Delinquency								
	Seventh Grade	Eighth Grade	SE	Seventh Grade	Eighth Grade	SE	Seventh Grade	Eighth Grade	SE						
Recent mover	0.01	(0.02)	0.03	(0.03)	0.00	(0.03)	0.10	(0.06)	0.02	(0.02)	0.06*	(0.03)			
Future mover	0.00	(0.03)	0.06*	(0.03)	-0.03	(0.05)	0.11	(0.06)	-0.04	(0.03)	0.03	(0.03)			
Wald's χ^2 for difference	$\chi^2 = 0.01$			$\chi^2 = 0.50$			$\chi^2 = 0.34$			$\chi^2 = 2.33$			$\chi^2 = 0.40$		
<i>Control variables</i>															
Male	0.04***	(0.01)	0.03**	(0.01)	0.01	(0.02)	-0.06*	(0.03)	0.18***	(0.01)	0.15***	(0.01)			
White	-0.04**	(0.01)	0.01	(0.02)	-0.07**	(0.02)	0.04	(0.04)	-0.06***	(0.02)	-0.02	(0.02)			
Two biological parents	0.00	(0.01)	-0.03*	(0.02)	-0.01	(0.02)	-0.02	(0.03)	-0.03	(0.02)	-0.05**	(0.02)			
One biological parent	0.02	(0.02)	0.02	(0.02)	0.04	(0.03)	0.09*	(0.04)	0.02	(0.02)	0.02	(0.02)			
Eligible for free lunch	0.05***	(0.01)	0.03*	(0.01)	0.07***	(0.02)	0.06	(0.03)	0.04**	(0.01)	0.05**	(0.02)			
Positive substance use expectancies	0.02*	(0.01)	0.03**	(0.01)	0.07***	(0.02)	0.10***	(0.02)	0.02*	(0.01)	0.03*	(0.01)			
Substance use	0.04***	(0.01)	0.07***	(0.01)	0.10***	(0.02)	0.18***	(0.02)	0.04***	(0.01)	0.05***	(0.01)			
Delinquency	0.01	(0.01)	0.03**	(0.01)	0.01	(0.02)	0.05*	(0.02)	0.03***	(0.01)	0.07***	(0.01)			
School grades	-0.04***	(0.01)	-0.06***	(0.01)	-0.07***	(0.01)	-0.13***	(0.02)	-0.06***	(0.01)	-0.07***	(0.01)			
School attachment	-0.04***	(0.01)	-0.04***	(0.01)	-0.05**	(0.02)	-0.09***	(0.02)	-0.04***	(0.01)	-0.05***	(0.01)			
Family relations	0.02	(0.01)	0.02	(0.01)	0.03	(0.02)	0.07*	(0.03)	0.01	(0.01)	0.03*	(0.02)			
Consistent discipline	-0.01	(0.01)	-0.01*	(0.01)	0.01	(0.01)	-0.04*	(0.02)	0.00	(0.01)	-0.02*	(0.01)			
Church attendance	0.00	(0.00)	-0.01***	(0.00)	-0.00	(0.00)	-0.01	(0.01)	-0.00	(0.00)	-0.01**	(0.00)			
Sensation seeking	0.02**	(0.01)	0.00	(0.01)	0.02	(0.01)	-0.01	(0.02)	0.02*	(0.01)	0.00	(0.01)			
School size (x100)	0.00	(0.00)	-0.00	(0.00)	-0.00	(0.00)	-0.00	(0.00)	0.00	(0.00)	0.00	(0.00)			
Percent new students	-0.01	(0.00)	0.00	(0.01)	-0.01	(0.00)	0.02	(0.01)	-0.01*	(0.00)	0.02**	(0.01)			
Intercept	1.41***	(0.03)	1.55***	(0.03)	-0.26***	(0.04)	-0.04	(0.05)	0.19***	(0.02)	0.30***	(0.03)			
Random effects	Var	SD	Var	SD	Var	SD	Var	SD	Var	SD	Var	SD			

Predictor	Friends' Positive Substance Use Expectancies				Friends' Substance Use				Friends' Delinquency			
	Seventh Grade		Eighth Grade		Seventh Grade		Eighth Grade		Seventh Grade		Eighth Grade	
	b	SE	b	SE	b	SE	b	SE	b	SE	b	SE
Level 2	0.11	0.01	0.11	0.01	0.15	0.02	0.19	0.03	0.09	0.01	0.11	0.02
Level 1	0.33	0.00	0.37	0.00	0.57	0.01	0.83	0.01	0.37	0.00	0.41	0.00
N	4,397		4,171		4,397		4,171		4,397		4,171	

NOTES: b = estimate; SE = standard error; Var = variance; SD = standard deviation.

Source: PROSPER Peers Study

* $p < .05$;

** $p < .01$;

*** $p < .001$ (two-tailed).