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ABSTRACT

Adolescents who experience repeated change in family structure as parents begin and end romantic unions are more likely than adolescents in stable family structures to engage in aggressive, antisocial, or delinquent behavior. We ask whether the link between family structure instability and behavior in adolescence may be explained in part by the residential and school mobility that are often associated with family structure change. Our analysis uses nationally-representative data from a two-generation study to assess the relative effects of instability and mobility on the mother-reported externalizing behavior and self-reported delinquent behavior of adolescents who were 12 to 17 years old in 2006. We find that residential and school mobility explain the association of family structure instability with each outcome, and these factors in turn are explained by children's exposure to poor peer networks.

A substantial literature has emerged during the last 20 years to demonstrate that the experience of instability in family structure has detrimental consequences for adolescents' behavior and school attachment (Cavanagh 2008, Cavanagh et al. 2006, Fomby & Cherlin 2007, Heard 2007a, b, Wu & Martinson 1993). In the context of this literature, family structure instability is defined as multiple entries into and exits from an adolescent's primary household by a parent's succession of spouses or romantic partners. While causal models are lacking, much of the effect of family instability on children's and adolescents' behavior has been attributed to economic stress and changes in parenting behavior and child-parent relationship quality resulting from repeated transitions and the exposure to parents' conflict with partners in poor-quality unions that eventually dissolve (Cavanagh 2008, Fomby & Osborne 2008, Osborne & McLanahan 2007).

We step outside of the family dynamic to consider how adolescents' social context changes in concert with family structure change and to assess whether changes in context as defined by residential and school mobility partially attenuate the association of union instability with externalizing behavior and delinquent behavior. We investigate how frequently residential and school mobility co-occur with a family structure transition for children in adolescence (ages 12-17) and whether that mobility mediates the relationship between family structure instability and children's delinquent behavior. Specifically, we hypothesize that where family structure instability is related to multiple changes in residences and school enrollments, adolescents will be more likely to develop negative peer networks that are associated with a higher likelihood of delinquent behavior. In addition, we test mechanisms that may intervene at different points in the causal pathway in order to explain how multiple sources of change in adolescents' family and social context contribute to poor behavioral adjustment. The hypothesized pathway is summarized graphically in Figure 1.

Background

The experience of family structure instability is associated with behaviors in adolescence that potentially lead to disadvantaged entry into adulthood. Wu and colleagues reported from nationally representative data that adolescents who had experienced multiple changes in family structure had an

elevated risk of nonmarital childbearing, and white adolescents had an elevated risk of early sexual initiation, controlling for family structure at birth and in adolescence (Wu 1996, Wu & Martinson 1993, Wu & Thomson 2001). Using data from two generations in the 1979 National Longitudinal Survey of Youth and Children of NLSY (NLSY79/CNLSY), Fomby and Cherlin reported that young white adolescents (ages 10-14) who had experienced three family structure transitions since birth had predicted mother-reported externalizing behavior problems scores one-third of a standard deviation higher than children who had experienced no transitions. White adolescents who had experienced family structure instability also had elevated self-reports of delinquent behavior in the last year (Fomby & Cherlin 2007). Drawing on the National Longitudinal Study of Adolescent Health (Add Health), Cavanagh (2008) reported a greater likelihood of marijuana use among adolescents in grades 7-12 who had experienced family structure instability since birth. Additionally, Langenkamp and Frisco (2008) reported an increased risk of excessive binge drinking when a recent family structure transition was compounded by growing emotional distance between an adolescent and his or her mother. Heard (2007b) found that mothers' union transitions in early childhood had an enduring deleterious association with adolescents' GPA, college aspirations, and school discipline.

Existing conceptual models of why family structure instability concerns children and adolescents are rooted in family theory, testing hypotheses drawn from theories of family stress, family conflict, and family systems. Indisputably, family is an essential component of the social context that shapes children's and adolescents' behavior. However, extrafamilial relationships that youth establish with other adults and with peers also have a significant influence on the likelihood of engaging in behaviors that are prosocial or behaviors that carry some risk to health, school performance, social connectedness, or more general well-being (Bearman & Brueckner 2001, Ryan 2000). Especially for adolescents, peer networks are essential for testing and articulating a distinctive self-identity (Kerpelman & Pittman 2001, Tarrant et al. 2006). Peer networks also provide a salient set of social norms to define and enforce acceptable behavior (Bearman & Brueckner 2001).

Work by Haynie and colleagues using data from the Add Health study has established that residential and school mobility affect adolescents' behavior through changes in composition and quality of adolescents' peer networks. Mobile adolescents develop smaller and less dense social networks in their new locations (South & Haynie 2004), and peers in those networks demonstrate poorer academic school performance and lower school engagement compared to the peer networks of non-mobile adolescents (Haynie et al. 2006). Mobile adolescents are more likely to enter peer networks whose members are disengaged from school because from the perspective of students already established at an adolescent's new school, there are fewer social risks and costs associated with admitting a new member to a network that is relatively unpopular (Eckert 1989, Haynie et al. 2006). Peer networks that operate at the margins of the school community are more likely than adolescents in more prosocial groups with less porous boundaries to engage in and to encourage delinquent behavior and disengagement from school (Eckert 1989). Hence, it is not necessarily the case that residential and school mobility directly causes adolescents to act out, but rather that the social structure of school environments places mobile adolescents in a position to be more readily accepted into peer groups that are engaged in delinquent or antisocial behavior.

Adolescents who have experienced changes in family structure are more likely than children who remain in stable family structures to experience residential and school mobility and may therefore have a greater likelihood of engaging in risky and delinquent behavior. Following children in the Panel Study of Income Dynamics, South, Crowder, and Trent (1998) report that in the observation interval following a divorce, 36 percent of children residing with a mother, and 46 percent of children residing with a father move out of their original Census tract each year. In comparison, 9 percent of children in stable two-parent families move out of their Census tracts annually. In the ensuing period, children residing with mothers who remain unmarried or who remarry continue to have an elevated annual rate of residential mobility compared to children who remain in stable two-parent families: 22 percent of children with unmarried mothers and 35 percent of children whose mothers remarry move from one Census tract to another each year. A longer-term picture from the Virginia Longitudinal Study of Divorce and

Remarriage shows that divorced women with children moved an average of four times in six years following union dissolution, and poor women in the sample moved seven times in that period, often into progressively lower-quality neighborhoods (Hetherington & Kelly 2002).

In addition to its relatively greater frequency, evidence indicates that residential mobility appears to be more detrimental among adolescents outside of two-parent families. High school students in the 1988 National Health Interview Survey who resided with a never-married, divorced, or remarried parent had a significantly greater likelihood of poor behavioral and academic adjustment when they had experienced any residential mobility. No such effects of residential mobility were reported for children residing with two-parent families continuously (Tucker et al. 1998). More broadly, the experience of simultaneous or closely-spaced transitions in school, family, and developmental domains is associated with lower self-esteem and poorer school engagement among young adolescents compared to the experience of sequenced, more widely-spaced transitions (Simmons et al. 1987).

Mediating factors

Our causal model posits that family structure instability is associated with relatively frequent residential and school mobility, and this mobility leads to selection into peer networks where adolescents are more likely to engage in delinquent behavior. A variety of factors that co-occur with family instability and mobility may represent mechanisms that drive the causal model. Among these factors are an increased risk of poverty, diminished school attachment, and lower social capital among adolescents who have experienced family instability relative to the adolescents in stable family structures. Alternatively, our model potentially represents a spurious association such that mothers and adolescents' behavioral attributes that were present prior to family structure change and mobility explain any observed associations in the causal model.

Poverty. Across the early life course, household poverty is associated with compromised behavioral, scholastic, and cognitive outcomes (McLanahan 2009, McLanahan & Sandefur 1994). Adolescents who experience union instability potentially experience more fluctuations in household income and may have lower household income overall compared to children in stable two-parent families

(but not necessarily compared to adolescents in stable single-parent families). Beyond household-level effects, a decline in income following a union transition is associated with the risk of reduced neighborhood quality. As a result of declining household income, children who experience residential mobility following a divorce are more likely to move to lower-income neighborhoods compared to children who experience a move in a stable two-parent family, and children whose mothers remarry move into only slightly wealthier neighborhoods compared to children whose divorced mothers remain unmarried (South et al. 1998).

School attachment. Non-routine school changes (i.e., changes other than standard moves from elementary to middle school or middle to high school) require students to make new friends, establish a scholastic reputation with new teachers and administrators, and navigate social cliques. School change accompanied by residential change introduces additional challenges as students acclimate to a broadly new environment (see Swanson & Schneider 1999). Given the potential stress and anxiety associated with non-routine school change, students' involvement in poor peer networks and delinquent behavior may be a response to the perception that social boundaries in the new school are challenging to penetrate (Eckert 1989, Haynie et al. 2006). We consider whether parents' and adolescents' satisfaction with how well the current school serves the family's needs mediates any association between school mobility, pressure from peer networks, and adolescents' externalizing and delinquent behavior.

Social capital. Compared to adolescents in stable families, adolescents who experience multiple family structure transitions have less access to social capital in the form of coresident kin, extended kin residing nearby, and close relationships with adults established through neighborhood proximity, church, or school (Fomby et al. 2008). The relative lack of social capital may be attributable to more frequent residential mobility. Families who experience residential change have fewer social connections following a move, and parents of school-age children are less likely to know the parents of their children's friends (Pettit 2004, Pettit & McLanahan 2003). For younger adolescents only, we ask whether social capital in the form of mother's regular interaction with extended family and her own friends or knowing the children in her adolescent's friendship networks reduces any association between residential mobility and

children's externalizing behavior or delinquency. (Similar measures are not available for older adolescents.)

Selection effects. Parents and adolescents who have experienced multiple union transitions may have attributes that predict future family instability, mobility, and adolescent delinquent behavior. For example, a parent with poor impulse regulation may be more likely to begin or end relationships quickly, to change residences frequently, and to pass on poor self-regulation skills to children compared to a parent with better impulse regulation. Under such circumstances, any association between family structure instability, residential and school mobility, and adolescents' delinquent behavior would be spurious, as each factor would be associated more directly with impulsivity.

There is evidence to support the argument that pre-existing attributes of parents and children might explain the hypothesized relationship between union instability, mobility, and behavior. Using longitudinal, nationally representative data from the National Education Longitudinal Study of 1988 (NELS 88), Pribesh and Downey (1999) reported that about 90 percent of the apparent effect of residential and school mobility on students' academic performance was explained by family attributes measured prior to observed residential or school moves, including poverty, prior mobility, and relatively low social capital. Based on survey data from a regional study of a housing relocation experiment, Pettit and McLanahan (2003) concluded that families who relocated established less social capital in their destination areas in part because of negative selection. That is, the families who selected to move made that choice, in part, because they had less social capital in the original neighborhood compared to those who remained and were disinclined to build social capital in their new location. Finally, also using NELS 88 data, Rumberger and Larson (1998) found that adolescents with high levels of behavior problems or absenteeism were more likely to change schools compared to children without such histories. The authors argue that for troubled students, school change may represent a soft alternative or precursor to school dropout. In sum, expected changes in income, social capital, and peer behavior following family structure transitions and mobility may simply reflect earlier disadvantaged circumstances.

Data and Methods

We use two-generation data from the 1979 National Longitudinal Survey of Youth (NLSY79) and Children of the NLSY (CNLSY, 1986-2006) to address our research question. The NLSY79, developed by the U.S. Bureau of Labor Statistics (BLS), is a nationally-representative sample of men and women who were 14 to 22 years old in 1979 (N=12,686). Respondents were interviewed annually until 1994 and have been interviewed every other year since then. In 1986, the BLS launched the CNLSY to follow the development of children whose mothers were initially included in the NLSY79, and children have been interviewed biennially. The original response rates for the NLSY79 and CNLSY were 87 and 94 percent, respectively. The retention rates to 2006 are 76.8 percent in the NLSY79, about 93 percent for children age 14 and under in the CNLSY, and about 83 percent for older children (Center for Human Resource Research 2006a, b). Together, NLSY79/CNLSY data include information on mother's union transitions; children's history of residential and school mobility; children's peer relationships; and children's externalizing behavior (mother-reported, available up to age 14) and delinquent behavior (adolescent-reported). Our outcome measures are child externalizing behavior for adolescents ages 12 to 14 and delinquent behavior for adolescents ages 12 to 17 in 2006. Our analysis is constrained to consider the effects of family structure change and mobility only since 1998 because between-wave information on residential mobility only became available in 2000 when a 2-year residential history was first reported.

At each wave of the CNLSY, different interview protocols are used for respondents classified as children (ages 14 and younger) or as young adults (ages 15 and older). The protocol for children includes assessments to measure cognitive ability, temperament, motor and social development, behavior problems, and self-competence of the children as well as the quality of their home environment. These assessments are based on reports from a child's mother as well as direct assessment and observation of children. Since 1988, children ages 10 and over have also completed personal interviews about their schooling, family, and attitudes and behaviors. In 2006, only children 12 and over self-reported on the frequency of delinquent behaviors during the last year. Young adults respond to an age-appropriate protocol that shares some overlap with the child assessment but also includes information on family formation and labor force participation. Mothers do not provide an assessment of young adults (Center for

Human Resource Research 2006a). The lack of complete concordance between the two interview protocols prohibits the use of identical outcome measures and independent variables; it also hampers the development of a longitudinal model that measures incremental change in adolescents' outcomes. We have sought to develop roughly parallel analytic models between younger and older adolescents here.

Children in the CNLSY are nationally representative of children born to a cohort of women who were 14 to 22 years old in 1979. Therefore, compared to the general population of children and young adults, the CNLSY includes adult children who were born to relatively young mothers in the early 1980s as well as young children who were more recently born to relatively older mothers. Children born to relatively young mothers may have experienced more frequent and consequential family structure instability compared to the general population, and children born to older mothers may be relatively higher-order births or may have been born to mothers who began union formation and childbearing relatively late. In the 2006 wave of the CNLSY, adolescents and young adults between 14 and 20 years of age have mothers whose age at birth is within one-half of a standard deviation of the national average for mother's age at birth among children in that age range. We exclude young adults who are over 17 years old because they are likely to have graduated from high school and to have entered college or established separate residences, making the research question less relevant to them. We add in adolescents who are 12 and 13 years old, although their mothers are slightly older than average, in order to make comparisons in how instability and mobility differentially affect younger and older adolescents. Including these children of slightly older mothers did not lead to a substantively different picture of the association between family structure instability and behavioral outcomes based on analyses using the 2000 wave of the CNLSY (Fomby & Cherlin 2007).

We restrict our analysis to mothers and biological children who have always resided together and who each participated in the 2006 wave of the NLSY79/CNLSY. The CNLSY does not follow children when they move out of the mother's household, therefore underestimates family structure instability that results in children's residence with biological fathers in separate households or in other arrangements. We

further restrict our analysis to mothers who had not had their first child prior to their 1979 interview. Our analytic sample includes 527 adolescents aged 12-14 and 800 adolescents aged 15-17.

Dependent variables

Two indicators of behavioral adjustment are available for younger adolescents: the mother-reported externalizing Behavior Problems Index score and the adolescent's self-report of delinquent behavior during the last year. For young adults, only the self-report of delinquent behavior is available. The Behavior Problems Index (BPI) measures the frequency, range, and type of childhood behavior problems for children age 4 and over and is derived largely from the Achenbach Child Behavior Checklist (Center for Human Resource Research 2006a). The externalizing behavior problems scale includes 19 questions that pertain to antisocial and aggressive behavior, hyperactivity, and peer problems ($\alpha=.87$). Mothers indicate whether their adolescent engages in a specified behavior never (0), sometimes (1), or often (2). We use the standardized, age-normed version of the scale, which has a mean of 100 and a standard deviation of 15. A higher score indicates more reported externalizing behavior problems.

Based on adolescent self-reports, we construct a nine-item scale of children's delinquent behavior, including whether in the last year the child has stayed out late; hurt someone; lied; stolen; damaged school property; gotten drunk; skipped out of school; required a parent to come to the school; or stayed out without permission. Adolescents indicate whether they engaged in each behavior never, once, twice, or more than twice in the last year. These items are administered using computer-assisted self-interview techniques to improve item response rates and validity. We compute the average score from all adolescents providing valid responses to at least seven items; a higher score indicates more frequent delinquent behavior.

Key independent variables

Adolescents' exposure to *family structure instability* is represented by a count of union transitions a mother has experienced between 1998 and 2006. We define the following changes in union status as a union transition: from single to either cohabiting or married, from cohabiting to single, or from married to separated, divorced, or widowed. We do not count a union status change from cohabitation to marriage or

from separation to divorce as an additional transition. Our measure of household structure change does not account for movements into or out of the household by other kin or non-kin.

Indicators of mothers and adolescents' *residential mobility* have been gathered since 2000. At each wave, mothers are asked to report on the total number of addresses she has resided at since the last interview (two years prior). We sum all residential transitions that a mother and adolescent have experienced since 1998 to represent residential mobility. Information on the date when a move occurred is available only for moves from one city, county, or state to another; the timing of residential changes for local (intra-city) moves is not available. Therefore, we can develop a sequential model of union status change followed by residential change only where union transitions were followed by a move at least across city lines. With this limitation, we cannot determine whether observed effects of residential mobility following family structure change on adolescent behavior are attributable to the sequence of destabilizing events or to the physical distance involved in the move. Therefore, we develop models based on the total count of moves without accounting for timing. Supplemental analyses indicate that this choice provides a conservative estimate of the effect of residential mobility resulting from family structure instability.

For young adolescents, *school mobility* is represented by the mother's report of the total number of schools the adolescent has ever attended by 2006. For older adolescents, school mobility is represented by the mother's report of the total number of schools the adolescent had attended by age 14 (based on information from the wave when the adolescent was last included in the child interview protocol) plus the total number of high schools the adolescent reports having attended by 2006. These counts include routine school transitions from primary to secondary education. Data on the timing of school transitions are not available.

Peer network quality is based on adolescent self-reports of feeling pressure from friends to smoke, drink, use drugs, skip school, or commit violence at the 2006 interview. We develop a dichotomous indicator coded 1 if adolescents report feeling any type of pressure from friends, 0

otherwise. About 7 percent of young adolescents and 15 percent of older adolescents report feeling some type of peer pressure.

Explanatory variables

Income. Household income as a percentage of the federal poverty level (FPL) is reported at each interview wave. Our analyses include household income in 1998 and change in household income as a percentage of the FPL between 1998 and 2006. Data are missing on 1998 income for about 3 percent of cases. For those cases, we impute a conditional mean based on mother's household in 1996 and 2000 where data are available and otherwise impute the sample mean. Conditional mean imputations include an error term in order to maintain the distribution of the original variable and to capture the uncertainty associated with imputation.

Social capital. We use two indicators of social capital in 2006. Both are drawn from the mother's NLSY79 interview. One is an ordinal measure of how frequently an adolescent's mother socializes with friends and family (from less than once a year to several times a week, with a higher score indicating more frequent contact). The other is a count of the number of her adolescent's friends the mother knows by sight and name. Comparable indicators are not available for all young adolescents in 1998, so we are unable to measure change in access to social capital. Because of the NLSY79 instrument design, responses are available only for adolescents who are 14 years old or younger in 2006. Therefore, the mediating effect of social capital is not assessed for older adolescents.

School quality. At each wave, mothers provide a "school GPA," rating the quality of their child's school on a 5-point scale for each of eight items for younger adolescents. We compute the average score in 2006 where mothers provided valid responses to at least six items. For older adolescents, we compute the average of their responses to 10 items about their perception of their current school's academic and social environment. We dichotomize this average score so that older adolescents who report a positive school environment (in the top quartile) are compared to adolescents who are less satisfied. We also include an indicator of whether the adolescent has dropped out of school by 2006 (and hence does not report on school quality).

Behavior problems. To capture adolescent behavior problems that preceded observed family structure instability and mobility, we include the adolescent's externalizing behavior problems score reported by the mother in 1998. Where that information is missing, we impute a conditional mean based on the adolescent's scores from 1994 and 1996. The imputed value includes an error term in order to maintain the distribution of the original variable and to reflect the uncertainty associated with imputation. To capture the intergenerational transmission of problem behavior (through genetic or environmental mechanisms), we also include a count of the mother's illegal activities she self-reported in 1980, prior to the birth of the adolescent.

Union transitions. We include a count of all union transitions the mother experienced between the time of her adolescent's birth and 1998. Until 1990, the NLSY79 instrument did not record information on cohabiting unions that were in progress at interview. Until 2000, the instrument did not record information on cohabiting unions that began and ended between waves. Therefore, the count of union transmissions is underestimated for adolescents whose mothers had early or brief cohabiting unions. We also control for union status at birth (married vs. not married).

Our models also control for adolescent's age, gender, and race. We include only white and black adolescents because the CNLSY sample is not representative of ethnic groups like Latinos and Asians whose prevalence in the U.S. population has increased due to immigration since 1979. We also control for mother's union status at the 2006 interview (married vs. cohabiting or single), mother's education in 2006, mother's unemployment status in 2006, and adolescent's feeling of closeness to his/her mother in 2006 (a higher score indicates greater closeness).

Analytic methods

We first present descriptive statistics for each variable overall and by whether an adolescent has ever experienced a family structure transition. We provide tests of significance for group differences. Our multivariate analysis uses ordinary least squares regression to predict a young adolescent's externalizing behavior problems score and Poisson regressions to predict adolescents' average delinquent behavior in the last year because the delinquent behavior measures are positively skewed. Considering the dependent

variable is an average, rather than a count, interpretation of coefficients should be regarded as representing change in an adolescent's mean score, rather than a change in the expected count of delinquent behaviors.

We pool white and black adolescents in the same model. Interaction terms between race and family structure history were insignificant. Prior research using the same sample of children when they were 5 to 14 years old in 2000 reported significant race differences in the association of family structure instability with children's externalizing behavior and delinquency (Fomby & Cherlin 2007). Specifically, in that research, there was a significant, robust association between family structure transitions and each outcome for white children, but not for black children. We did not replicate that racial difference for adolescents observed in 2006, raising the question of whether race differences in the effect of family structure transitions vary by age, or whether there has been salient differential attrition in the CNLSY by race and/or family structure status between 2000 and 2006. That investigation is beyond the scope of the current study.

Results

Table 1 summarizes unweighted descriptive statistics for the sample. Young adolescents who have experienced any family structure transition since 1998 have an average externalizing behavior problems score of 103.37, compared to an average score of 99.84 for young adolescents who have not experienced a change in family structure. Both adolescent groups also self-report more frequent delinquent behavior in the past year when they have experienced a family structure transition. Group differences on these indicators of adolescents' behavior are significant at $p < .05$.

Adolescents who have experienced a family structure change since 1998 have also made more residential and school transitions compared to children who have remained in stable family structures. Adolescents in unstable family structures have moved more than twice as often since 1998, and during their lifetimes, children who have experienced instability have attended 3.69 schools on average, compared to 3.25 schools for other adolescents. The descriptive statistics suggest that residential and school mobility each co-vary with family structure transitions, but residential mobility is more frequent

among adolescents in unstable family structures than are school changes. Almost twice as many young adolescents report experiencing peer pressure from friends when they have experienced family structure instability (15 percent vs. 8 percent for young adolescents in stable families). All older adolescents report greater exposure to peer pressure regardless of family structure history (24 percent overall compared to 10 percent of all younger adolescents).

Adolescents who have experienced family structure change since 1998 are relatively disadvantaged compared to other adolescents on most of the other dimensions considered, i.e., their mothers are more likely to have left high school without a diploma. While the groups are similar in their household income in 1998, those who have experienced family structure instability have experienced income gains relative to the federal poverty level about one-third the size of those in stable arrangements (an 11-percentage point increase for the any transitions group compared to a 30.5 percentage point increase for the stable group). Mothers who have had union transitions have less frequent social contact with friends and family ($p < .10$), and adolescents who have experienced family structure change have dropped out of high school at twice the rate of other adolescents. Adolescents from families that have experienced instability since 1998 also had higher BPI scores in 1998, and their mothers reported more illegal behavior when they were young adults.

Multivariate analysis

Table 2 summarizes results from a series of ordinary least squares regressions predicting externalizing behavior problems scores for young adolescents (ages 12-14). Standard errors appear in brackets beneath unstandardized coefficients. In a bivariate context (column 1), the number of family structure transitions a young adolescent has experienced between 1998 and 2006 is associated with the outcome at the $p < .10$ level. For every additional family structure an adolescent has experienced, the predicted externalizing behavior score increases by 1.792 points or about 12 percent of a standard deviation. Column 2 adds residential mobility since 1998 and number of schools ever attended. The effect of family structure transitions is reduced below significance, and school change is associated with higher predicted externalizing behavior problems scores ($p < .01$). Each school change is associated with nearly a

two-point increase in a young adolescent's externalizing behavior problems score. The magnitude of the coefficient associated with family structure transitions is reduced by about one-third compared to the bivariate model. When the mobility variables are added separately, each is significant at $p < .01$, and the effect of family structure transitions is statistically insignificant (not shown).

Column 3 accounts for exposure to peer pressure, our measure of peer group quality. School mobility remains positive and significant at $p < .01$. Peer group quality is also positively associated with the dependent variable, and the magnitude of the unstandardized coefficient indicates that young adolescents' externalizing behavior problems scores increase by nearly a full standard deviation when a child reports exposure to some type of peer pressure ($\beta = 12.383$), controlling for other factors. Results are similar with control variables added (not shown).

Column 4 accounts for the influence of income change, school quality, social capital, and selection effects on the association of family structure instability and mobility with young adolescents' externalizing behavior problems. Control variables are included. School quality is negatively associated with externalizing behavior problems. Where mothers report higher satisfaction with their adolescents' school quality, the predicted behavior problems score decreases by nearly 4 points. Accounting for attributes measured in 1998 or earlier, adolescents' early externalizing BPI scores and mothers' illegal activity scores are positively and significantly associated with the 2006 BPI score, and their inclusion reduces the magnitude of the peer network quality coefficient by about one-quarter ($\beta = 9.036$) compared to the model without explanatory factors (column 3). Family structure transitions and residential mobility remain unrelated to externalizing behavior problems, and the magnitude of the coefficient for school mobility is reduced by about 30 percent, but remains significant at $p < .05$.

Tables 3 and 4 summarize results from Poisson regression models predicting delinquent behavior for young adolescents (table 3) and older adolescents (table 4). The exponentiated value of a coefficient ($\exp(\beta_k)$) represents the factor by which the dependent variable increases or decreases with a one-unit increase in the associated independent variable. For younger adolescents, family structure transitions are positively predictive of delinquent behavior in the bivariate context (column 1, $p < .01$). The strength of the

association diminishes when residential and school mobility are accounted for (column 2), but neither type of mobility has a direct association with the outcome measure. With peer network quality included (column 3), the effect of family structure transitions and residential and school mobility are statistically insignificant. Exposure to peer pressure is associated with a dramatic increase in a young adolescent's average delinquency score ($\exp(.911)=2.48$, $p<.01$). The explanatory factors have little substantive impact on the coefficients of interest (column 4). Only the experience of family structure transitions prior to 1998 is significantly associated with the outcome.

Among older adolescents (table 4), the experience of family structure transitions is strongly associated with an increased delinquency score in the bivariate model (column 1), a finding consistent with the preceding analysis for younger adolescents. For every additional transition an older adolescent has experienced, the average delinquency score increases by about 9 percent ($\exp(.086)=1.09$, $p<.01$). With residential and school mobility included in the model (column 2), family structure transitions are statistically insignificant, and school mobility is positively predictive of delinquency and is marginally significant. Again, the effect of exposure to peer pressure (column 3) overwhelms the effects of instability and mobility, and exposure more than doubles the predicted average delinquency score ($\exp(.786)=2.19$, $p<.01$). Residential and school mobility retain marginal significance with only exposure to peer pressure accounted for, but become statistically insignificant with control variables and explanatory factors included (column 4). High school dropouts and adolescents whose mothers engaged in higher levels of illegal behavior as adolescents have higher reported delinquency scores compared to otherwise similar adolescents ($p<.05$). The combined explanatory factors reduce the magnitude of the coefficient associated with peer pressure exposure by about 12 percent, but the coefficient remains statistically significant at $p<.01$.

Discussion

Adolescents who experience repeated change in family structure as parents begin and end romantic unions are more likely than adolescents in stable family structures to engage in aggressive, antisocial, or delinquent behavior. Here, we consider whether the link between family structure instability

and behavior in adolescence may be explained in part by the residential and school mobility that are often associated with family structure change. Our analysis uses nationally-representative data on adolescents whose mothers were adolescents and young adults themselves in 1979. We consider three indicators of adolescents' behavior: for younger adolescents (12-14), we consider their mother-reported externalizing behavior problems score and adolescents' self-reports of delinquent behavior in the last year; for older adolescents (15-17), we consider only their self-reported delinquent behavior.

In the main, our analytic results support the hypothesized causal model summarized in figure 1. We replicate the finding that the number of family structure transitions an adolescent has experienced is associated with externalizing behavior problems and delinquency. That association is weaker for externalizing behavior problems than for delinquency. For all adolescents, residential mobility and school changes attenuate the association of family structure instability with each outcome. In models excluding control variables and explanatory variables, school mobility has an independent, statistically significant association with younger adolescents' externalizing BPI scores and older adolescents' delinquency, but not with younger adolescents' delinquency. Across the board, exposure to peer pressure, which we have regarded as a measure of peer network quality, sharply attenuates the association of family structure instability and school and residential mobility with behavioral outcomes. We conclude that adolescents are more likely to develop poor peer networks that lead to delinquent behavior when they have experienced instability and mobility, and it is the network quality, rather than the chain of events leading up to it, that contributes to adolescents' externalizing and delinquent behavior.

We investigated four sets of mediating factors that might explain how adolescents' circumstances change with instability and mobility in ways that would lead to poor network quality. These included income in 1998 and subsequent income change; access to social capital in 2006; school quality and dropout status in 2006; and selection factors that may expose a spurious association among the factors considered in the causal model. Mothers and adolescents' assessments of school quality consistently reduce the magnitude of the association of school mobility with behavior problems and delinquency. Adolescents who experience frequent school mobility may move between low-quality schools or may

experience a downward trajectory in school quality. Alternatively, given that the measure of school quality is based on subjective indicators, it is possible that adolescents who have experienced frequent change have greater demands from teachers and administrators that cause them to be more critical of school quality. Access to social capital has a similar attenuating effect on the association between young adolescents' school quality and their externalizing behavior problems score.

Selection factors related to behavior, including adolescents' earlier behavior problems scores and mothers' illegal behaviors in adolescence or early adulthood, have the strongest attenuating effect on the association between exposure to peer pressure and each behavior indicator. The greatest effect is on young adolescents' behavior problems scores. Earlier behavior problems and mother's illegal behaviors are independently associated with the younger adolescents' externalizing behavior problems score and older adolescents' self-reported delinquency. The lack of congruence between what is predictive of young adolescents' externalizing behavior problems scores and their delinquency scores raises a question about differences in the composition of the two scales and about possible reporter effects. Overall, the explanatory factors do little to drive down the association of exposure to peer pressure with the measures of behavior.

Limitations

The strengths of the data used are in completeness of available data for family structure transition history and school mobility and are the reliable and valid measures of externalizing behavior and delinquency. An important data limitation is the lack of information on the timing of local residential moves, which prohibits establishing temporal ordering between family structure transitions and all residential changes. While temporal ordering is ideal, it may be the case that adolescents who experience family structure instability experience other destabilizing events even in the context of a single union status. That is, partners whose unions eventually dissolve may have other stressors like employment instability or income stability that contribute to frequent relocations; and parents who are inclined to repartner may be generally more willing to change their surroundings even prior to beginning a new

union. In sum, family structure instability and mobility may co-exist as expressions of a parent's underlying behavioral traits.

Other limitations include the relatively weak measures of social capital compared to the information available on other nationally representative data sets. In addition, the structure of the Children of NLSY design is restrictive for truly longitudinal analysis. The absence of a mother interview for older adolescents prevents the development of measures of change over time from early childhood and also does not permit the assessment of mother-reported externalizing behavior problems after age 14. Despite these limitations, the hypothesized associations are present, and the variables used to establish those associations are well-measured.

The public-use version of the NLSY79 data does not include information on neighborhood quality that would provide a more complete test of the hypothesis that income change and residential mobility following a family structure transition contribute to externalizing problems and delinquent behavior. Adolescents residing in neighborhoods characterized by high levels of concentrated poverty are relatively more likely to engage in risk-taking behavior (Baumer & South 2001, Frank et al. 2007, Massey & Denton 1993, South et al. 2003, Wilson 1987) and to experience an elevated risk of school dropout (Crowder & South 2003). Concentrated neighborhood poverty may influence adolescents' risk-taking behavior through greater exposure to social disorganization (Wilson 1987), lower social cohesion (Billy, Brewster and Grady 1994), peer attitudes that promote risk-taking behavior (Baumer and South 2001, South and Baumer 2000), and a perceived shortage of long-term economic prospects (MacLeod 1995). A proposed direction for future research is to apply restricted-use data from the NLSY79 and CNLSY to consider whether the socioeconomic attributes of respondents' neighborhoods moderate the association of mobility and peer networks with behavior for adolescents in unstable family structures.

Despite the limitations, the preceding analysis provides a persuasive argument for the hypothesis that residential and school mobility, co-occurring with family structure change, influence peer network selection affecting adolescents' behavioral development. This causal pathway may be unique in adolescence, when youth are particularly tuned in to their broader social context for information about

normative behavior and identity development. Future work will further elucidate the causal model tested here by considering contextual measures related to neighborhood and school quality and will assess the utility of the model for children in other life stages.

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Figure 1. Conceptual method of the pathway describing the association between family structure change and adolescent behavior

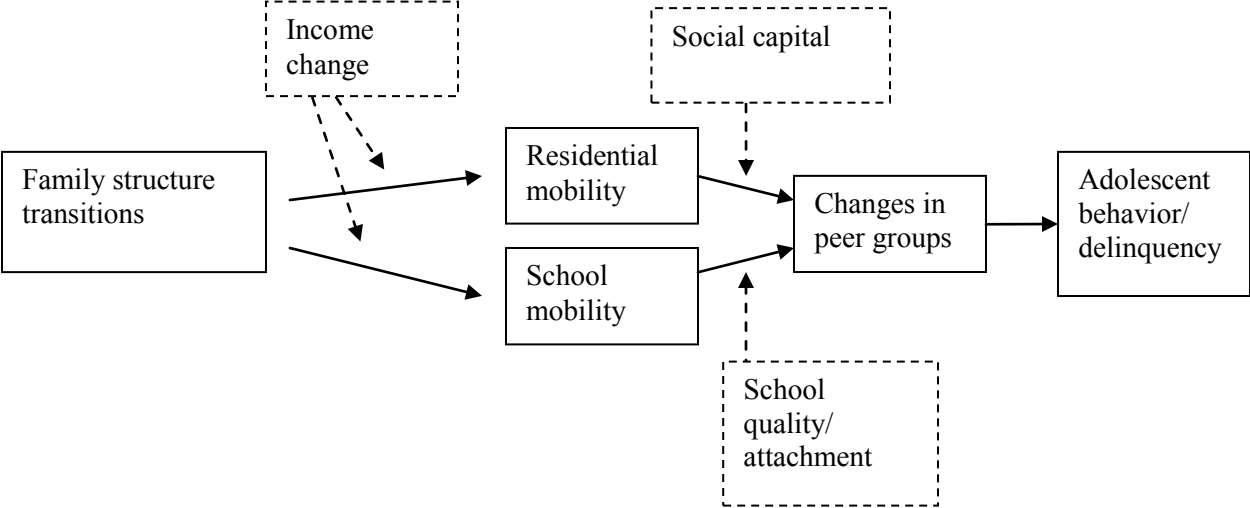


Table 1. Unweighted descriptive statistics, overall and by whether adolescent has experienced any family structure change
Source: 1979 National Longitudinal Survey of Youth and Children of NLSY, 1979-2006

Variable	Mean/ Prop.	SD	Mean/ Prop.	SD	Mean/ Prop.	SD
<u>Outcome measures</u>						
2006 Externalizing BPI score (age<=14)	100.58	14.69	99.74	13.82	103.37	17.06 *
2006 self-reported delinquency, average (range=0-2, age<=14)	0.38	0.41	0.36	0.40	0.46	0.43 *
2006 self-reported delinquency, average (range=0-2, age=15-17)	0.47	0.48	0.44	0.47	0.53	0.51 *
<u>Change in adolescent's lives, 1998-2006</u>						
Family structure transitions, 1998-2006	0.45	0.92				
Number of residences, 1998-2006	1.06	1.61	0.79	1.37	1.84	1.96 *
Number of schools, lifetime	3.34	1.50	3.23	1.44	3.69	1.61 *
Any peer pressure from friends (age<=14)	0.10		0.08		0.15	*
Any peer pressure from friends (age15-17)	0.24		0.23		0.26	
<u>Control variables</u>						
Adolescent is black	0.31		0.26		0.46	*
Young adolescent's age (12-14)	12.75	0.72	12.72	0.71	12.78	0.75
Older adolescent's age	15.99	0.81	15.96	0.81	16.07	0.80
Adolescent is male	0.52		0.53		0.51	
Mother is single in 2006	0.29		0.19		0.59	*
Mother is cohabiting in 2006	0.03		0.00		0.13	*
Young adolescent's closeness to mother (1-4, 4=extremely close)	3.77	0.57	3.76	0.58	3.81	0.54
Older adolescent's closeness to mother	3.55	0.74	3.57	0.71	3.49	0.83
Mother has < HS diploma	0.12		0.09		0.20	*
Mother has HS diploma	0.42		0.40		0.46	
Mother has > HS education	0.46		0.51		0.34	*
Mother is unemployed in 2006	0.23		0.22		0.23	
<u>Explanatory factors</u>						
1998 income as % of FPL	169.86	33.26	170.50	32.46	167.97	35.50
Difference in HH income as % of FPL, 1998-2006	25.73	36.53	30.51	31.28	11.55	46.15 *
Mother's eval of child's school quality, average score (1-4) (age<=14)	3.28	0.69	3.32	0.67	3.15	0.75 *
# of adolescent's friends mother knows (age<=14)	1.97	1.08	1.85	1.00	2.36	1.25 *
Mom's frequency of family/friend visits (range=1-7, age<=14)	3.34	1.22	3.39	1.18	3.16	1.34 ^
Adolescent has positive view of school (age=15-17)	0.12		0.13		0.09	
Adolescent dropped out of HS	0.03		0.03		0.06	*
1998 externalizing BPI score	98.01	8.11	97.49	7.67	99.55	9.12 *
Mother's 1980 illegal activities score (0-27)	2.68	3.85	2.54	3.61	3.08	4.47 *
Mother unmarried at adolescent's birth	0.20		0.15		0.35	*
Number of family structure transitions before 1998	0.31	0.69	0.21	0.56	0.61	0.92 *
N	1327		993		334	

Between-group differences significant at *p<.05, ^p<.10

Table 2. Ordinary least squares regressions predicting age-normed, mother-reported externalizing behavior problems scores, adolescents 12-14 years old, 2006 wave of the Children of the NLSY (standard errors appear beneath unstandardized coefficients)

	1	2	3	4
	Bivariate	Res change and schools	Exposure to peer pressure	Full model
Transitions adol exp'd btwn 1998/2006	1.792 [0.923]+	1.133 [0.870]	0.71 [0.852]	-0.345 [0.836]
Res. changes adol exp'd btwn 1998/2006		0.675 [0.556]	0.563 [0.569]	0.33 [0.526]
School count (lifetime)		1.987 [0.703]**	2.013 [0.685]**	1.428 [0.629]*
Adol. Exposed to peer pressure in last yr			12.383 [2.997]**	9.036 [2.630]**
Poverty level, 1998				-0.019 [0.023]
Change in poverty level from 1998 - 2006				0.000 [0.022]
Mother's report on child's school quality				-3.882 [1.196]**
No. of friends mom knows well (2006)				0.859 [0.652]
How often mom visits with family/friends (2006)				-0.18 [0.503]
1998 externalizing BPI score				0.416 [0.056]**
Mother's illegal behavior in 1980				0.279 [0.143]+
Mother single at child's birth				-1.03 [2.025]
Transitions adol. experienced prior to 1998				0.22 [1.350]
Constant	99.919 [0.685]**	94.373 [1.724]**	93.34 [1.700]**	65.592 [13.080]**
Observations	515	515	515	515
R-squared	0.01	0.04	0.11	0.33

Robust standard errors in brackets

+ significant at 10%; * significant at 5%; ** significant at 1%

Table 3. Poisson regression models predicting average delinquency score (range=0-2), adolescents 12-14 years old, 2006 wave of the Children of the NLSY (standard errors appear beneath unstandardized coefficients)

	1	4	5	11
	Bivariate	Res change and schools	Exposure to peer pressure	Full model
Transitions adol exp'd btwn 1998/2006	0.121 [0.046] **	0.096 [0.049]+	0.054 [0.049]	0.013 [0.057]
Res. changes adol exp'd btwn 1998/2006		0.025 [0.031]	0.014 [0.031]	-0.028 [0.031]
School count (lifetime)		0.06 [0.046]	0.06 [0.044]	0.042 [0.042]
Adol. Exposed to peer pressure in last yr			0.911 [0.104]**	0.742 [0.107]**
Poverty level, 1998				0.002 [0.001]
Change in poverty level from 1998 - 2006				0.001 [0.002]
Mother's report on child's school quality				-0.074 [0.069]
No. of friends mom knows well (2006)				-0.078 [0.052]
How often mom visits with family/friends (2006)				-0.046 [0.038]
1998 externalizing BPI score				0.001 [0.003]
Mother's illegal behavior in 1980				-0.003 [0.011]
Mother single at child's birth				-0.046 [0.138]
Transitions adol. experienced prior to 1998				0.199 [0.080]*
Constant	-1.029 [0.058]**	-1.199 [0.127]**	-1.323 [0.120]**	-1.56 [1.084]
Observations	447	447	447	447
Wald Chi2	7.03	9.98	102.61	210.55

Robust standard errors in brackets

+ significant at 10%; * significant at 5%; ** significant at 1%

Table 4. Poisson regression models predicting average delinquency score (range=0-2), adolescents 15-17 years old, 2006 wave of the Children of the NLSY (standard errors appear beneath unstandardized coefficients)

	1	2	3	4
	Bivariate	Res change and schools	Exposure to peer pressure	Full model
Transitions adol exp'd btwn 1998/2006	0.086 [0.033]**	0.054 [0.038]	0.043 [0.037]	0.036 [0.042]
Res. changes adol exp'd btwn 1998/2006		0.034 [0.021]	0.037 [0.021]+	0.023 [0.021]
School count (lifetime)		0.043 [0.026]+	0.051 [0.026]+	0.038 [0.026]
Adol. Exposed to peer pressure in last yr			0.786 [0.068]**	0.693 [0.069]**
Poverty level, 1998				-0.001 [0.001]
Change in poverty level from 1998 - 2006				-0.001 [0.001]
Adolescent's positive report of sch quality (vs. other)				-0.137 [0.098]
Adolescent dropped out of HS				0.365 [0.168]*
Adolescent's externalizing behavior score, 1998				0.003 [0.002]
Mother's illegal behavior in 1980				0.02 [0.008]*
Mother single at child's birth				-0.07 [0.102]
Transitions adol. experienced prior to 1998				-0.026 [0.044]
Constant	-0.81 [0.043]**	-1.003 [0.105]**	-1.284 [0.105]**	-1.247 [0.722]+
Observations	800	800	800	800
Wald chi2	6.87	16.28	158.99	284.04

Robust standard errors in brackets

+ significant at 10%; * significant at 5%; ** significant at 1%