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Longitudinal Changes in Adolescent Risk Behaviors and Family Processes: A Bidirectional System?

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Introduction

A leading set of theoretical models in the field of developmental psychology argues that children's development and family processes are enmeshed in bidirectional relationships between parents and children (Bell, 1968; Sameroff, 1975). Such models purport that parenting practices and family environments help to shape the behaviors of children, and similarly, that children's characteristics and behaviors influence parenting practices as well as broader family processes. These transactional, reciprocal models have been incorporated perhaps most strongly in empirical research on children's and adolescents' engagement in problem behaviors. Numerous conceptual models by scholars such as Dishion (Dishion, Nelson, & Bullock, 2004; Dishion, Poulin, & Medici Skaggs, 2000) and Patterson (Patterson, Reid & Dishion, 1992), argue that early engagement in antisocial behaviors and problematic parenting practices co-evolve. For example, Dishion and colleagues (Dishion, et al., 2000; Dishion, et al., 2004) have proposed a process of "premature autonomy," in which some young adolescents begin to engage with deviant peers and behaviors, pulling away from closeness with their parents; concomitantly, parents decrease their effective oversight and management, thereby providing greater opportunities for youth to engage in problematic behaviors and peer relations (see also Jang & Smith, 1997; Kerr & Stattin, 2003).

Empirical research following models such as Dishion's (2000; 2004) has found that parenting practices, particularly parent-adolescent closeness, parental monitoring or supervision, and appropriate parental disciplinary practices predict relative declines in adolescents' antisocial behaviors or delinquency (e.g., Laird; Pettit, Bates, & Dodge, 2003; Sampson & Laub, 1994). Similarly, research has found that adolescent engagement in delinquency predicts relative declines over time in the parent-adolescent relationship and parental effectiveness (Laird et al.,

2003; Sampson & Laub, 1994), with some arguing that this effect is stronger than that from parents to children (e.g., Anderson, Lytton, & Romney, 1986; Kerr & Status, 2003). Patterson and colleagues (Patterson, Reid & Dishion, 1992) describe this process as parents abdicating their parental responsibilities, disengaging in the face of adolescent problem behavior, in turn providing enhanced opportunities for even more problem behavior. Other scholars have noted the possibility for a developmental progression in the relative strength of the reciprocal processes (Stice & Barrera, 1995). In short, during earlier childhood parenting practices may be more influential. But as children age into adolescence, developing more sustained behavioral patterns and seeking greater independence, parents may become more reactive. Hence, the path from adolescent behaviors to parenting may strengthen.

Focus on Substance Use and Sexual Activity

Much of the research on bidirectional relations between parenting behaviors and adolescent functioning has focused on adolescents' engagement in antisocial or delinquent activities broadly defined, including behaviors such as stealing, violent interactions, and other criminal activities. Less research has assessed bidirectional effects between parenting and other types of adolescent risk behaviors. Two examples are sexual activity and substance use. Sexual activity and substance use typically emerge during adolescence, and while both carry health and psychosocial risks and are linked with other types of problem behaviors, sexual activity and substance use are also becoming normative experiences for adolescents in the U.S. National data indicate that in 1997, 24% of 9th graders had engaged in sexual intercourse in the previous three months, a number that increased to 46% for 12th graders (Centers for Disease Control and Prevention, 1998). In this same year, over one fifth of 8th graders reported some substance use in the previous 30 days, rising to over a third engaging in substance use by 12th grade.

Social control and family interaction theories of substance use and adolescent sexual activity view parent-child relationships and parenting behaviors as central forces influencing adolescents' proclivity towards these behaviors (see Petraitis, Flay, & Miller, 1995 for an overview). Essentially, closeness and attachment in the parent-adolescent relationship are seen to increase adolescents' connections to conventional models and norms of behavior, while monitoring and supervision by parents decreases adolescents' opportunities to associate with delinquent peers and to engage in high risk behaviors (Hawkins & Weis, 1985). Empirical analyses have documented that low parental monitoring or control in early adolescence predicts a growth in substance use over time (Jackson, Henriksen, & Dickinson, 1997; Stice & Barrera, 1995). Other research suggests that changes in family processes over early adolescence predict later substance use. For example, growth models of adolescent substance use by Duncan and colleagues (Duncan, Duncan, Biglan, & Ary, 1997), found that increases over time in parent-adolescent conflict predicted increased trajectories of substance use. Similarly, Dishion and colleagues (Dishion et al., 2004) reported that declines in parents' monitoring and closeness (which the authors termed family management) predicted later adolescent substance use for boys with early deviant peer contact. A host of research also has asserted that less positive and involved parenting is a risk factor for adolescent sexual activity (e.g., Capaldi, Crosby, & Stoolmiller, 1996; Cleveland & Gilson, 2004). For example, McNeely and colleagues (2002) reported that mother-adolescent closeness and parental monitoring predicted a lower likelihood of adolescents, particularly girls, initiating sexual activity.

Although longitudinal research provides support for parenting practices predicting the trajectory of adolescent risk behaviors, very little research has assessed whether adolescent substance and sexual risk behaviors may influence parenting practices. Substance use and sexual

activity may not carry the same hostile and uncommunicative behavioral patterns associated with other types of antisocial behaviors. Moreover, parents may have limited knowledge of their adolescent's engagement in these risk behaviors, or may even see some level of substance use and sexual activity as normative adolescent experiences. Hence, parenting behaviors may be less negatively affected by adolescent engagement in these behaviors than by adolescent violent or delinquent activities. On the other hand, with rising awareness concerning the risks of early sexual activity and substance use, and with their overlapping etiology with other types of problem behaviors, substance use and sexual activity may affect parenting behaviors similarly.

In one of the few studies which have directly assessed prospective reciprocal relationships between parenting behaviors and adolescent substance use, Stice and colleagues (Stice & Barrera, 1995) found that adolescent substance use predicted relative declines in parental control and parental support one year later; in addition, parental control and support predicted relative declines in adolescent substance use one year later, with similar effect sizes in the two sets of paths. Similarly, one recent study has assessed reciprocity between adolescent sexual activity and parenting practices. Ream & Savin-Williams (2005) reported that adolescents' initiation of sexual activity predicted declines in parental-youth closeness and increased problem-focused discussions over two waves of data; similarly, these parenting practices predicted later sexual activity. More research is needed to replicate these two sets of results and further assess bidirectionality in the link between adolescent sexual and substance use risk behaviors and parenting. Two additional major weaknesses are observed in the literature in this area.

One substantial weakness in this research base concerns a lack of differentiation between mothers' and fathers' parenting behaviors. Nearly all of the extant literature, particularly that incorporating longitudinal data, either focuses solely on mothers' parenting behaviors (e.g.,

Jackson et al., 1997), or combines reports concerning both mothers and fathers into total parenting scores (e.g., Duncan et al., 1998; Dishion et al, 2004), even when separate measures on each parent are available (e.g., Liard et al., 2003; Rueter & Conger, 1998; Sampson & Laub, 1994; Stice & Barrerra, 1995). Much of the research also fails to distinguish step- from biological parents (Dishion et al., 2004) or to control for changes in parenting status (e.g., parental separation). Yet both theory and research argue that fathers' parenting and mothers' parenting may have distinct relations with adolescent risk behaviors. One example is the work by Ream & Savin-Williams (2005), which found that closeness and interactions between adolescents and both mothers and fathers showed similar but independent reciprocal relationships to adolescent sexual activity. Overall, however, very little is known concerning how fathers' parenting practices are related to adolescent risk behaviors. Theorists argue that fathers' parenting is more influenced by contextual factors than is mothers' (Doherty et al., 1996), suggesting perhaps that adolescent behaviors may influence fathers' parenting more strongly than mothers'.

A second substantial hole in this area of research concerns other aspects of family processes, such as family routines or rituals. Emerging literature asserts that families' engagement in regular, routinized family interactions (e.g., eating dinner together) may support children's connections to their family and help to sustain psychological health and well-being (see Fiese, Tomcho, Douglas, Josephs, Poltrock, & Baker, 2002). Yet very little research has assessed longitudinal links between family routines and adolescent development. At a developmental time when early adolescents are increasing their emotional independence and spending increasing time away from their parents, sustaining family routines may be particularly influential.

In this research, we assess longitudinal, bidirectional relationships between multiple arenas of parenting provided by both fathers and mothers, including adolescent-parent closeness, parental monitoring, and family routines, as well as parents' financial and human capital provided to children, with adolescents' trajectories of substance use and risky sexual behaviors. Using a large, nationally representative sample and six waves of data drawn from the NLSY97, analyses assess whether these two sets of variables are significantly correlated both concurrently and over time. We hypothesize that maternal and paternal involved parenting will act to discourage adolescent engagement in risky behaviors, predicting lower levels of substance use and risky sexual behavior. Similarly, we examine associations between adolescent substance use and risky sexual behaviors and parenting trajectories. We expect that adolescent risk behaviors will predict declines over time in parents' active involvement and oversight of their adolescents.

Method

Sampling and Data Collection

Data for this investigation are drawn from wave 1 through wave 6 of the National Longitudinal Study of Youth 1997 Cohort (NLSY97), a longitudinal study of the educational and labor market experiences of youth in the U.S that started in 1997. The original sample consisted of a nationally representative group of 8,984 youth between the ages of 12 and 16, with purposive over-sampling to increase the number of poor and minority youth. Each year since 1997 the NLSY97 has gathered data from the youth on such topics as education, employment, achievement, and risk taking behavior. In 1997, the respondent's primary parent participated in an interview to assess family demographics, resources, and youth behaviors. In subsequent rounds, parents completed a household income update. Both the youth and parent interviews have been conducted using Computer-Assisted Personal Interviews (CAPI), administered in

either English or Spanish. The NLSY97 sampled all appropriately-aged youth in identified households, so the sample contains some sibling pairs. Altogether, the NLSY97 cohort came from 6,819 unique households. Over the years the NLSY97 has had remarkably low attrition, with 93% of respondents followed in wave 2 and nearly 88% of respondents followed into the sixth wave.

The current study is based on youth who were ages 12-14 at the time of the initial interview and who had a biological father or a step father and a biological or step mother in the household in at least 1 of the first 3 waves (n=3502). The sample used in the analyses excludes respondents who were greater than 14 years old at the time of initial screening date (n=3567; 39.7%) because central family process variables of interest were only asked of youth less than 15 years of age at the initial screening date. Also excluded are youth who did not have a father in the household at any of the first three time points (n=1505; 16.8%) as well as youth who do not have a mother at any of the first three time points (n=132; 1.5%). Finally, youth who responded to questions about their mother's boyfriend (n=217; 2.4%) or father's girlfriend (n=61; 0.7%) at wave 1 were excluded.

Comparisons between those excluded from the sample based on our selection criteria and those were included revealed that those who were excluded from the sample were relatively more disadvantaged across several dimensions. They came from families with less income, their parents were less likely to be employed and to have completed high school. Their mothers were also younger when they gave birth to their first child. Youth excluded from the sample were also more likely to be African American and had higher scores on both the delinquency index and the risky sex composite than those who were included.

When missing data occurred within the eligible sample of 3,502 youth, independent variables were imputed. Ninety-two percent of the cases had valid data on all parenting and risk composites. Twenty-nine percent of cases were missing data on covariates in the model. Traditional approaches to handling missing data, such as listwise deletion or mean imputation, have been criticized for biasing estimates, misrepresenting statistical power, and leading to invalid conclusions (Acock, 2005). Therefore, missing data were imputed for the current study using expectation maximization (EM), which uses a maximum likelihood approach (Dempster, Laird, & Rubin, 1977). Results from analyses using only the original data did not differ substantively from those using the imputed data; hence, the later are reported.

Measures

Family process variables. Three dimensions of family process were used in the analyses: youth relationship with each parent, monitoring by each parent, and family routines. All composites are derived from youth reports and pertained to the parents in the household at the time of data collection. At each of the first three waves, youth reported on their relationship with their father and with their mother. Youth were asked to respond to eight items on a 5 point scale (0 = *strongly disagree/never*, 4 = *strongly agree/always*) to statements such as "*I really enjoy spending time with him/her,*" "*How often does s/he praise you for doing well?*," and "*How often does s/he criticize you or your ideas?*" (reversed). These items were summed separately for fathers (αs ranged from .82 to .85) and mothers (αs from .74 to .79) to create a parent-youth relationship scale for each parent, with higher scores representing more positive relationships. Parental monitoring was measured separately for each parent at each of the first four waves. Four standard questions on monitoring used by previous researchers (e.g. Hetherington, Cox, & Cox, 1992) were asked on a five-point scale (0 = *knows nothing*, 4 = *knows everything*), such as

"*How much does s/he know about whom you are with when you are not at home?*" The items were summed and a scale was created separately for fathers (αs from .81 to .85) and mothers (αs from .71 to .75). Youth were also asked questions about family routines in rounds 1 through 4. The family routines index is made up of 3 items on an 8-point scale (0 = *no days/week*, 7 = *all seven days a week*) in which youth responded to questions regarding the frequency of activities such as the number of days the youth eats dinner with the family. The variables were summed to create a family routines index each wave (αs from .50 to .59).

Two variables were constructed for each of the five family process measures, relationship with mother, relationship with father, mother monitoring, father monitoring, and family routines. The first was a measure of the level of the family process variable taken from the baseline interview in 1997. The second was a measure of the change in family process that took place between the wave 3 and 1 interviews. If a respondent was missing family process data for the wave 3 interview, the family process change variables were calculated by taking a difference between the wave 2 and wave 1 family process measures.

Child outcome variables. Youth reported on their substance use and sexual behaviors at each of the 6 rounds of data collection. Substance use includes three items noting the number of times the respondent had smoked a cigarette, had an alcoholic beverage, and used marijuana in the past month. These items were summed, creating a total substance use index each wave (αs from .50 to .56). Adolescents also reported on risky sexual behaviors at each interview point in which they were age 14 or older. A risky sex composite was created from three items noting the frequency of each since the last interview: number of sex partners, frequency of sexual intercourse, and frequency of unprotected sexual intercourse. Each of the items to be included in the risky sex composite was measured in different units, so we placed them on a common metric

before constructing our composite variable. We did this by collapsing the individual responses on each item across all waves of the survey into a single variable. We then divided the overall distributions of each variable into tenths. Individuals were then assigned a value of 1 to 10 for each item, based on the decile of the distribution into which their response fell. Individuals who responded "none" were given a value of 0 on that item. The risky sex composite was created by taking a sum across these new standardized item scores (αs range from .73 to .82). In addition to computing a risky sex and a substance use composite variable for each wave of the survey, changes in the risky sex and the substance use composite between the wave 3 and the wave 1 interviews were calculated for the analysis of family process trajectories.

Family structure variables. Several variables were created from data in the household roster to reflect important dimensions of family structure. Two sets of dummy variables were created to reflect whether children lived with a stepmother or stepfather. The first set consisted of variables that indicated whether children lived with a stepmother or stepfather at the time of the 1997 interview. The second set reflected whether a child lived with a stepmother or stepfather at any time during the first three waves of data collection. Additional variables were created for each parent to reflect changes in household composition that took place during the first three waves of the survey. More specifically, dummy variables were created to indicate whether a child's father or mother moved out of the household, or made multiple transitions (out/in) over the first three waves of data collection, with stability as the omitted category.

Demographic characteristics. Important demographic characteristics of youth and their families were included in the analyses as well. Time-invariant variables derived from the wave 1 interview included adolescents' ethnicity and gender; mother and father ages as well as mother's age at first birth; and maternal and paternal education. Adolescents' ethnicity was coded into

three categories, Hispanic of any race, non-Hispanic Black, and non-Hispanic White/Other (omitted). Gender was coded as female with male omitted. Mother's and father's age, as well as mother's age at first birth were coded in years. Finally, maternal and paternal education were each coded into three categories, less than high school, high school graduate, and more than high school (omitted).

Time-varying family demographic variables were derived from youth or parent interviews and included the following: employment, income, and the number of minors in the household. All time-varying demographic characteristics were represented with two variables. The first reflected the level of the variable at the time of the wave 1 interview in 1997. The second represented changes in the demographic characteristic that took place between the wave 1 and wave 3 interviews. Mother's and father's employment statuses at the time of the wave 1 interview were each represented with a dummy variable, with not employed as the omitted category. Mother's and father's employment transitions between the wave 1 and wave 3 interviews were each modeled with a series of three dummy variables reflecting stable employment, movements into employment, and movements out of employment, with stable lack of employment as the omitted category.

Family income was measured in thousands of dollars using a sum of mother's and father's annual incomes from wages and salary. One income measure was created to reflect the level of household income at wave 1 of the survey, while the second income variable reflected changes in family income that took place between wave 3 and wave 1. Two variables were created to reflect the number of minors in a child's household as well. The first assessed the number of children under the age of 18 living in the same household as the respondent child in

1997 and the second measured changes in the number of children living in the child's household between the first and third waves of the survey.

Youth age was used to estimate trajectories of risky behavior and family process trajectories. Age was measured in 6 month increments.

Modeling Procedures

Multilevel growth models were used to address our primary research questions in this study. All of the models that are described below were estimated using HLM 6.02. In our analysis of risky sexual behavior and substance use trajectories, level one corresponded to repeated measures of our composite variables drawn from all six waves of the NLSY97 that were nested within individual at level two. Since the outcome variables for these analyses were based on count data with many zeros, we conducted nonlinear analyses with a generalized linear model using an overdispersed Poisson sampling model with a log-link function. Growth in substance use was expressed as a function of age, expressed in 6 month increments and centered at age 12. Growth in risky sexual behavior was modeled as a function of age in 6 month increments as well, but it was centered at 14 years, because this was the age at which the NLSY97 began asking adolescents about risky sexual behaviors. In addition to the linear age term, a quadratic term was included in the growth model at level one, because the growth of risky sexual behavior and substance use were found to decelerate over time. The level 1 model was estimated using equation 1 below, where η is the log-link function. e_{ti} is the level 1 random effect for a particular observation.

$$(1)\eta = \pi_{0i} + \pi_{1i} Age + \pi_{2i} Age^2 + e_{ti}$$
$$\eta = \log(\lambda_{ij})$$

Variability in the intercept and the linear growth terms of adolescents' trajectories were explained at level 2 using a series of time varying and time invariant child and family

demographic characteristics, as well as family structure and family process measures. As shown in equations 2-4 below, variation in initial levels of risky adolescent outcomes was explained with a series of time-varying family demographic (FD_{i97}), family structure (FS_{i97}), and family process (FP_{i97}) variables. Several time–invariant characteristics of children (CD_i) and their families (FD_i) were used to explain variation in initial levels as well. Variation in the linear rate of growth was explained at level 2 with time-invariant characteristics of children (CD_i) and their families (FD_i) as well as a series of variables reflecting changes in time-varying family demographic characteristics (FD_{i1-3}), family structure (FS_{i1-3}), and family process variables(FP_{i1-3}). Individual-level random effects were included for the level 1 linear slope and intercept terms. The quadratic growth term was fixed at level 2.

$$(2)\pi_{0i} = \beta_{01} + \beta_{02}FD_{i97} + \beta_{03}FD_i + \beta_{04}CD_i + \beta_{05}FS_{i97} + \beta_{06}FP_{i97} + r_{0i}$$
$$(3)\pi_{1i} = \beta_{11} + \beta_{12}FD_{i1-3} + \beta_{13}FD_i + \beta_{14}CD_i + \beta_{15}FS_{i1-3} + \beta_{16}FP_{i1-3} + r_{1i}$$
$$(4)\pi_{2i} = \beta_{21}$$

All independent variables in the models were centered at the average for the sample to facilitate more meaningful interpretation of the intercept term. Thus, the intercept terms in the substance use analysis reflects the average level of substance use for the average 12 year old in the sample, whereas the intercept in the risky sexual behavior analysis reflects the average level of risky sexual behavior for 14 year olds in the sample. The results of the trajectory analyses that we present are for the unit-specific models.

Multilevel growth models of a similar form were used to address our research questions related to family process trajectories. In this series of analyses, level one corresponded to repeated measures of the family process composites over three or four waves of the survey, depending on the number of waves of available data on the family process composite. These observations were nested within parents at level two. Unlike the risky sexual behavior and the

substance use composites, the family process variables were characterized by normal distributions and did not require a link function. Growth in the family process measures was expressed as a function of age, which was expressed in 6 month increments and centered at 14, because both the substance use and the risky sexual behavior composites were used to predict family process trajectories. Equation 5 below was used to estimate the family process trajectories at level 1.

$$(5) FP_i = \pi_{0i} + \pi_{1i} Age + e_{ti}$$

Here family process (FP_i) is modeled as a function age and an error term (e_{ti}). Variation in the level one intercept and growth parameters were explained at level two using a series of time-varying and time-invariant child and family demographic characteristics, family structure variables, and measures of substance use and risky sexual behavior. More specifically, variation in family process at age 14 was explained with a series of time varying family demographic demographic (FD_{i97}), family structure (FS_{i97}), and risky adolescent outcomes (RO_{i97}). Time – invariant characteristics of children (CD_i) and their families (FD_i) were used to explain variation in initial levels as well. Variability in the slopes of family process trajectories were explained at level 2 with time-invariant characteristics of children (CD_i) and their families (FD_i) as well as a series of variables reflecting changes in time-varying family demographic characteristics (FD_{i1-3}), family structure (FS_{i1-3}), and risky adolescent outcomes (RO_{i1-3}).

$$(6) \pi_{0i} = \beta_{01} + \beta_{02} FD_{i97} + \beta_{03} FD_i + \beta_{04} CD_i + \beta_{05} FS_{i97} + \beta_{06} RO_{i97} + r_{0i}$$
$$(7) \pi_{1i} = \beta_{11} + \beta_{12} FD_{i1-3} + \beta_{13} FD_i + \beta_{14} CD_i + \beta_{15} FS_{i1-3} + \beta_{16} RO_{i1-3} + r_{1i}$$

Results

Descriptive Results

Table 1 presents descriptive statistics for the sample. For both substance use and risky sexual behavior, rates are strongly skewed towards no engagement, but both behaviors increased

over time, with some indication of declining rate of increase over time. In contrast, the parenting variables, including closeness to and monitoring by both mothers and fathers as well as family routines, all showed small, linear decreases in average scores over time.

Trajectories of Risky Behaviors

Table 2 presents results of hierarchical generalized models predicting adolescents' substance use (column 2) and risky sexual activity (column 3), including the unstandardized regression coefficients, their standard errors, and the event rate ratios for the unit-specific models. In the Poisson model, the event rate ratio is the exponential of a coefficient and it can be interpreted as the percentage change in the dependent variable that is related to a one unit increase in the independent variable, holding other factors constant. Results indicate that parents' human and financial capital characteristics were rarely significantly related to adolescents' trajectories of risk behaviors. The family processes were important, however. Positive relationships with fathers were associated with lower levels of substance use at age 12. More specifically, a unit increase in this measure was linked to a 2% decline in substance use (event rate ratio = .98) Fathers' monitoring also predicted lower levels of substance use at age 12 and lower levels of risky sexual activity at age 14. A unit increase in fathers' monitoring was associated to a 5% reduction in substance use at age 12 (event rate ratio = .95) and a 4% reduction in risky sexual activity at age 14 (event rate ratio = .96). Increases in fathers' monitoring across the first 3 waves of the survey also related to less growth over time in risky sexual behavior, with a unit increase in monitoring predicting 1% less growth per six month increment (event rate ratio = .99).

Interestingly, mothers' parenting was not especially important for explaining variation in adolescent risk trajectories in two-parent families. Only one significant coefficient emerged,

with greater maternal monitoring predicting lower growth over time in adolescent substance use. Specifically, a unit increase in mother's monitoring across the first 3 waves of the survey led to 1% less growth per six month increment (event rate ratio = .99). Family routines was the most robust family process of the risky behavior trajectories. Greater family routines predicted lower risky sexual behavior and substance use at ages 14 and 12 respectively. A unit increase in family routines relating to a 7% reduction in substance use at age 12 and a 6% decline in risky sexual behavior at age 14. Improvements in family routines overtime were linked slower growth in both trajectories, with a one unit increase in family routines relating to a 1% decline in substance use and risky sexual behavior per 6 month age increase.

In addition to parenting process, family structure and stability variables were significant predictors of adolescents' risk behavior trajectories. Youth with step mothers in their household at baseline had markedly higher levels of both types of risky behaviors. The presence of a step mother was liked to a 160% increase in substance use (event rate ratio 2.60) and a 132% increase in risky sexual activity (event rate ratio 2.32) for the average 12 and 14 year old youth in our sample respectively, when compared to an adolescent living with their biological mother. The presence of a step father in the household was linked to a 75% increase in the level of risky sexual activity (event rate ratio 1.75) at age 14, compared to an adolescent who lived with their biological father. Finally, when fathers left households, adolescents experienced steeper increases in substance use. Substance use of youths whose father left their household grew 3% more per 6 month interval (event rate ratio = 1.03) when compared to adolescents whose fathers were in the household consistently across the 3 waves of data collection.

Additional models assessed whether biological relatedness (stepparent versus biological) of parents moderated the influence of family process on children's trajectories of risky behavior.

Results revealed only a few significant interactions, suggesting that the overall relationships between parenting and trajectories of risky behavior are similar for different family structures. Several exceptions to this are worth noting. Family routines were less protective for growth in substance use and risky sexual behavior when there was a stepmother in the household, compared to the adolescent's biological mother. Interestingly, a close mother-child relationship was protective for adolescents' substance use growth and levels of risky sexual behavior at age 14 when it was a stepmother in the household, compared to the biological mother. A close father-child relationship was especially protective for the levels of substance use at age 12 and the growth of substance use overtime when there was a stepfather in the household in comparison to a biological father. Mothers' monitoring was protective for initial levels of substance use for adolescents' with a step father, though it was not protective for those with biological fathers in the household. Finally, improvement in the consistency of family routines were less protective for substance use growth among adolescents living with a stepfather, in comparison to those who were living with their biological father.

Interaction models also assessed whether the links between parenting and adolescent risk behaviors were moderated by adolescent gender. Results indicated few significant gender interactions, suggesting that overall the longitudinal relationships between parenting and youth risk behaviors are similar for boys and girls. Notable exceptions are that family routines were especially protective for the level of substance use reported by girls when compared to boys at age 12. A close relationship between the adolescent and mother was related to higher levels of risky sexual behavior at age 14 for girls but not boys. In addition, mothers' monitoring was less protective for the growth over time in substance use for girls versus boys.

Family Process Trajectories

A second set of hierarchical linear models was estimated to consider associations between adolescent substance use and sexual behaviors and family process trajectories over time. Recall that these models have much more limited power to predict change, due to two data limitations. First, only three or four waves of parenting variables were available in the data, providing a more limited window in which to observe change. Second, because youth were only asked about sexual behaviors starting at age 14, these analyses are limited to youth who were 14 years of age or older in 1997. Thus, the analysis of family process trajectories is based on only 1/3 of the full sample that was used in the prior analysis. The results of our parenting trajectory analyses can be found in table 3. It is important to note when interpreting the results of these analyses that the quality of family process taking place in youths' household tended to decline as children aged. This is evident by the negative intercept term for the slope coefficients in each of the family process models in table 3. Higher levels of substance use were consistently associated with worse family functioning at age 14. Furthermore, increases in substance use between wave 1 and wave 3 were related to greater declines in father-child and mother-child closeness, mother monitoring, and family routines. Adolescents' risky sexual behaviors also predicted family processes, albeit not as consistently as youth substance use. Risky sexual behaviors at age 14 predicted lower levels of father-child and mother-child relationship closeness. Moreover, increases in risky sexual behaviors were linked to greater declines over time in father-child closeness and in family routines. Sexual behaviors were not predictive of parental monitoring.

Discussion

Results from this research provide important new insights into how parenting practices and youth engagement in risk behaviors co-evolve over the years of adolescence. In short, our results support a transactional theoretical perspective, which argues that individuals both affect

and are affected by their environments. In the realm of parenting and child development, this perspective notes that firm, supportive, and stable parenting and home environments help to provide a strong base for adolescents, increasing their self regulatory behavior, providing an emotional anchor, and helping adolescents to deviate from engagement in risky and negative behaviors. In the reverse, this perspective argues that both normative and non-normative adolescent behaviors such as engagement in hostile or antisocial actions, negativity, and engagement with problem peers—act as deterrents to consistent and involved parenting, pushing parents away, increasing negativity in the parent-adolescent relationship, and decreasing parents' ability or desire to retain firm oversight over their adolescents' activities.

Our results extend these models into two important areas of adolescent functioning, substance use and sexual activity. Although trends indicate that a large proportion of youth engage in these behaviors, they are nonetheless considered "risky", as they pose clear health risks, psychosocial risks, and are linked to other types of problematic behaviors such as criminal activity, school problems, and early parenthood. Moreover, our results substantially increase the information on how fathers' parenting rather than just mothers' fit into these family systems.

Interestingly, our results found that fathers' parenting practices and the stability of family routines were more consistently predictive of adolescent risk behaviors than were mothers' parenting practices. Family routines- that is regularity of eating meals together and engaging in other regular activities as a family- emerged as the most robust predictor of adolescent risk behaviors. Greater family routines predicted lower levels of substance use and risky sexual activity at the initiation of data collection. Furthermore, change over time in family routines during early to mid adolescence predicted lower growth in these risk behaviors through the years of adolescence. These results suggest that retaining stable family traditions and regular time

together- increasingly difficult challenges as adolescents gain greater autonomy and often participate in increasing levels of extra-curricular, work, and peer activities, and as all families face the increased time demands of a 24/7 economy—may be centrally important mechanisms through which families can help adolescents opt out of or decrease their involvement in risky behaviors. Fathers' relationships with adolescents were also important. Closer father-adolescent relationships predicted lower initial levels of substance use, and greater monitoring by fathers was correlated with lower initial levels of both sexual activity and substance use, while these same processes with mothers were not significant. Moreover, changes over time in early adolescent paternal monitoring predicted lower trajectories of adolescent sexual risk behaviors, suggesting that fathering may have longer-term influences on adolescents' behaviors later in adolescence. Changes in maternal monitoring also predicted trajectories of substance use.

In contrast to much extant research in the field, these relationships, albeit still correlational, controlled for a host of child and family correlates, for family structural changes, and for parenting from both parents. The models also provide temporality, modeling trajectories of risk behaviors throughout adolescence as a function of parenting practices in early-mid adolescence. This longitudinal view allows an opportunity to assess how relationships and behaviors change through the central transitions periods of adolescence.

The second central set of findings suggests that adolescent behaviors may also have a significant effect on parenting practices and family processes. In fact, even though the models assessing links between adolescent behaviors and trajectories of parenting had less power to detect significant effects, with a shorter time window and a smaller sample, results were more consistent than in the models using parenting to predict changes in adolescent risk behaviors. This supports the argument of Stice and Barrera (1995), who noted that as children age, child

effects on parents may become stronger than parent effects on children. Our results suggest that quite consistently, when adolescents engaged in early substance use, they had less close relationships with their parents, had parents who provide lower monitoring, and had less regular and stable family routines. In contrast, early sexual activity was related only to lower closeness with mothers and fathers, not to differential levels of parental monitoring or family routines. Moreover, increases in substance use predicted lowered trajectories of closeness with mothers and fathers, maternal monitoring, and family routines, while increases in risky sexual behaviors predicted greater declining trajectories over time of closeness with fathers and family routines.

In comparing the two sets of findings, an interesting contrast emerges in regards to relationship closeness versus parental monitoring. In terms of maternal monitoring and substance use, the relationships appear reciprocal and bidirectional. Increases in maternal monitoring predicted lowered trajectories of substance use, and increases in substance use predicted lowered trajectories of maternal monitoring. In contrast, fathers' monitoring showed slightly different patterns in relation to risky sexual behaviors. Greater paternal monitoring predicted lowered trajectories of adolescent sexual behaviors, but the reverse was not significant- fathers' monitoring did not decline over time in relation to adolescent sexual behaviors. In contrast, parent-adolescent closeness showed lowered trajectories over time in response to adolescent risk behaviors (with the exception of sexual behaviors not predicting changes in mother-adolescent closeness). But emotional closeness did not predict trajectories of risk behaviors. These results provide some hint of evidence that relationship quality between parents and adolescents may be more responsive to adolescents' behaviors, whereas fathers' supervisory processes such as monitoring may potentially be more of a stable influence on adolescent

behaviors, particularly sexual risky behaviors. These newly emerging patterns clearly should be explored further in additional research.

Table 1. *Descriptive Statistics*

	Range	Mean	Standard Deviation
Risk Behavior Variables			
Substance Use 1997	0-70	1.89	7.09
Substance Use 1998	0-80	4.65	11.56
Substance Use 1999	0-85	6.74	14.12
Substance Use 2000	0-90	8.81	15.73
Substance Use 2001	0-90	11.04	17.66
Substance Use 2002	0-90	12.62	18.07
Risky Sexual Activity 1997	0-25	1.03	3.49
Risky Sexual Activity 1998	0-30	2.41	5.38
Risky Sexual Activity 1999	0-30	3.01	5.97
Risky Sexual Activity 2000	0-30	4.80	7.12
Risky Sexual Activity 2001	0-30	6.57	7.81
Risky Sexual Activity 2002	0-30	8.82	8.54
Family Process Variables			
Relationship with Mother 1997	2-32	25.49	4.59
Relationship with Mother 1998	0-32	24.81	4.79
Relationship with Mother 1999	3-32	24.72	4.91
Relationship with Mother Change	-23-20	-.87	4.86
Relationship with Father 1997	2-32	24.74	5.49
Relationship with Father 1998	0-32	23.94	5.82
Relationship with Father 1999	0-32	23.80	5.82
Relationship with Father Change	-27-23	-1.06	5.33
Monitoring by Mother 1997	0-16	10.50	3.16
Monitoring by Mother 1998	0-16	10.00	3.15
Monitoring by Mother 1999	0-16	9.77	3.24
Monitoring by Mother 2000	0-16	9.69	3.20
Monitoring by Mother Change	-14-14	-.78	3.45
Monitoring by Father 1997	0-16	8.38	3.95
Monitoring by Father 1998	0-16	7.66	3.94
Monitoring by Father 1999	0-16	7.41	3.93
Monitoring by Father 2000	0-16	7.29	3.78
Monitoring by Father Change	-16-16	-.97	3.95
Family Routines 1997	0-21	9.60	4.39
Family Routines 1998	0-21	8.19	4.13
Family Routines 1999	0-21	7.61	4.08
Family Routines 2000	0-21	6.75	4.06
Family Routines Change	-20-21	-2.02	4.37
Time Invariant Controls			
Youth's Gender (Female)	0-1	.47	.50
Mother's Age 1997	22-73	39.72	5.40
Father's Age 1997	24-77	42.29	6.47

Age of Mother at First Birth	14-52	23.33	4.71
Black	0-1	.16	.37
Hispanic	0-1	.21	.41
Mother Less than High School	0-1	.19	.39
Mother High School Grad Only	0-1	.33	.47
Father Less than High School	0-1	.19	.39
Father High School Grad Only	0-1	.30	.46
Time Variant Controls			
Minors in Household 1997	1-9	2.51	1.71
Minors in Household Change	-5-6	-.48	.86
Mother's Employment Status 1997	0-1	.72	.45
Mother Out of Employment	0-1	.06	.24
Mother Into Employment	0-1	.11	.32
Mother Stable Employment	0-1	.15	.36
Father's Employment Status 1997	0-1	.91	.29
Father Out of Employment	0-1	.03	.18
Father Into Employment	0-1	.05	.22
Father Stable Employment	0-1	.01	.08
Parents' Income 1997 (in Thousands)	0-384	50.56	40.23
Parents' Income Change	-384-472	4.91	40.39
Mother Out-In	0-1	.05	.22
Mother Out	0-1	.10	.30
Father Out-In	0-1	.07	.25
Father Out	0-1	.13	.33
Stepmother 1997	0-1	.03	.16
Stepmother 1997-1999	0-1	.05	.21
Stepfather 1997	0-1	.12	.32
Stepfather 1997-1999	0-1	.18	.38

Table 2. Parenting Predicting Adolescent Substance Use and Risky Sexual Activity

	Substance Use			Risky Sexual Activity		
	Coefficient	Standard Error	ER Ratio	Coefficient	Standard Error	ER Ratio
Intercept						
Intercept	-3.624**	.121	.027	-3.877**	.152	.021
Relationship with Mother	-.006	.010	.994	.001	.011	1.001
Relationship with Father	-.019*	.009	.981	-.003	.010	.997
Monitoring Mother	-.022	.017	.978	.009	.019	1.009
Monitoring Father	-.050**	.015	.951	-.041*	.017	.960
Family Routines	-.077**	.010	.926	-.066**	.012	.936
Stepfather	.472	.191	1.603	.558*	.226	1.748
Stepmother	.958**	.322	2.606	.843*	.374	2.323
Gender	.239	.140	1.270	-.640**	.206	.528
Slope						
Intercept	.648**	.022	1.912	.853**	.030	2.349
Relationship with Mother	-.000	.001	1.000	-.000	.001	1.000
Relationship with Father	-.001	.001	.999	.000	.001	1.000
Monitoring Mother	-.003*	.001	.997	.002	.001	1.002
Monitoring Father	-.000	.001	1.000	-.002*	.001	.998
Family Routines	-.005**	.001	.995	-.004**	.001	.996
Father Out-In	-.009	.015	.991	.002	.018	1.002
Father Out	.026*	.012	1.026	.014	.015	1.014
Mother Out-In	.019	.019	1.019	.029	.021	1.029
Mother Out	.023	.013	1.023	.007	.015	1.007
Stepfather	-.018	.014	.983	-.038	.020	.963
Stepmother	-.049	.026	.952	-.043	.028	.958
Gender	-.057**	.011	.945	.047**	.017	1.048

Quadratic Slope						
Intercept	-.020**	.001	.980	-.032**	.002	.969
Panel 2. Stepmother Interactions						
Intercept						
Rel Mother X Stepmother	-.064	.050	.938	-.134*	.056	.875
Rel Father X Stepmother	.003	.035	1.009	.054	.056	1.056
Mon Mother X Stepmother	.007	.080	1.066	.098	.085	1.013
Mon Father X Stepmother	.039	.068	.978	.010	.084	1.010
Fam Routines X Stepmother	.104	.057	1.074	.023	.064	1.023
Slope						
Rel Mother X Stepmother	-.005*	.002	.995	-.003	.002	.997
Rel Father X Stepmother	-.000	.003	.999	.000	.003	1.000
Mon Mother X Stepmother	.003	.005	1.002	-.001	.005	.999
Mon Father X Stepmother	-.000	.004	1.000	-.002	.005	.998
Fam Routines X Stepmother	.010**	.004	1.008	.010*	.004	1.010
Panel 3. Stepfather Interactions						
Intercept						
Rel Mother X Stepfather	.040	.027	1.041	.023	.031	1.023
Rel Father X Stepfather	-.060*	.024	.942	-.038	.026	.963
Mon Mother X Stepfather	-.114**	.043	.893	-.032	.043	.969
Mon Father X Stepfather	.075	.039	1.078	-.033	.043	.967
Fam Routines X Stepfather	.043	.024	1.043	.034	.026	1.034
Slope						
Rel Mother X Stepfather	.002	.002	1.002	.001	.002	1.001
Rel Father X Stepfather	-.003*	.002	.997	-.002	.002	.998
Mon Mother X Stepfather	.004	.003	.996	-.002	.003	.998
Mon Father X Stepfather	.003	.003	1.003	-.001	.003	.999
Fam Routines X Stepfather	.004*	.002	1.004	.003	.002	.003
Panel 4. Adolescent Gender Interactions						
Intercept						
Rel Mother X Female	.026	.020	1.027	.039*	.023	1.040
Rel Father X Female	-.021	.027	.978	-.044	.020	.956
Mon Mother X Female	.058	.034	1.060	.033	.038	1.033

Mon Father X Female	-.027	.029	.974	-.033	.034	.967
Fam Routines X Female	-.043*	.019	.958	-.040	.023	.960
Slope						
Rel Mother X Female	-.000	.001	1.000	-.003	.002	.997
Rel Father X Female	.001	.001	1.001	-.002	.001	.998
Mon Mother X Female	.005*	.002	1.005	.003	.003	1.003
Mon Father X Female	-.004	.002	.996	-.003	.002	.997
Fam Routines X Female	-.002	.001	.998	-.001	.002	.999

Table 3. Substance Use and Risky Sex Predicting Trajectories of Mothers' and Fathers' Parenting Practices

	Relationship Mother		Relationship Father		Monitoring Mother		Monitoring Father		Family Routines	
	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error
Intercept										
Intercept	24.971**	.121	24.233**	.146	10.206**	.079	7.287**	.096	14.718**	.123
Substance Use	-.058**	.013	-.092**	.016	-.047**	.008	-.051**	.010	-.049**	.008
Risky Sex	-.093*	.042	-.142**	.045	-.034	.024	-.027	.033	-.049	.035
Stepfather	-.631	.369	-2.866**	.476	-.696**	.245	-1.603**	.346	-.076	.343
Stepmother	-.938	.943	1.36	.709	-1.458**	.486	-.081	.627	.281	.584
Gender	.574*	.243	-.539	.289	.742**	.157	.114	.192	-.313	.248
Slope										
Intercept	-.099**	.027	-.198**	.033	-.111**	.014	-.120**	.019	-1.226**	.018
Substance Use	-.006**	.002	-.010**	.002	-.002*	.001	-.001	.001	-.004**	.001
Risky Sex	-.003	.003	-.008*	.004	-.001	.002	.003	.003	-.006**	.002
Father Out-In	.087	.116	-.167	.148	-.016	.062	-.068	.091	.101	.078
Father Out	.056	.090	-.390*	.176	.029	.051	-.057	.112	.094	.052
Mother Out-In	009	.130	.194	.138	-.026	.071	.003	.117	-.033	.088
Mother Out	-.268*	.131	.170	.146	-.097	.067	.156	.119	-.063	.063
Stepfather	-.028	.066	.026	.077	.058	.035	.014	.059	-.091*	.045
Stepmother	-.508**	.159	-.017	.127	-.192*	.076	.013	.111	-.188*	.084
Gender	-.173**	.048	-.091	.054	.016	.025	-.015	.037	-.037	.036
Panel 2. Stepmother Interactions										
Slope										
Substance Use X Stepmother	-.009	.013	.008	.010	-.004	.008	-.012*	.006	.013	.007
Risky Sex X Stepmother	.003	.020	-.004	.015	.008	.014	.004	.013	-.046*	.019
Panel 3. Stepfather Interactions										
Slope										
Substance Use X Stepfather	.003	.007	-.001	.009	.007*	.003	.007	.005	.006	.004

Risky Sex X Stepfather	.007	.011	.006	.013	-.014	.008	-.017*	.008	-.015	.012
Panel 4. Gender Interactions										
Intercept										
Substance Use X Female	.034	.030	.023	.036	-.007	.020	-.005	.020	-.002	.018
Risky Sex X Female	-.001	.096	-.061	.099	-.017	.059	-.005	.067	-.047	.071
Slope										
Substance Use X Female	-.008	.005	-.008	.006	-.000	.002	-.001	.003	-.005	.003
Risky Sex X Female	.003	.010	.016	.011	.003	.005	-.001	.007	.014	.008

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