Does Single Parenthood Increase the Probability of Teenage Promiscuity, Substance Use and Crime?*

Heather Antecol
Department of Economics
Claremont McKenna College
500 E. Ninth Street
Claremont, CA 91711
heather.antecol@mckenna.edu
Fax: (909) 621-8249

Kelly Bedard
Department of Economics
University of California
Santa Barbara, CA 93106
kelly@econ.ucsb.edu
Fax: (805) 893-8830

Abstract

There is longstanding evidence that youth raised by single parents are more likely to perform poorly in school and partake in 'deviant' behaviors such as smoking, sex, substance use and crime. However, there is not widespread agreement as to whether the timing of the marital disruption differentially impacts youth outcomes. Using the National Longitudinal Survey of Youth and its Young Adult Supplement, we find that an additional five years with the biological father decreases the probability of smoking, drinking, engaging in sexual activity, marijuana use, and conviction by approximately 5.3, 1.2, 3.4, 2.2 and 0.3 percentage points, respectively.

JEL Codes: J12, J13
Key Words: Family Structure, Marital Dissolution, Youth Outcomes

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* The corresponding author is Heather Antecol.

1. Introduction

The evolving structure of the family over the past 40 years is one of the fundamental changes in American society. In 1960, only 12 percent of children spent all, or part, of their childhood apart from one or more of their biological parents. By 1995 this number had increased to approximately 40 percent (McLanahan 1997). The decline of the 'traditional' family has spawned a large literature attempting to measure the importance of family structure in determining child/youth outcomes. These studies generally find that children raised in single parent homes perform more poorly in school,[1] and are more likely to become sexually active, commit illegal acts and use illegal drugs at young ages.[2]

Researchers in this area have become increasingly aware of the importance of the timing of family disruption. While family stress and instability surrounding marital breakdown suggests that a disruption during adolescence may have a bigger impact on youth outcomes than a disruption during early childhood, lower supervision and/or parental interaction in single-parent homes may mean that early disruption is in fact more detrimental (see Harper and McLanahan (1999) for a detailed discussion of these issues).

Unfortunately, the empirical findings on this matter are mixed and therefore do not resolve the theoretical ambiguity. For example, Krein and Beller (1988) find that family dissolution during the pre-school years has a larger negative effect on educational attainment than family dissolution during the elementary or high school years. Fronstin, Greenberg and Robins (2001) similarly find that family disruptions prior to the middle teenage years have a somewhat more negative impact on educational attainment while later disruptions have a somewhat worse impact on labor market outcomes, such as

employment and earnings. And, Ermisch and Francesconi (2001) find that youth whose fathers left the household during early childhood have lower educational attainment and are more likely to be economically inactive and smoke cigarettes.

In contrast, Ginther and Pollak (2003) find little to no evidence that youth who spend more years in single parent and/or stepparent households have worse educational outcomes than youth from intact households. McLanahan and Bumpass (1988) similarly find no evidence that the timing of family breakdown explains the subsequent family formation decisions of the affected children. This does not mean that childhood family structure has no impact on marital decisions later in life, only that it is exposure to marital dissolution and not the timing of dissolution that increases the probability that youth experience marital instability later in life. Finally, Harper and McLanahan (1999) similarly find that the timing of the disruption plays no role in explaining the incarceration of youth from single-parent households, but that children with never married mothers are more likely to be convicted of a crime.

The explanation for the wide range of results reported in the literature may lie in the wide range of data sources used. Or, it may lie in the differential implications of the timing of family breakdown for different types of youth behavior. In other words, parental instability occurring at different points in the life course of a child/adolescent may manifest itself very differently. For example, a youth whose father was never present may be more likely to engage in criminal activity while a youth whose father leaves the household during his teenage years may be more likely to use illegal drugs. Since previous studies generally focused on a single outcome, it is difficult to determine which of the two explanations is correct, or at least more important.

Interpreting the existing empirical findings is made still more difficult by the absence of a clear understanding of the link between family structure and youth outcomes. To a large extent the problem lies in the fact that unobserved parental characteristics (such as, parental supervision/interaction and family stress) and household characteristics (such as, family income and maternal employment) may be associated with both poor parenting and family structure. As Painter and Levine (2000) point out, this problem is particularly challenging from a policy standpoint. If parental and socioeconomic characteristics are the driving force behind poor youth outcomes then policies that attempt to keep families intact will have little effect on youth outcomes. On the other hand, if it is the absence of the father that leads to poor youth outcomes, then such policies might have a positive impact. These issues are economically important because the early adoption of deviant behaviors has long-run impacts on educational, labor market, and health outcomes (see Gruber 2001 and the references therein). For example, girls who become sexually active at young ages are at an elevated risk of teenage pregnancy, and hence a greater risk of leaving high school and a higher risk of welfare dependency (see Moffitt 1992).

The purpose of this paper is to add to the current debate about the impact of family structure on youth outcomes by exploring the relationship between the timing of the disruption and a broad range of youth outcomes—smoking, drinking, sexual activity, marijuana use and conviction— using the National Longitudinal Survey of Youth (NLSY) linked with the NLSY Young Adult Supplement (NLSY-YAS). By exploring the relationship between the timing of family dissolution and a wide range of youth outcomes in a single data source we are able to identify the differential impact of the

timing of family breakdown across youth behaviors. In an attempt to reduce the bias due to unobserved heterogeneity, we include a comprehensive set of controls for maternal, household, and youth characteristics. A similar approach is used by Painter and Levine (2000), Waldfogel, Han, and Brooks-Gunn (2002) and Ruhm (2004).[3]

Measuring paternal presence as a continuous variable, we find statistically significant reductions in youth participation in smoking, drinking, sexual intercourse, marijuana use and conviction before the age of fifteen the longer the biological father remains in the household. In particular, an additional five years with the biological father decreases the probability that a youth smokes cigarettes, drinks alcohol, engages in sexual activity, uses marijuana and is convicted by approximately 5.3, 1.2, 3.4, 2.2, and 0.3 percentage points, respectively. Once we allow for non-linearity in the impact of the timing of paternal exit we also find evidence that the point during a child's life at which their biological father leaves affects youth behavior in distinct ways. For example, youth smoking, sexual activity, and marijuana use is highest among youth whose father left during early childhood.

The remainder of the paper is as follows. Sections 2 and 3 discuss the theoretical model and estimation procedure, respectively. Section 4 describes the parental and youth data. Section 5 discusses the timing and duration of marriages during a youth's life. Section 6 discusses the results. Section 7 concludes.

2. A Simple Theoretical Framework

Consider the following production function:

$$Y_t = Y(Y_{t-1}, d_t, i_t, s_t) \quad (1)$$

where Y denotes a specific youth outcome (such as being sexually active before reaching age fifteen), d is the length of time that the youth is exposed to their biological father, i is family income, and s captures exogenous shocks.[4] This formulation assumes that children always live with their biological mother and that youth outcomes at time t depend on youth outcomes in the previous period (t-1). Notice that the primary arguments of the youth outcome production function, namely family disruption and family income are themselves the outcomes of utility maximization on the part of parents and hence may be endogenous (we return to this issue in Section 3).

This production function has several important features. First, we assume that the longer the biological father remains in the household the lower the probability that the youth partakes in a deviant behavior. In other words, exposure to one's biological father has a deterrent effect on 'bad' behavior. Second, we assume that families with higher incomes purchase more goods and services that enter positively into the production of 'good' youth behavior, or in the context of equation (1) serve to reduce the probability of deviant youth behavior. Finally, previous parental choices are relevant as we assume that current youth outcomes are a function of previous behavior.

Recursively substituting in for lagged values of Y allows us to rewrite equation (1) as:

$$Y_t = Y(D_t, I_t, S_t) \quad (2)$$

where,

$$
\begin{aligned}
D_t &= [d_t, d_{t-1}, ..., d_1] \\
I_t &= [i_t, i_{t-1}, ..., i_1] \\
S_t &= [s_t, s_{t-1}, ..., s_1]
\end{aligned}
\tag{3}
$$

and the subscript 1 denotes the first year of life.

While the discussion thus far has outlined a structural production function, we are unable to estimate equation (2) empirically. We therefore focus on the following reduced form model:

$$Y_t = Y(D_t, X_t, \varepsilon_t) \tag{4}$$

where X is a vector of parental, youth, and family background characteristics and ε is a disturbance term capturing shocks and variables not otherwise controlled for. An extensive list of variables is included in X in order to account for all other factors that influence youth outcomes. However, to the extent that the included regressors do not adequately control for all other factors, the reduced form estimates of the impact of time with the biological father will be biased (this issue is discussed in detail in Section 3). In most specifications we summarize D as a single continuous variable measuring total years with the biological father, but in Section 6.2 we allow for the possibility that the relationship between youth outcomes and time with the biological father may be non-linear.

3. Econometric Approach

In order to estimate the reduced form model (equation 4), let the indicator variable $Y_{jt} = 1$ if the youth j participates in a specified deviant behavior before age t and let $Y_{jt} = 0$ otherwise. The choice problem is then described by the following latent variable model:

$$Y_{jt}^{*} = X_{jt}\beta + D_{jt}\delta + S_{jt} + e_{jt} \quad (5)$$

where t =15, Y^{*} is the net utility that a youth receives from the deviant behavior, X is a vector of control variables, D is the number of months that the biological father is present in the household, S captures shocks and unobservable parental, household, and youth characteristics, and e is a normally distributed disturbance term with mean zero and unit variance.

The basic choice problem is:

$$Y_{jt}^{*} = X_{jt}\beta + D_{jt}\delta + \varepsilon_{jt} \quad (6)$$

where $\varepsilon_{jt} = S_{jt} + e_{jt}$. In a model with a sparse set of control variables included in X, the omission of important parental, household, and youth characteristics might imply that $\text{cov}(D_{jt}, S_{jt}) \neq 0$, and hence render biased estimates of δ (the parameter of interest). This problem can be mitigated by including a sufficiently rich set of control variables in X to ensure that D is orthogonal to ε.[5] Section 4 includes a detailed description of the variables included in X.

A youth only participates in the deviant behavior if the expected net utility from doing so is positive, and thus the probability that the youth is observed engaging in the specified deviant behavior is given by:

$$\text{prob}(Y_{jt} = 1) = \text{prob}(X_{jt}\beta + D_{jt}\delta + \varepsilon_{jt} > 0) = \Phi(X_{jt}\beta + D_{jt}\delta) \quad (7)$$

where $\Phi()$ is the standard normal cumulative distribution function.

4. Data

All youth, parental and family data are drawn from the National Longitudinal Survey of Youth (NLSY) and the NLSY Young Adult Supplement (NLSY-YAS). These data suit our purposes for a number of reasons. First, the NLSY-YAS allows us to include a wide range of youth outcomes, that is, participation in smoking, drinking, sexual activity, marijuana use and crime before the age of fifteen. Secondly, the NLSY and the NLSY-YAS contain a broad range of control variables for youth and their parents, which is important as it allows us to identify pre- and post-disruption factors. Thirdly, and most importantly, combining these data allows us to measure the length of time that each youth lives with his/her biological father.

Since 1986 the children of NLSY women have been surveyed biannually. Child cognitive ability and development are assessed using tests and mothers are extensively surveyed to establish the quality of the home environment. Beginning in 1994 the survey was extended to survey 'youth' aged fifteen and over directly. Each youth completes an interview focusing on education, employment and family-related behavior as well as filling out a confidential questionnaire that focuses on substance use, sexual activity and other sensitive issues. Youth are asked how old they were when they first smoked cigarettes, began drinking alcohol at least once a month, engaged in sexual intercourse, used marijuana and were convicted of a crime other than a minor traffic offense. This information is used to construct indicator variables equal to one if the respondent participated in a specified 'deviant' behavior before the age of fifteen and zero otherwise.

To maintain the largest sample possible, the retrospective 'deviant' youth behavior reports for 2000 are used. A youth is only included if they are fifteen or older at

the 2000 interview date so that behavior occurring up until the end of age fourteen can be included. If the youth was surveyed in 2000, but did not respond to a particular deviant behavior question his/her response in 1998 is used instead if he/she was at least fifteen years old at that interview date. We similarly proceed backwards to 1996 for individuals not responding in 2000 and 1998 but who are fifteen in 1996, and to 1994 for individuals who did not respond in 2000, 1998, and 1996 but did respond in 1994 and were at least fifteen years old in that year. Table 1 reports the summary statistics for youth participation in deviant behaviors. Approximately 2 percent of youth are convicted of a crime before age fifteen, while 18 percent, 29 percent, 12 percent and 8 percent become sexually active, smoke, use marijuana and drink regularly, respectively.[6]

TABLE 1 HERE

Combining the NLSY and the NLSY-YAS allows us to measure the timing of family disruption by linking youth to their biological father through the mother's marital status. The sample is restricted to mothers and children residing with their mother at age fifteen, because the number of children raised by single fathers and alternate caregivers are too small to reliably analyze. Similar to Bumpass, Raley, and Sweet (1995), the father is assumed to be present in the household from the point of birth if he was either married to the mother at the point of birth or married her within twelve months of the youth's birth. In all other cases, we assume that the youth never lives with his/her biological father. Referring to Table 1, the average youth resides with his father for 9.1 years. Further, approximately half of the youth reside with their biological father for

their entire life up to age fifteen, 22 percent never live with their biological father,[7] and 29 percent suffer a family disruption between birth and age fifteen.

The deviant behavior variables are linked to youth and parental controls measured at three points in time: maternal variables at age fourteen and in 1979, maternal and family characteristics when the youth is fifteen, and average maternal and family characteristics from the youth's birth to age five, from age six to ten, and from age eleven to age fifteen. It is important to account for average maternal and family characteristics over the youth's entire life as opposed to a single point, or single window of time, during a youth's life because variables from a particular point in time may not to adequately describe youth's lifetime environment (see Wolfe, Haveman, and Ginther (1996) for a detailed description of the 'window problem').

As previously stated, the NLSY allows us to control for a comprehensive set of explanatory variables. In Section 6 we begin by first including a limited set of controls and then proceed to expand the set to include an extensive set of regressors. For expository ease we describe the variables in the order that they are added to the model in Section 6.

The first specification (A) includes the years that the biological father remains in the household and the set of regressors most commonly controlled for in the literature. These include the youth's race, sex, and birth order, as well as the number of children in household, mother's years of education, mother's age at the youth's birth, SMSA status, and region of residence (see the Data Appendix for a detailed description of all variables).

Specification B includes the Specification A variables plus a set of time-invariant controls for maternal background.[8] The additional variables include, the number of children ever born to the youth's mother, the mother's immigrant status, the mother's Armed Forces Qualifications Test (AFQT) score,[9] the mother's education level[10] and immigrant status of the mother's mother and father, the mother's place of residence at age fourteen, the mother's family structure at age fourteen, the mother's religion in 1979, and whether reading materials were present in the mother's home at age fourteen.

Specification C, the preferred specification, includes the Specification B variables plus a set of regressors that control for the household characteristics that are varying over time and may be correlated with other factors affecting youth outcomes. These include mother's average weekly hours of work when the youth was born to age five, from age six to ten, and from age eleven to age fifteen and average family income for the same time periods.

Summary statistics for the Specification C variables, with the exception of SMSA and region, are reported in Table 1. Focusing on the variables commonly controlled for in the literature, the sample is 52 percent male, 20 percent black and 8 percent Hispanic. The average youth lives in a household with 2.6 children and was the 1.6^{th} child born to their mother (59 percent are firstborn children). Finally, the mother of the average youth was 21.2 when the youth was born and has 12.4 years of education.

5. Family Structure and Youth Participation in Deviant Behavior

We begin by following conventional practice and comparing youth outcomes across family types where the father is always present to family types where the father is

not always present (see the top panel of Table 2). As one might expect, youth who spend their entire childhood with both biological parents (row 1) are less likely to participate in all forms of deviant behavior compared to youth who spend less than their entire childhood with their biological father (row 2). However, the simple behavior differences between youth whose father is always present and youth who spend at least some fraction of their first fifteen years without their father may mask important differences in the impact of the timing of paternal departure. We therefore separate youth whose fathers are not always present into groups based on the length of time that the father is in the household: the biological father is never present, present when the youth is born until (but not including) their fifth year, present when the youth is five years old until (but not including) their tenth year, and present when the youth is ten years old until (but not including) their fifteenth year.

TABLE 2 HERE

Breaking youth whose fathers are not always present into these four groups reveals several interesting patterns (see the top panel of Table 2). First, for youth whose father was present at birth (rows 4 through 6), the longer the biological father remains in the household, the less likely the youth is to participate in deviant behaviors. Secondly, youth whose father are never present (row 3) are less likely to partake in all forms of deviant behaviors than are youth whose biological father are present when the youth was born until (but not including) age five (row 4). This suggests that the existence of a disruption itself matters, in addition to the timing of the disruption. Furthermore, youth

whose biological father is never present are less likely to smoke (row 3, column 1) than youth from all other family structure types. While at first this seems perplexing, it is largely driven by the fact that a large portion of the sample that never has a biological father present are black, and blacks are less likely to smoke than all other groups.[11]

The bottom two panels of Table 2 report the fraction of youth participating in deviant behaviors across family structures separately for boys and girls. While the levels of youth behavior differ somewhat across boys and girls, the patterns across family structures are similar. We return to this issue in Section 6.1.

Taken as a whole, the results reported thus far tentatively suggest that youth from non-traditional families are more likely to partake in deviant behaviors and that the timing of the disruption matters. However, whether this relationship is linear or non-linear is unclear from these descriptive statistics. The remainder of the paper more formally explores these issues.

6. Results

6.1 The Impact of Parental Presence on Youth Behavior

Table 3 reports the probit estimates of paternal presence for smoking, drinking, sex, marijuana use and conviction for three specifications. Panel A includes the years that the biological father remains in the household and the set of regressors most commonly controlled for in the literature – Specification A (see Section 4 for details). In order to more easily describe the quantitative importance of this variable, all tables report the average treatment effect, evaluated at means, as well as standard errors calculated using the "delta" method.

TABLE 3 HERE

According to Panel A the longer the biological father remains in the household the lower the probability that youth participate in all forms of deviant behavior. And, that in all cases the estimates are statistically significant at the conventional level. For expository ease, it is easiest to consider the impact of five extra years with the biological father. In particular, five more years with the biological father decreases the probability of participation in smoking, drinking, sex, marijuana use and conviction by 5.0, 1.2, 3.5, 2.4 and 0.7 percentage points, respectively. To put these results in context, given that 29 percent of youth have smoked cigarettes at least once before age fifteen, a 5 percentage point reduction in smoking participation translates into a 17 percent lower probability of smoking before the age of fifteen for youth whose fathers remain in the household for an extra five years. The percentage reductions in drinking, sex, marijuana and conviction associated with an additional five years with the biological father are similarly 15, 20, 20, and 30 percent relative to the mean.

As previously discussed, it is reasonable to be concerned that observable maternal, household, and youth characteristics may be correlated with the length of time that the father remains in the household and hence bias the estimated impact of years with the father on youth behavior. In order to mitigate this potential bias we follow Painter and Levine (2000), Waldfogel, Han, and Brooks-Gunn (2002) and Ruhm (2004), and include several extensive sets of controls in Panels B and C corresponding to Specifications B and C (see Section 4). However, adding an extensive list of maternal

and household measures has very little impact. For all outcomes, the point estimates for Specifications A, B, and C are statistically indistinguishable from each other at the conventional level.[12,13] Our findings are consistent with Painter and Levine (2000) who find that controlling for pre-disruption factors only moderately reduces the estimated impact of family disruption. In contrast, Thomson, Hanson, and McLanahan (1994) and Furstenberg and Teitler (1994) find that controlling for pre-disruption factors greatly reduces the estimated impact of family disruption on child/youth outcomes and Morrison and Cherlin (1995).

In an attempt to explore possible interactions between the impact of paternal presence and youth outcomes, Table 4 expands Specification C to include interactions between years with the biological father and child gender (Panel 1) and maternal years of education (Panel 2). The first panel provides no evidence of a differential impact of years with the biological father for boys and girls. While the two paternal presence measures are jointly significant for all outcomes, except for drinking, at the 10% level or better, in no case is the interaction term statistically significant.

TABLE 4 HERE

It also seems possible that the impact of the presence of the biological father in the household may differ across men based on their observable characteristics. For example, highly educated men may have a stronger impact on youth outcomes than less educated men. On the other hand, the presence of the father may be more important in low education households if less educated women have a harder time as single parents.

Given the ambiguous prediction, it is an empirical question. While we do not have good measures of paternal education, given assortative mating, maternal and paternal characteristics are likely highly correlated. As such, Panel 2 interacts the length of time the biological father remains in the household with maternal education. Again, the point estimates provide no evidence of an interaction effect.

6.2 The Timing of the Family Disruption and Youth Behavior

To further our understanding of the effect of the timing of family disruption on youth outcomes we allow for the possibility that the impact of paternal exit from the household is nonlinear. In particular, we re-estimate equation (7) for Specification C replacing the continuous father presence variable with a series of indicator variables. The base model reported in Panel 1 of Table 5 includes an indicator variable equal to one if the youth spent less than their entire life with their biological father, and zero otherwise. Panel 2 generalizes the model to include four indicator variables: the biological father is never present, the biological father is present when the youth was born until (but not including) age five, the biological father is present when the youth is five until (but not including) age ten, and the biological father is present when the youth is ten until (but not including) age fifteen. In both panels, biological father always present is the omitted category.

TABLE 5 HERE

Similar to the results presented in Panel C of Table 3, the results reported in Panel 1 of Table 5 show that youth participation in smoking, drinking, sex, marijuana and conviction are lower in traditional households. And, that in all cases the estimates are statistically significant at the conventional level. In particular, youth who spend less than their entire life with their biological father are 12.9, 2.6, 7.7, 4.8, and 0.9 percentage points more likely to smoke, drink, become sexually active, use marijuana, and be convicted before the age of fifteen.

Panel 2 reveals two facts. One, youth whose father was never present are more likely to partake in all forms of deviant behavior than youth whose father is always present. And two, the probability that a youth smokes, has sex, and/or uses marijuana is highest for youth experiencing marital dissolution during early childhood. These results imply that the timing of disruption is important, in addition to the existence of a disruption. In contrast, Painter and Levine (2000) find that the timing of the disruption has less effect on youth sexual behavior than the existence of the disruption itself.

One might also be concerned that the presence of a stepfather may affect youth participation in deviant behavior.[14] A number of recent studies find that children raised in stepfamilies have worse educational outcomes than children raised in intact families (Case, Lin, and McLanahan 2001, Ginther and Pollak 2003, Painter and Levine 2000, Biblarz and Raftery 1999, Boggess 1998, and Wojtkiewicz 1993). Children raised in stepfamilies are also more likely to be incarcerated (Harper and McLanahan 1999) and are more likely to exhibit behavioral problems (Thomson, Hanson, and McLanahan 1994). In contrast, Painter and Levine (2000) find no significant difference between children raised in stepfamilies and intact families in terms of premarital fertility,

Thomson, Hanson, and McLanahan (1994) find that children raised in stepfamilies have similar academic performance to children raised in intact families and Hill, Yeung, and Duncan (2001) report both positive and negative effects of maternal remarriage on educational attainment depending on the age of the child/youth at the time of remarriage and the gender of the offspring.

To determine whether the presence of a stepfather affects the deviant youth behaviors included in the present study, Panel 3 of Table 5 includes an indicator variable equal to one if a stepfather is present in the household at any point in time. We find no evidence that youth raised in stepfamilies perform worse than youth from intact families for any of our indicator variables. Moreover, the inclusion of the stepfather indicator does not change the general patterns found for the presence of the biological father indicator variables.

7. Conclusion

This study has documented the differential impact of parental instability by age at separation across a wide range of deviant youth behaviors. We find that an additional five years with the biological father decreases the probability of smoking by 5.3 percentage points, drinking by 1.2 percentage points, engaging in sexual intercourse by 3.4 percentage points, marijuana use by 2.2 percentage points and conviction by 0.3 percentage points. To the extent that we have adequately controlled for family and environmental characteristics, and hence isolated the impact of paternal presence on youth participation in deviant behaviors, the estimates indicate that the longer the father remains in the household the 'better off' the youth is. However, the results reported in

this paper do not necessarily suggest a policy of discouraging divorce for at least two reasons. First, the reported estimates do not inform us about youth outcomes in the event that divorce does not occur but family stress continues to increase because marital dissolution is barred. Secondly, maternal bargaining power may be reduced if divorce is less easily obtainable. To the extent that mother's invest more in children, such a shift might be to the detriment of children in 'unstable' intact families.

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Endnotes

[1] Examples include Painter and Levine (2000), Biblarz and Raftery (1999), Jonsson and Gahler (1997), Garasky (1995), Wojtkiewicz (1993), Manski, Sandefur, McLanahan, and Powers (1992), Sandefur, McLanahan, and Wojtkiewicz (1992) and Astone and McLanahan (1991).

[2] Examples include Painter and Levine (2000), Harper and McLanahan (1999), Comanor and Phillips (2002), Cherlin, Kiernan, and Chase-Lansdale (1995), Flewelling and Bauman (1990), McLanahan and Bumpass (1988) and Matsueda and Heimer (1987).

[3] There are two obvious alternative ways to deal with this potential bias. (1) A sibling fixed effect model (see Ermisch and Francesconi 2001 and the references therein). However, since siblings are usually born within a few years of each other, we do not have enough sibling pairs with different lengths of paternal exposure to estimate such a model with any precision. In other words, almost all of the variation in paternal exposure is across families rather than within families. (2) Instrumental variables using divorce law changes in a state fixed effects model. Unfortunately, this approach is impossible in the NLSY because few laws change during the period of interest. Moreover, even if there was more legislative variation, divorce law changes may not be valid instruments for divorce since they directly change many other things as well (see Gruber 2004 for a detailed discussion of this point).

[4] Ruhm (2004) uses a similar theoretical framework to examine the effect of maternal employment on child cognitive development.

[5] As Ruhm (2004) points out, one difficulty with this approach is that the results may be difficult to interpret if endogenous regressors are included that absorb some portion of the effect of family structure.

[6] The sample size varies across deviant behaviors due to non-reporting. The summary statistics for the independent variables from Specification C (see the Data Appendix) are based on the marijuana use sample, however, similar results are found for all other dependent variable samples and are available from the authors upon request.

[7] While this seems high, it is largely driven by the large fraction of black women in the sample, who are more likely to have out-of-wedlock births (see Antecol and Bedard (2002) for a detailed discussion). In this sample, 61.5 of black youth never live with their biological father compared to only 11.0 percent of white youth.

[8] Ideally we would include similar paternal measures, but these are either unavailable or badly reported.

[9] The AFQT score is adjusted for age and race.

[10] Due to non-reporting mother's mother's education and mother's father's education are replaced with the average education level if the data is missing and all models including these variables also include two dummy variables indicating missing data.

[11] According to our tabulations, 62 (11) percent of black (non-black) youth never live with their father and 15 (33) percent have smoked a cigarette.

[12] The results are also similar when maternal church attendance, attitudes towards female roles, smoking, and marijuana use are included in the control vector. We also estimated all models defining the presence of the biological father in a variety of ways. In all cases the results are similar and are available from the author upon request.

[13] All other coefficient estimates are available upon request.

[14] Changes in child support enforcement might also lead to changes in youth outcomes. While there were major changes to the Child Support Enforcement in 1984 and 1988, Case, Lin and McLanahan (2000) find that the level and probability of receiving child support payments have been relatively constant since the late 1970s. This being said, we do control for family income, which includes alimony and child support.

Table 1. Summary Statistics

	Sample Size	Mean	Standard Deviation
Smoking	1751	0.29	0.45
Drinking	1904	0.08	0.27
Sex	1841	0.18	0.38
Marijuana Use	1914	0.12	0.33
Conviction	1880	0.02	0.15
Years with Biological Father	1914	9.13	6.50
Biological Father is Never Present	1914	0.22	0.41
0<Biological Father Present<5	1914	0.13	0.34
5<=Biological Father Present<10	1914	0.10	0.30
10<=Biological Father Present<15	1914	0.06	0.24
Biological Father is Always Present	1914	0.49	0.50
Male	1914	0.52	0.50
Birth Order	1914	1.57	0.82
Black	1914	0.20	0.40
Hispanic	1914	0.08	0.27
Age of Mother at Youth's Birth	1914	21.21	2.92
Mother's Years of Education	1914	12.39	1.95
Number of Children in the Household	1914	2.62	1.14
Number of Biological Children	1914	2.82	1.23
Magazines in Mother's Household at 14	1914	0.53	0.50
Newspaper in Mother's Household at 14	1914	0.75	0.44
Library Card in Mother's Household at 14	1914	0.70	0.46
Immigrant Grandmother	1914	0.06	0.24
Immigrant Grandfather	1914	0.10	0.44
Grandmother's Years of Education	1790	10.61	2.71
Grandmother's Years of Education Missing	1914	0.05	0.23
Grandfather's Years of Education	1584	10.57	3.25
Grandfather's Years of Education Missing	1914	0.13	0.34
Mother Lived with Mother and Father at 14	1914	0.67	0.47
Mother Live with Mother Only at 14	1914	0.13	0.33
Mother's Adjusted AFQT Score	1914	-5.87	22.83
Immigrant Mother	1914	0.05	0.21
Mother Lived in the South at 14	1914	0.36	0.48
Mother is Catholic	1914	0.25	0.44
Mother is Baptist	1914	0.28	0.45
Mother Has No Religious Affiliation	1914	0.10	0.30
Family Income from Age 11-15	1914	5.11	4.84
Family Income from Age 6-10	1914	4.50	5.42
Family Income from Age 0-5	1914	3.60	3.52
Mother's Average Weekly Hours from Age 11-15	1914	26.54	16.57
Mother's Average Weekly Hours from Age 6-10	1914	21.26	15.82
Mother's Average Weekly Hours from Age 0-5	1914	15.74	13.84

All youth outcomes measure participation before age fifteen. Means and standard deviations calculated using 2000 youth sampling weights.

Table 2. Paternal Presence and Youth Behavior

	Smoking	Drinking	Sex	Marijuana	Conviction
Boys and Girls					
Biological Father is Always Present	0.25	0.07	0.12	0.10	0.01
Biological Father Not Always Present	0.33	0.09	0.23	0.15	0.03
Biological Father is Never Present	0.22	0.07	0.25	0.12	0.03
0<Biological Father Present<5	0.49	0.10	0.28	0.19	0.04
5<=Biological Father Present<10	0.40	0.10	0.18	0.16	0.04
10<=Biological Father Present<15	0.28	0.08	0.16	0.09	0.02
Boys					
Biological Father is Always Present	0.25	0.08	0.12	0.10	0.01
Biological Father Not Always Present	0.31	0.07	0.26	0.15	0.04
Biological Father is Never Present	0.23	0.06	0.26	0.13	0.03
0<Biological Father Present<5	0.41	0.10	0.33	0.21	0.06
5<=Biological Father Present<10	0.45	0.06	0.24	0.18	0.05
10<=Biological Father Present<15	0.20	0.09	0.13	0.08	0.05
Girls					
Biological Father is Always Present	0.24	0.06	0.11	0.09	0.01
Biological Father Not Always Present	0.35	0.10	0.21	0.14	0.03
Biological Father is Never Present	0.21	0.08	0.24	0.12	0.04
0<Biological Father Present<5	0.56	0.11	0.23	0.18	0.01
5<=Biological Father Present<10	0.35	0.14	0.13	0.15	0.03
10<=Biological Father Present<15	0.37	0.07	0.18	0.10	0.00

Percentages calculated using 2000 youth sampling weights.

Table 3. Probit Estimates (Marginal Effects)

	Smoking	Drinking	Sex	Marijuana	Conviction
Panel A					
Years with Biological Father	**-0.0100**	**-0.0024**	**-0.0071**	**-0.0048**	**-0.0014**
	(0.0022)	(0.0011)	(0.0017)	(0.0014)	(0.0005)
Impact of Five More Years with Father	-0.050	-0.012	-0.035	-0.024	-0.007
Panel B					
Years with Biological Father	**-0.0107**	-0.0020	**-0.0070**	**-0.0041**	**-0.0012**
	(0.0023)	(0.0011)	(0.0017)	(0.0014)	(0.0004)
Impact of Five More Years with Father	-0.054	-0.010	-0.035	-0.021	-0.006
Panel C					
Years with Biological Father	**-0.0106**	**-0.0025**	**-0.0067**	**-0.0043**	**-0.0007**
	(0.0024)	(0.0011)	(0.0018)	(0.0014)	(0.0003)
Impact of Five More Years with Father	-0.053	-0.012	-0.034	-0.022	-0.003
Sample Size	1751	1904	1841	1914	1880

Heteroskedastic consistent standard errors are in parentheses. Bold coefficients are statistically significant at the 5% level.
All youth outcomes measure participation before age fifteen. 2000 youth sampling weights are used. Panel labels (A-C) indicate the variables included (the variable lists are cumulative, e.g. C includes A and B), see the Data Appendix for more detail.

Table 4. Probit Estimates (Marginal Effects) for Models with Interactions

	Smoking	Drinking	Sex	Marijuana	Conviction
Panel 1: Boys and Girls					
Years with Biological Father	**-0.0110**	**-0.0036**	**-0.0057**	-0.0038	**-0.0007**
	(0.0031)	(0.0014)	(0.0023)	(0.0018)	(0.0004)
Years with Biological Father * Male	0.0009	0.0023	-0.0019	-0.0009	0.0000
	(0.0039)	(0.0018)	(0.0028)	(0.0023)	(0.0005)
P-Value for Joint Significance	0.00	0.03	0.00	0.01	0.02
Impact of Five More Years with Father for:					
Boys	-0.051	-0.006	-0.038	-0.024	-0.003
Girls	-0.055	-0.018	-0.029	-0.019	-0.003
Panel 2: Mother's Education					
Years with Biological Father	-0.0034	-0.0049	-0.0056	-0.0017	-0.0008
	(0.0129)	(0.0062)	(0.0098)	(0.0082)	(0.0012)
Years with Biological Father * Education	-0.0006	0.0002	-0.0001	-0.0002	0.0000
	(0.0011)	(0.0005)	(0.0008)	(0.0007)	(0.0001)
P-Value for Joint Significance	0.00	0.07	0.00	0.01	0.02
Impact of Five More Years with Father if:					
Mother's Education is 12	-0.053	-0.012	-0.033	-0.021	-0.003
Mother's Education is 13	-0.056	-0.011	-0.034	-0.022	-0.003
Sample Size	1751	1904	1841	1914	1880

Heteroskedastic consistent standard errors are in parentheses. Bold coefficients are statistically significant at the 5% level.
All youth outcomes measure participation before age fifteen. 2000 youth sampling weights are used. All Panels also include the variables listed in specification C, see the Data Appendix for more detail.

Table 5. Paternal Presence and Youth Behavior (Marginal Effects)

	Smoking	Drinking	Sex	Marijuana	Conviction
Panel 1					
<100% of Life with Biological Father	**0.1285**	0.0262	**0.0769**	**0.0475**	**0.0092**
	(0.0294)	(0.0141)	(0.0226)	(0.0187)	(0.0043)
Panel 2					
Biological Father is Never Present	**0.1025**	**0.0449**	**0.0797**	**0.0588**	**0.0179**
	(0.0440)	(0.0229)	(0.0332)	(0.0296)	(0.0113)
0<Biological Father Present<5	**0.2144**	0.0253	**0.1467**	**0.0783**	0.0117
	(0.0484)	(0.0245)	(0.0432)	(0.0347)	(0.0089)
5<=Biological Father Present<10	**0.1611**	0.0324	0.0546	0.0563	**0.0138**
	(0.0542)	(0.0285)	(0.0409)	(0.0356)	(0.0104)
10<=Biological Father Present<15	0.0285	0.0066	0.0129	-0.0132	0.0047
	(0.0611)	(0.0305)	(0.0464)	(0.0337)	(0.0091)
Joint Significance of Paternal Presence (P-Value)	0.00	0.24	0.00	0.03	0.08
Panel 3					
Biological Father is Never Present	**0.1002**	**0.0671**	**0.1148**	0.0540	**0.0257**
	(0.0511)	(0.0300)	(0.0400)	(0.0333)	(0.0158)
0<Biological Father Present<5	**0.2116**	0.0501	**0.1924**	**0.0724**	**0.0196**
	(0.0573)	(0.0321)	(0.0523)	(0.0398)	(0.0142)
5<=Biological Father Present<10	**0.1585**	0.0554	**0.0929**	0.0510	**0.0233**
	(0.0604)	(0.0377)	(0.0487)	(0.0394)	(0.0162)
10<=Biological Father Present<15	0.0271	0.0180	0.0304	-0.0155	0.0075
	(0.0620)	(0.0343)	(0.0501)	(0.0338)	(0.0110)
Stepfather Present for Some Period	0.0034	-0.0248	-0.0451	0.0063	-0.0047
	(0.0384)	(0.0155)	(0.0240)	(0.0219)	(0.0031)
Joint Significance of Paternal Presence (P-Value)	0.00	0.11	0.00	0.14	0.05
Sample Size	1751	1904	1841	1914	1880

Heteroskedastic consistent standard errors are in parentheses. Bold coefficients are statistically significant at the 5% level. All youth outcomes measure participation before age fifteen. 2000 youth sampling weights are used. All models also include variable list C. See the Data Appendix for a detailed variable list.

Data Appendix

Specification	Variable Description
A	Years with biological father Race: black and Hispanic (omitted categrory: all other groups) Male Birth order (1=oldest child) Number of children in household Mother's years of education Mother's age at youth's birth 3 SMSA indicators (omitted category: not in an SMSA) 3 Regional Indicators (omitted category: Northeast)
B	Number of children ever born to the youth's mother Mother's immigrant status (=1 if an immigrant) Mother's adjusted AFQT score (see endnote 9) Mother's Mother's education (see endnote 10) Mother's Mother's immigrant status (=1 if an immigrant) Mother lived in the south at age 14 Mother's Father's education (see endnote 10) Mother's Father's immigrant status (=1 if an immigrant) Mother's family structure at age 14 (included categories: live with both parents, live with mother only) Mother's religion in 1979 (included categories: Catholic, Baptist, no religious affiliation) Reading material in mother's household at age 14 (included variables: magazines, newspaper, library card)
C	Mother's average weekly hours of work when child is 0-5 Mother's average weekly hours of work when child is 6-10 Mother's average weekly hours of work when child is 11-15 Average annual family income when child is 0-5 (in $10,000) Average annual family income when child is 6-10 (in $10,000) Average annual family income when child is 11-15 (in $10,000)