Effects of Paternal Presence and Family Instability on Child Cognitive Performance

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Abstract

This study outlines different effects of paternal presence on child cognitive performance by exploiting data from the Fragile Families and Child Wellbeing Study (FFCWS). In addition to incorporating numerous covariates in the model to exploit the richness of the data, the study employs a proxy variable-OLS solution to dealing with the problem of unobserved heterogeneity, where parents' innate ability, values and preferences may be correlated with paternal presence as well as the child's cognitive ability. Paternal presence, defined as a continuous variable, yields no statistically significant effect on the child's cognitive development. However, the study distinguishes between *stability and family structure effects* of paternal presence. The empirical results show that cognitive outcomes are statistically similar for children in stable single-parent and stable two-parent households. However, disruptive family structures, characterized by a father's partial presence in the home, are shown to have adverse effects on cognitive performance compared to the stable single-parent family structure. The profound implication of these findings is the importance of family stability relative to family structure in producing positive child outcomes.

JEL Classifications: J12, J13

I. Introduction

Non-traditional and single-parent family structures are a growing phenomenon in the United States. According to the U.S. Census Bureau Current Population Reports, in 1996, 25.4% of all children under eighteen had only one parent in the household. This figure rose to 27.3% in 2002; during this period, over 80% of single-parent family households were headed by single mothers. The issue therefore remains as to how children are being affected by the growing trend of family structures, in which the father is seldom in residence. This study will examine how paternal presence in the household and stability of the family structure impact the child's cognitive development.

The fundamental identification problem in answering this question is that unobserved characteristics such as parental values, preferences and innate ability are potentially correlated with both paternal presence and child outcomes – a situation which could severely bias the estimated effect of paternal presence (Lang and Zagorsky, (2001) and Painter and Levine, (2000)). The problem can be addressed by including numerous family background and individual covariates to attenuate omitted variable bias and subsequently make causal inferences (Antecol and Bedard, (2007); Lang and Zagorsky (2001); Painter and Levine (2000)). I employ this approach to address the identification problem using data from The Fragile Families and Child Wellbeing Study (FFCWS), which provides very rich data on family structure as well as a plethora of family background, household and individual correlates.

Prior studies have focused on the outcomes of adolescent children and the outcomes of adults who grew up in single-parent households (Antecol and Bedard, (2007); Corak, (2001); Lang and Zagorsky, (2001); Painter and Levine, (2000); Sandefur and Wells, (1997)). However, there is still much to learn about the impact of family structure on outcomes for young children, particularly pre-school aged children. Parental investments during early childhood years may significantly impact the brain development of the child, thus affecting cognitive skills and accordingly, human capital accumulation (Heckman (2000); Ruhm, (2004)). It is therefore imperative to investigate how the family setting affects early cognitive development due to the momentous impact this may potentially have on skills of the future labor force.

The outcome variable used to evaluate cognition is the revised version of the Peabody Picture Vocabulary Test (PPVT-R), as it conveniently serves as a measure of cognitive ability and academic readiness. Unlike Antecol and Bedard (2007) and Lang and Zagorsky (2001), the study finds no statistically significant effects of paternal presence when the indicator is defined as a continuous variable. However, once the model meticulously specifies all family structure types brought about by variations in paternal presence, the *stability effect* is clearly observed. First, the study finds that child cognitive performance within the stable two-parent family structure is not statistically different from performance within the stable single-parent family structure. Second, disruptive family structures, where paternal presence in the household is sporadic, yield more negative outcomes for the child than the stable single-parent household. In general, children of unstable families score 2 to 10 points lower than children of stable single-parent families, depending on the family type. Two-parent families are not shown to necessarily yield better cognitive outcomes than single-parent families and as such, the *family structure effect* is not substantiated by this model. The main implication of these findings is that when it comes to the cognitive development of pre-school aged children, the stability of the family structure is more important than the family structure type.

The paper is organized as follows. Section II provides a brief review of past works that examine the effect of paternal presence in the home. Section III describes a simple theoretical framework from which the model specification was derived. Section IV discusses the econometric issues associated with measuring the effect of paternal presence. Section V gives the data description and descriptive statistics of the variables used in the model. Section VI discusses the OLS regression results and robustness checks; Section VII concludes with a summary of the findings and policy implications.

II. Literature Review

Child outcomes are not only shaped by the genetic endowments of parents, but also the allocation of resources within the household. Parents have genetic endowments such as health and intelligence that are considered heritable and thus, are passed on to children directly (Haveman and Wolfe, (1995); Scott-Jones, (1994)). Therefore, a child will inherit intellectual and health endowments from his/her parents regardless of the family structure. However, parental genetic endowments also affect child outcomes by influencing the level and allocation of resources within the household. Family dissolution ultimately influences the resources devoted to child development. A highly intelligent and healthy father living in the household could significantly increase household income and subsequently the investments of both time and goods devoted to the child (Haveman and Wolfe, (1995)). The mother could also increase her time allocation within the household and her interaction with the child as a result (Scott-Jones, (1994)).

These arguments suggest that paternal absence could have deleterious effects on the cognitive performance of the child. Furthermore, the timing of paternal absence may also have varying effects (Haveman and Wolfe, (1995); Seltzer, (1994)). Using sibling comparisons, studies have shown that children exposed to paternal absence for a longer period of time experience more pronounced negative effects (Ermisch and Francesconi, (2001); Sandefur and Wells, (1997); Sutton-Smith et al., (1968)). However, the assumption must be made that siblings respond to paternal absence in the same way and that parents treat all children equally. There is also the selection problem associated with using sibling comparisons – it limits the analysis sample to families with multiple children (Sigle-Rushton and McLanahan, (2002)).

Other studies examine and exploit the reasons for paternal absence. Divorce for instance, as a cause of paternal absence, is much more endogenous than paternal loss through death (Corak, (2001); Lang and Zagorsky, (2001)). Divorce or separation may be caused by pre-existing factors and consequently, father absence would be endogenous in the model. Paternal absence through death, on the other hand, is arguably more exogenous since it is not expected to be correlated with pre-existing factors[1]. Lang and Zagorsky (2001) exploit the exogenous variation provided by paternal death and concluded that this event decreased the probability of a son being married.

It is traditionally believed that paternal presence in the household yields positive repercussions for family and child outcomes. However, it has been shown that father presence may not be as important as previously thought (Corak, (2001); Lang and Zagorsky, (2001)). Lang and Zagorsky (2001) found that when family background and

[1] If father's death is due to risky lifestyle choices such as dangerous occupations, criminal activities, unhealthy eating or drinking, death is arguably no longer an exogenous event.

individual characteristics were controlled for, there was not much evidence of the positive impact on outcomes that one would expect (with the exception of father's death lowering the chances of the son being married). In particular, paternal absence had only modest effects on child cognitive ability as measured by the Armed Forces Qualification Test (AFQT).

Using a similar methodology however, Antecol and Bedard (2007) buttressed the traditional hypothesis on the importance of father presence, concluding that children were indeed "better off" the longer the biological father lived in the household. They found that an additional 5 years living with a biological father reduced the probability of outcomes such as smoking, drinking, convictions, marijuana use and pre-marital sexual activity.

Recently, there have emerged works that examine the stability of the family structure. Cavanagh and Huston (2006) showed that family instability was strongly associated with teacher and observer reports of child behavioral problems. Fomby and Cherlin (2007) bolstered these findings, noting that multiple family transitions produced more negative developmental outcomes than stable two-parent and even stable single-parent family structures. Similarly, Osborne and McLanahan (2007) concluded that partnership instability moderately contributed to behavioral problems in young children up to three years old.

Cavanagh and Huston (2006) hinted at the importance of unraveling family structure as a dynamic process rather than observing it in its discrete form. Instead of examining paternal presence as a continuous variable with a unique effect, the purpose of this study is to explore the possibility of multiple effects on the child's cognitive development by meticulously detailing all family structure types generated from variability in paternal presence over time.

III. Simple Theoretical Framework

The model is based on the following production function:

$$\mathbf{Y_i = F\ (T_i, P_i, H_i, X_i)} \qquad \mathbf{(1)}$$

where Y denotes the child's PPVT-R score as a measure of child output, T is a vector of variables modeling family structures, P is a vector of parental attributes affecting the productivity of time inputs, H denotes measures of household income and X is a vector of individual and family background covariates affecting performance[2].

The family structures are depicted as a tree diagram, in which the mother's presence is held constant while the father's presence is allowed to vary (see Figure I). Binary variables are created to represent each form of paternal presence. Paternal presence is specified in this way to examine how the stability and presence of a father impact the child's cognition simultaneously. These issues for children in their early developmental stages of learning (pre-school) have yet to be critically analyzed together, and this model specification will allow me to do exactly this.

It should be noted that these measures do not speak to the quality, but rather to the quantity of time the father spends in the home. Nevertheless, we expect that paternal presence (whether through marriage or common-law union) will have a positive impact on child cognitive ability. It is also important to reiterate that if the father is not consistently present in the home, a negative disruptive effect may ensue. The child's

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[2] Leibowitz (1977) employs a similar theoretical framework to show the effect of quality of time inputs on child output measured by the PPVT.

adjustment to untimely paternal shifts into or out of the household could detract from the quality and quantity of interaction time between the parent and the child (Amato and Booth, (1991); Cherlin, (1978); Seltzer, (1994)). In addition, family disruption may cause stress for parents as well as the child, generating parental aggravation and even child behavioral problems (McLanahan, (1985); Sandefur and Wells, (1997); Wu, (1996)).

Parental attributes such as schooling and substance abuse, P, affect time inputs and child cognitive ability and should be extensively controlled for in order to reduce omitted variable bias. In addition, higher household income, H, is assumed to have a positive effect on the child's PPVT-R score because more goods and services that foster educational development can be purchased (Leibowitz, (1977)). Individual and family characteristics X_i, include the child's birth order, sex, race/ethnicity, father figures present in the home and household size. (See Table I for the full list of control variables.)

IV. Econometric Approach

The production function (1) given above can be estimated as:

$$\mathbf{Y_i = \sum_{j=1}^{m} \delta_j T_{ji} + P_i \beta_1 + H_i \beta_2 + X_i \beta_3 + \mu_i + \varepsilon_i} \qquad \textbf{(2)}$$

where Y denotes the child's PPVT-R score and T is the set of *m* family structure types engendered by variability in paternal presence; δ_j shows the effect of different family structures on cognitive performance. Father's time in the household as well as parents' education and income are potentially correlated with time-invariant and unobserved innate ability, parental values and preferences (captured by μ).

Since the Fragile Families dataset includes the Wechsler Adult Intelligence Scale – Revised (WAIS-R[3]) scores for both parents, I argue that these scores can be used as proxy variables for parents' cognitive ability. In addition, the dataset supplies several proxy variables for parental values and preferences (see Table I (section D) for the complete list of proxy variables, Z_i). If these variables are valid proxies for unobserved characteristics, listed above, the OLS estimator, δ, will be arguably unbiased: δ is expected to be upwardly biased if unobserved heterogeneity is not effectively addressed. The methodology of dealing with omitted variable bias in this way is formally known as the *Proxy-Variable OLS Solution* (Wooldridge, (2002) pg. 63-64). I argue that the proxy variables for parental ability, tastes and preferences, Z_i, are valid in that they are *redundant* (i.e. they can be ignored as long as μ and the independent variables are directly controlled for) and once they are accounted for in the model, yield no correlation between μ and the independent variables. Put simply, once Z_i is incorporated into the model, the endogenous variables and Z_i should not be correlated with ε_i.

The reduced-form model becomes:

$$\mathbf{Y_i = \sum_{j=1}^{m} \psi_j\, T_{ji} + P_i\, \alpha_1 + H_i\, \alpha_2 + X_i\, \alpha_3 + Z_i\, \alpha_4 + \nu_i} \qquad \mathbf{(3)}$$

where Z_i represents the proxy variables for innate ability, parental values and preferences usually unmeasured in previous studies.

Prior studies have exploited variation from parental loss through death as well as sibling composition to attenuate omitted variable bias (Lang and Zagorsky, (2001); Sandefur and Wells, (1997)). However, as discussed in section II, using these methods may introduce other sources of bias into the model. Exploiting sibling comparisons, for

[3] The questions are acquired from the Similarities subtest expected to measure verbal concept formation and reasoning abilities (Wechsler, (1981)).

instance, requires the assumption that siblings receive equal parental investments; moreover, the analysis sample is restricted to only those families with multiple children (Sigle-Rushton and McLanahan, (2002)). Paternal death may also be endogenous in the model if death is caused by endogenous factors such as lifestyle and occupational choices. Furthermore, it cannot be used to examine multiple effects of paternal presence.

If the main observed and unobserved characteristics can be directly controlled for in the model using a rich set of control variables along with the proxy-variable OLS solution, then arguably the "true" impact of father's presence on child cognitive performance can be isolated. The FFCWS aptly offers a wealth of data in which once unobserved and unmeasured characteristics can now be directly controlled for in the model. Even though this econometric method is not as elaborate as those employed in previous studies, omitted variable bias will be effectively attenuated without introducing other sources of bias.

V. Data Description

The Fragile Families and Child Wellbeing Study (FFCWS) supplies rich and detailed information on family structure, family characteristics and conditions. It follows a sample of approximately 5,000 children born between 1998 and 2000. Follow-up interviews were conducted at one, three and five years thereafter. For this analysis, I will only use data from the baseline, the one-year and three-year follow-up interviews.

The baseline interviews of both parents occurred shortly after the child was born, when both parents were likely to be present in the hospital for the birth of their child. As a result, the study was able to interview about 75% of all unmarried fathers in the sample – the cohort that is usually under-sampled in many surveys. Moreover, because both parents were interviewed at the baseline, data on missing fathers are also made available through the mother's responses.

i) Description of Variables in the Model

The child outcome that will be examined in this study is the revised version of the Peabody Picture Vocabulary Test (PPVT-R). The PPVT-R has two aims: (1) to test the respondent's receptive vocabulary capabilities for standard English and (2) to test the respondent's verbal ability[4]. The PPVT-R is also often used as a measure of academic readiness for pre-school aged children and hence is salient to examine.

Even though the PPVT-R is useful in measuring English Language proficiency and can even be useful to test respondents with mental and language impediments, one caveat is that it only serves as a reliable indicator of verbal ability for those living in an environment where English is principally spoken. For instance, the PPVT-R scores of Hispanic and Latin-American children in the sample may not be reliable indicators of their cognitive skills. Consequently, the language chiefly spoken in the household must be controlled for (in some form) if the PPVT-R is to accurately measure the verbal ability of these children[5].

For the test, the child has to identify the picture that best describes the noun or the verb spoken by the examiner (Jeruchimowicz et al., (1971)). The PPVT-R is generally administered to individuals over the age of 2.5 years. The data on the PPVT-R are provided in the 36-month In-Home Longitudinal Study of Pre-School Aged Children (a

[4] The PPVT-R is administered by the examiner, selecting a 'picture plate' which shows four different black and white images. The examinee must choose the image that best describes the stimulus word spoken by the examiner. American Guidance Service, Inc.
http://www.state.tn.us/education/ci/cistandards2001/la/cik3assesmentfolder/cik3rapeabodypicture.htm

[5] I include variables indicating whether the mother was interviewed in Spanish as well as parents' region of birth as proxy variables for chief language spoken in the child's household.

module of the FFCWS). As a result, only a single cross-section of the data can be used for the purpose of analysis. This immediately reduces the analysis sample to only 2,368 respondents. The average age of the child at the time the test was administered was approximately 38 months, underscoring the importance of controlling for as many factors influencing the child's cognitive performance as the data will allow.

Table I shows the summary statistics of all the variables included in the model. The outcome measure is the child's PPVT-R standardized score and the independent variables include measures of paternal presence, parental attributes, income, family background, household conditions and proxies for parents' ability, values and preferences. The standardized form of the PPVT-R score was chosen because it adjusts for the mental age-score of each child.

ii) Measures of Paternal Presence

The analysis sample is restricted to those children who live with their mothers all (or most of) the time[6]. This ensures that any disruptive effect from paternal movement is not conflated by the disruptive effect that will possibly ensue from maternal movement into or out of the household. However, this restriction may introduce bias from sample selection because there are idiosyncratic differences between mothers who are primary caregivers and mothers who are not. Nevertheless, the vast majority of mothers in the sample are primary caregivers to the focal child and so we can argue that any selection bias caused by this restriction would be inconsequential. The restriction reduces the

[6] Ideally, I would like to restrict the analysis sample to children living with their mothers all the time. However, in the third-year follow-up interview, the mother is asked if the focal child lives with her "all or most of the time." As a result, all primary caregivers are grouped together despite the implications for instability.

analysis sample from 2,368 respondents to 2,202 respondents. The final sample used for analysis is 1,745 respondents due to missing data for many of the covariates.

The central question needed to derive the family structure types is*: "Has the biological father ever been present in the household?"* From this question, different measures of paternal presence can be determined (See Figure I). From Figure I, we get the following measures:

1) Biological father present in the home since child's birth and married to mother
1) Biological father present in the home since child's birth and cohabits with mother
2) Biological father is no longer present in the home and mother is now married to social father[7]
2) Biological father is no longer present in the home and mother now cohabits with social father
3) Biological father is no longer present in the home and mother is now single
X) Social father is present in the home since child's birth and married to mother
X) Social father is present in the home since child's birth and cohabits with mother
4) Biological father has never been present in the home but the social father is now married to mother
4) Biological father has never been present in the home but the social father is now cohabiting with mother
5) Interim relationships
6) Biological father has been completely absent and mother has been single since child's birth

Since the FFCWS does not ask the mother about a possible social father in the home at the baseline, it cannot be observed whether the social father had been present in the home since the child's birth. Therefore, the two measures associated with the social father's stable presence in the household (X) cannot be directly specified in the model[8].

[7] To simplify the various measures of paternal presence, I define "social father" as a man (who is not the child's biological father) living and romantically involved with the focal child's mother.
[8] These households would likely be captured in measures where the child's father has never been present but the social father is currently present – father's presence can be determined at the baseline while the social father's presence can only be determined in subsequent waves.

I define an interim relationship as a relationship by the mother that initiated and/or dissolved between the baseline and third-year follow-up interviews. Interim relationships could potentially include any of following family transitions:

{father present at birth, absent at one-year follow-up and returns by third-year follow-up; father absent at birth, absent at one-year follow-up and enters the home by the third-year follow-up; father absent at birth, present at one-year follow-up and third-year follow-up; father present at birth, social father present at one-year follow-up and father returns by third-year follow-up; father absent at birth, social father present at one-year follow-up, he then leaves and father enters the home by third-year follow-up; no father present at child's birth, social father present at one-year follow-up and mother is again single by third-year follow-up}

If we assume that the effects of marriage and cohabitation on early cognitive development are not statistically different from each other, these numerous measures can be condensed as follows[9]:

1) Biological father has been present in the home since child's birth *(stable two-parent family structure)*
2) Biological father used to be in the home but the social father is now present *(disruptive two-parent family structure)*
3) Biological father used to be in the home but mother is now single *(disruptive single-parent family structure)*
4) Biological father has never been present in the home but social father is now present *(disruptive two-parent family structure)*
5) Interim relationships *(disruptive family structure)*
6) Biological father has been completely absent and mother has been single since child's birth *(stable single-parent family structure)*

[9] The assumption of no statistical difference between marriage and cohabitation fails if the interpretation of cohabitation varies among the mothers of the sample.

Consequently, the number of family structures specified in equation (3), *m*, is equal to 6. These family structures can be classified as: *stable two-parent*, *stable single-parent*, *disruptive two-parent* and *disruptive single-parent* households.

iii) Descriptive Statistics

The standardized PPVT-R scores range from 40 to 137 points and the mean for children in the analysis sample is about 87 points. This low mean can be attributed to over-sampling of large cities[10] but should not influence the regression estimates. 52% of children lived in stable two-parent households while 21% of children lived with their single-mothers since birth. Moreover, 2% of children had biological fathers who left but have social fathers present in the household by the mother's third-year interview; almost 11% of children had no social father present after their biological father left. By contrast, 6% of the children in the analysis sample never had a biological father living at home but now have a social father present; 8% experienced numerous disruptions caused by interim relationships of the mother. These figures reveal that a large percentage of children had their biological fathers present at least partially; however, a much smaller percentage of children had social fathers to fill the role of the absentee biological father.

Table II-A gives the mean standardized PPVT-R scores for each family structure type. The general score means in Panel A show that children of the stable two-parent family type have higher PPVT-R scores on average than children of stable single-parent or disruptive family structures. This is what we would expect a priori. However, the means also indicate that children of stable single-mother households have higher scores on average than children of unstable households. This lends credence to the theory

[10] These cities include: Austin, TX; Baltimore, MD; Detroit, MI; Milwaukee, WI; Newark, NJ; New York, NY; Oakland, CA; Richmond, VA; San Jose, CA (Reichman et al. (2001)).

postulated by Sandefur and Wells (1997), Wu (1996) and McLanahan (1985) that the stress associated with family disruption creates adverse outcomes for the child. The means also bolster Fomby and Cherlin's (2007) instability hypothesis, which posits that children's developmental outcomes are worse if they experience multiple family transitions as opposed to living in a stable environment. The outcome means insinuate that it is better for a father to be at home all the time than be there intermittently or not at all; it is also better for a father not to be at home at all than to be there intermittently.

The same pattern of results is also clearly evident in Panels B and C where the sample is split by gender in order to observe gender differences in the impacts of paternal presence. The results show that girls have higher average scores in general than boys as expected (Bornstein and Haynes, (1998)).

Table II-B illustrates other independent variables truncated by the following family types: stable two-parent family, disruptive family and the stable single-mother family structure. The most striking characteristic is that predominantly (over 70%), black parents and their children represent the stable single-mother household. White and Hispanic parents largely belong to stable two-parent households, with about 40% of white parents comprising this family type. Parents with at least college education largely constitute the stable two-parent family structure whereas over 25% of parents who were high school dropouts typify the disruptive and stable single-mother family types.

72% of fathers and 39% of mothers of stable two-parent families report they use alcohol – more than any other family type. This is not as surprising as it would appear since most fathers and a large percentage of mothers belonging to other family types also use alcohol. Also not surprising is that the stable two-parent family structure is characterized by older parents at the time of birth and higher household income.

Disruptive family structures, by contrast, typically display the youngest parents, the most residential moves since the child's birth, the shortest dating period before pregnancy and more mothers with mental or emotional problems compared to any other family type. For stable single-mother households, only 42% of children were breastfed, the lowest among all the family types. Parents associated with the stable single-mother household also have the lowest WAIS-R scores and household incomes.

One caveat in relying on these summary statistics is that they may reflect the use of over-sampling by the FFCWS. Observing the race averages indicate that about 53% of mothers and 56% of fathers in the analysis sample are black (49% of mothers and 51% of fathers in the total sample are black). The national average of blacks in the U.S. population is only about 12%[11]. Consequently, over-sampling directly increased the percentage of blacks in the sample. This provides an explanation for why a large percentage of children lived in stable single-parent households and only a small percentage had social fathers in the sample. Black children are less likely to have a father present in the household than any other racial or ethnic group. Subsequently, the means in Table I will be skewed by the use of over-sampling but this should not bias the regression estimators. In fact, it makes for a policy-relevant sample, where the results will yield direct implications for social policy.

[11] U.S. Census Bureau, Census (2000).

VI. Results

Table III presents estimates from a specification similar to those in columns (1) and (2) of *Tables 3 and 4* in Lang and Zagorsky (2001). They use the National Longitudinal Survey of Youth (NLSY) to examine how a parent's absence during childhood affects outcomes in adulthood. I define father's presence as the fraction of time the father has been living with the child, constructed as the total number of years the biological father has spent living with the child divided by the child's age. Column (1) indicates that as father presence increases from 0 to 1, the child's standardized PPVT-R score increases by 5.5 points when only region-of-birth and interview-year dummies are incorporated in the model. However, when similar control variables to Lang and Zagorsky (2001) are included in Column (2), the impact of the fraction of time a father is present in the household is no longer statistically significant, with the point estimate falling to about 0.8 points. Father's presence has a larger positive impact on girls' than boys' PPVT-R scores in the simple regression model; however, the effect dissipates for both boys and girls once the relevant control variables are included, challenging the statistically significant, albeit modest effects found by Lang and Zagorsky (2001).

However, if the effect of paternal presence varies by family structure type, then the small and statistically insignificant results displayed in Table III should not be surprising. Multiple effects subsumed in a single measure become conflated and thus yield a statistically insignificant estimate.

Table IV displays the results when the effect of paternal presence is allowed to vary by family structure. Column set (A) are regressions including only region-of-birth and interview-year dummies. Standardized PPVT-R scores are higher by 3 to 4 points for children of stable two-parent families relative to children of stable single-parent families. In addition, the stable single-parent family structure generates higher scores (by 1 to 8 points) than if the father or social father was present for only a partial period. These results underscore the implications derived from the outcome means in Table II-A and lend credence to the instability and stress hypotheses posited by Fomby and Cherlin (2007) and Sandefur and Wells (1997).

When exogenous variables (listed in Table I) are included in the model in column set (B), the effect of a father's stable presence is no longer statistically different from the effect of his stable absence. The negative effect caused by family disruption is still apparent, nevertheless. In the instance where the biological father has left and the social father is now living in the household, the child is at about a 10-point disadvantage; similarly, where the father was never present but the social father is currently present, the child's PPVT-R score is about 4 points lower than in the stable single-parent case.

Unobserved heterogeneity is expected to upwardly bias the father presence coefficients. Therefore, column set (D) includes proxy variables (listed in section D of Table I) for parental values, preferences and ability. When these proxy variables are included in the model, the coefficients measuring the father presence effects become more negative (except for when *father was never present but the social father is now present*) than the coefficients in column (C), where all independent variables except the proxy variables for unobserved characteristics are accounted for. Column set (D) shows that family disruption lowers the child's test scores between 2 and 10 points relative to the stable single-parent case. The negative coefficient on *father is no longer present but social father is now present* has the largest magnitude 'across the board' of any disruptive family structure defined. However, this family type also represents the fewest number of families (27 in total) compared to the other family types and as such, the large magnitude may just be a reflection of this small sample. Test scores when the father is completely present remains statistically similar to test scores when the father is completely absent, and thus the stability effect holds. What is also interesting is that family structures with two parents do not necessarily yield better outcomes than those with one parent. In particular, disruptive two-parent family structures adversely affect child cognitive performance relative to the stable single-parent household. Consequently, the family structure effect is not confirmed by these findings.

Tables V and VI indicate that in the naïve model, girls experience higher scores than boys when their fathers are completely present as opposed to completely absent. This is consistent with the outcome means discussed in the previous section. However, when the full set of variables are incorporated in the model, these gender differences are not as convincing. The disruptive effect seems to be a bit more pronounced for girls than boys in general when the father is present for only a partial period. Depending on the family type, boys living in unstable households score between 2 and 8 points lower than boys in stable single-mother households and girls living in disruptive households score between 1 and 14 points lower than girls living in stable single-mother households. These estimates are however, largely statistically insignificant.

The only statistically significant estimate belongs to the disruptive family structure in which the child's biological father has left and the social father has entered the household. Boys living in this family setting score almost 8 points lower than boys in stable single-mother households; similarly, girls belonging to this family type score about

13 points lower than girls living in stable single-mother households. This provides some, albeit weak evidence that during early childhood years, girls may in fact suffer more due to family disruption than boys. The stability effect on cognitive ability remains clearly evident since there is no statistical difference when the child lives in a stable two-parent home as opposed to a stable single-parent one.

i) The Resource Effect

An unusual feature of this model is the small mediating effect of resources in the child's household. The resource effect is captured by household income per person and shows that for an increase of $1000, the child's PPVT-R standardized score improves by 0.08 points (results not shown). This estimate is statistically significant at the 10% level but its small magnitude (about 0.5% of the standard deviation of the PPVT-R standardized scores) suggests that the resource effect is surprisingly not very important in this model. Nevertheless, its inclusion bears a strong implication for consistency of the family structure estimators. Column set (E) in Table IV shows that when the resource effect is unaccounted for, the estimated effect of each family structure type gets smaller (except for the family type in which the father is no longer present but the social father is)[12], indicating upward bias. This reinforces the importance of controlling for as many factors as possible that concurrently influence child cognitive ability and family structure, thus ensuring unbiased estimators.

ii) Robustness Checks

As stated in the previous section, some large cities were over-sampled. Over-sampled cities provided about 325 births per city towards the sample instead of the usual

[12] This family type includes only 27 observations compared to the other family types, which each have at least 100 observations.

100 births contributed by other cities. As long as over-sampling is based on exogenous variables, this sampling method should not pose a problem for OLS, except when parameter heterogeneity exists across strata (Deaton, (1997); Jurajda, (2007)). Since racial/ethnic minority groups were primarily over-sampled by the FFCWS, OLS estimators should not be affected. Nevertheless, over-sampling may affect the generality of the findings. As a consequence, I generate weighted estimators using national sampling weights from the FFCWS. The results in Table VII column set (B) show that the signs of the coefficients on the disruptive family types remain the same as in the un-weighted case and the magnitudes do not change significantly[13].

The identification strategy employed also does not address heterogeneous family treatment effects. Despite mitigating unobserved heterogeneity, my methodology treats all families as identical except for time of paternal exit from or entry into the household. It is salient to note that two families can be identical based on observables at the time of the test despite one father's exit from his family. By controlling for conditions preceding the father's exit from or social father's entrance into the household, families can be distinguished from each other beyond just the look of their present family structure. I incorporate in the full regression mother's education since child's birth, parents' alcohol and drug use for all three waves, household income over all three waves and average number of adults and children in the household over all three waves. Again, the results corroborate the main findings of this study.

[13] The coefficient on stable paternal presence is now negative and statistically significant at the 1% level, indicating that the stable two-parent household yields worse cognitive outcomes than the stable single-mother household. This result corroborates the findings of Finlay and Neumark (2008) that Hispanic children are indeed better off in stable single-mother households. However, it should be noted that un-weighted estimators are more efficient than weighted estimators when over-sampling is based on exogenous variables and the generalized conditional information matrix equality holds (Wooldridge, (1999) and Wooldridge, (2002)).

VII. Summary

This paper adds to the literature by utilizing rich, policy-relevant data to examine the various effects of paternal presence and family instability on child cognitive development. The results show that when an exhaustive set of control and proxy variables are incorporated in the model, the pre-school aged child is not necessarily better off when the father is home all the time as opposed to never being home but he/she is certainly better off when the father is never home as opposed to being home on a temporary basis. The study was therefore unable to reject the conventional hypothesis that stable paternal presence yields better cognitive outcomes than stable paternal absence.

The findings of Cavanagh and Huston (2006), Osborne and McLanahan (2007) and Fomby and Cherlin (2007) are endorsed by this study since a father's partial presence in the home stunts cognitive development relative to when he is not living in the household at all. The study also adds to this literature by reinforcing the stability effect: there is no statistical difference between the stable single-parent household and the stable two-parent household when it comes to child cognitive development; for children of disruptive family structures, their PPVT-R scores are lower by 2 – 10 points relative to children of stable single-parent households, depending on the family type. On the other hand, the family structure effect is not supported by these results since disruptive two-parent households are found to be worse than stable single-parent households as it pertains to child cognitive performance.

If the proxy-variable OLS solution and extensive covariates sufficiently attenuate unobserved heterogeneity, the causal relationship between paternal presence and child cognitive performance is only apparent in the stability the father generates within the family setting. Paternal presence improves cognitive development through the stability of family structure – any type of paternal presence will not necessarily engender positive results for the child. The stress hypothesis postulated by Sandefur and Wells (1997), Wu (1996) and McLanahan (1985) gives us some insight as to why this might be the case: disruptive family structures produce negative outcomes due to the stress and anxiety that accompany each transition. The study was not able to determine whether more family transitions yielded more adverse effects on early cognitive development.

Moreover, the findings of Lang and Zagorsky (2001) and Antecol and Bedard (2007) are not reinforced by this study – the child does not seem to be better off as the father's length of residence increases. However, it is important to note that I cannot predict how the child would adjust to his/her family transitions over the course of his/her life. Since, the subjects of study are pre-school aged children (average age is 38 months), it cannot be determined whether the negative effects of family dissolution are short-lived or are improved over time. The child may be able to adjust to his/her family structure as time progresses but this clearly goes beyond the scope of this paper. Further, these effects may not extend to other child outcomes such as behavioral problems or substance abuse. Future research may study this in more rigorous detail.

The main policy implication of the findings is the importance of encouraging family stability, as this should help improve the cognitive development of the children affected. There may also be implications for children parented by same-sex couples. If paternal presence only improves child cognitive performance through the stability of the family structure, it is quite possible that same-sex parents within a stable household may engender similar positive cognitive outcomes for their children as well.

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Table I. Summary Statistics

	Observations	Mean	Std. Deviation	Min	Max
PPVT-R Standardized Score	1745	86.60	16.69	40	137
A: Father Presence Measures (from Figure I)					
1) Father Present since Child's Birth	1745	0.52	0.50	0	1
2) Father is no longer present but Social Father is now present	1745	0.02	0.12	0	1
3) Father is no longer present and Mother is now single	1745	0.11	0.32	0	1
4) Father has never been present but Social Father is now present	1745	0.06	0.25	0	1
5) Interim Relationships	1745	0.08	0.28	0	1
6) Father Absent since Child's Birth	1745	0.21	0.41	0	1
B: Exogenous Control Variables					
Birth Order	1745	2.15	1.34	1	13
Male	1745	0.52	0.50	0	1
Mother Black	1745	0.53	0.50	0	1
Mother Hispanic	1745	0.20	0.40	0	1
Mother White	1745	0.31	0.46	0	1
Mother interviewed in Spanish	1745	0.03	0.18	0	1
Father Black	1745	0.56	0.50	0	1
Father Hispanic	1745	0.21	0.40	0	1
Father White	1745	0.56	0.50	0	1
C: Other Independent Variables					
Mother has some high school	1745	0.28	0.45	0	1
Mother has high school degree	1745	0.32	0.47	0	1
Mother has some college	1745	0.23	0.42	0	1

Mother has college degree and beyond	1745	0.12	0.32	0	1
Father has some high school	1745	0.24	0.43	0	1
Father has high school degree	1745	0.36	0.48	0	1
Father has some college	1745	0.19	0.39	0	1
Father has college degree and beyond	1745	0.10	0.30	0	1
Father smokes	1745	0.40	0.49	0	1
Father smokes (missing)	1745	0.15	0.36	0	1
Father uses alcohol	1745	0.65	0.48	0	1
Father uses alcohol (missing)	1745	0.23	0.42	0	1
Mother smokes in 2nd wave	1745	0.28	0.45	0	1
Mother uses alcohol in 2nd wave	1745	0.35	0.48	0	1
Mother's age at child's birth	1745	24.97	5.93	14	44
Father's age at child's birth	1745	27.40	7.06	16	67
Mother has mental or emotional problems[1]	1745	0.05	0.22	0	1
Father has mental or emotional problems	1745	0.02	0.14	0	1
Other father figures present[2]	1745	0.09	0.29	0	1
Household Income/person[3]	1745	6995.17	10271.37	0	100000
Household Income/person (missing)	1745	0.08	0.28	0	1
Residential Instability	1745	1.23	1.40	0	14
Child was Breastfed	1745	0.56	0.50	0	1
D: Proxies (Z_i)					
Mother’s WAIS-R[4] score	1745	7.05	2.54	0	15
Father’s WAIS-R score	1745	6.71	2.60	0	15
Paternal Importance[5]	1745	1.09	0.16	1	3
Either parent reports Parental Aggravation	1745	0.22	0.42	0	1
Religiosity	1745	4.27	1.56	0	7
Mother thought of having Abortion	1745	0.28	0.45	0	1

[1] The parent is characterized as having mental or emotional problems if he/she is taking medications for mental illnesses such as anxiety, depression or ADD
[2] Other father figures present in the home are defined as all men over eighteen living in the child’s household aside from the male spouse/partner.
[3] Household Income/person - third wave household income divided by household size
[4] WAIS-R – Wechsler Adult Intelligence Scale-Revised
[5] Index reflecting the mother’s evaluation of the importance of the father’s involvement in the upbringing of the child

Father suggested Abortion	1745	0.09	0.28	0	1
Child will *not* have Father's Last Name	1745	0.12	0.33	0	1
Father's Name is *not* on Birth Certificate	1745	0.07	0.25	0	1
Father did *not* visit Mother in Hospital for Child's Birth	1745	0.13	0.33	0	1
Length of time you knew Father before Pregnancy	1745	4.77	4.51	0	36

Data: FFCWS

Table II-A. Comparison of the Standardized PPVT-R Score by Family Structure

	Observations	**Mean**	Std. Deviation	Min	Max
Panel A: Boys and Girls					
1) Father Present since Child's Birth	903	**89**	17	40	137
2) Father is no longer present but Social Father is now present	27	**78**	14	40	105
3) Father is no longer present and Mother is now single	196	**84**	16	40	125
4) Father has never been present but Social Father is now present	113	**82**	16	40	110
5) Interim Relationships	145	**83**	16	40	118
6) Father Absent since Child's Birth	361	**85**	15	40	119
Panel B: Boys					
1) Father Present since Child's Birth	457	**88**	17	40	137
2) Father is no longer present but Social Father is now present	14	**79**	11	63	99
3) Father is no longer present and Mother is now single	103	**82**	17	40	117
4) Father has never been present but Social Father is now present	62	**82**	15	40	108
5) Interim Relationships	78	**83**	15	40	118
6) Father Absent since Child's Birth	195	**84**	17	40	119
Panel C: Girls					
1) Father Present since Child's Birth	446	**90**	17	40	130
2) Father is no longer present but Social Father is now present	13	**77**	18	40	105
3) Father is no longer present and Mother is now single	93	**87**	15	40	125
4) Father has never been present but Social Father is now present	51	**82**	16	43	110
5) Interim Relationships	67	**84**	17	40	117
6) Father Absent since Child's Birth	166	**86**	14	40	117

Data: FFCWS

Table II-B. Summary Statistics of Independent Variables by Family Type

	Stable Father Presence N=903		Unstable Father Presence N=481		Stable Father Absence N=361	
Birth Order	2.12	(1.27)	2.21	(1.46)	2.12	(1.34)
Male	0.51	(0.50)	0.53	(0.50)	0.54	(0.50)
Mother Black	0.38	(0.49)	0.66	(0.47)	0.73	(0.44)
Mother Hispanic	0.24	(0.43)	0.16	(0.37)	0.15	(0.36)
Mother White	0.42	(0.49)	0.22	(0.41)	0.16	(0.37)
Mother Speaks Spanish	0.05	(0.22)	0.02	(0.13)	0.02	(0.13)
Father Black	0.41	(0.49)	0.67	(0.47)	0.78	(0.41)
Father Hispanic	0.24	(0.43)	0.18	(0.38)	0.16	(0.36)
Father White	0.40	(0.49)	0.19	(0.39)	0.12	(0.32)
Mother has some high school	0.21	(0.41)	0.36	(0.48)	0.35	(0.48)
Mother has high school degree	0.29	(0.45)	0.35	(0.48)	0.35	(0.48)
Mother has some college	0.25	(0.43)	0.21	(0.41)	0.21	(0.41)
Mother has college degree and beyond	0.20	(0.40)	0.03	(0.17)	0.03	(0.16)
Father has some high school	0.20	(0.40)	0.31	(0.46)	0.25	(0.43)
Father has high school degree	0.29	(0.45)	0.43	(0.50)	0.43	(0.50)
Father has some college	0.22	(0.42)	0.13	(0.34)	0.17	(0.38)
Father has college degree and beyond	0.17	(0.38)	0.02	(0.16)	0.02	(0.14)
Father smokes	0.37	(0.48)	0.49	(0.50)	0.36	(0.48)
Father smokes (missing)	0.09	(0.28)	0.18	(0.39)	0.29	(0.45)
Father uses alcohol	0.72	(0.45)	0.62	(0.49)	0.50	(0.50)
Father uses alcohol (missing)	0.13	(0.33)	0.28	(0.45)	0.40	(0.49)
Mother smokes in 2nd wave	0.23	(0.42)	0.34	(0.47)	0.34	(0.47)
Mother uses alcohol in 2nd wave	0.39	(0.49)	0.35	(0.48)	0.26	(0.44)
Mother's age at child's birth	26.61	(6.12)	22.94	(5.00)	23.59	(5.37)
Father's age at child's birth	29.02	(7.00)	25.43	(6.17)	25.96	(7.33)
Mother has mental or emotional problems	0.04	(0.21)	0.07	(0.26)	0.04	(0.20)
Father has mental or emotional problems	0.02	(0.14)	0.02	(0.14)	0.02	(0.13)

Other father figures present	0.07	(0.25)	0.11	(0.31)	0.13	(0.33)
Household Income/person	9447.91	(12084.68)	4740.25	(7746.73)	3864.39	(5784.06)
Household Income/person (missing)	0.08	(0.27)	0.08	(0.28)	0.09	(0.29)
Residential Instability	0.94	(1.11)	1.69	(1.72)	1.33	(1.39)
Child was Breastfed	0.65	(0.48)	0.48	(0.50)	0.42	(0.49)
Mother's WAIS Score	7.34	(2.60)	6.90	(2.39)	6.52	(2.50)
Father's WAIS Score	6.94	(2.69)	6.55	(2.56)	6.34	(2.38)
Paternal Importance	1.08	(0.13)	1.10	(0.18)	1.11	(0.21)
Either Parent reports Parental Aggravation	0.23	(0.42)	0.21	(0.41)	0.22	(0.42)
Religiosity	4.22	(1.53)	4.32	(1.59)	4.31	(1.58)
Mother thought about Abortion	0.20	(0.40)	0.35	(0.48)	0.41	(0.49)
Father suggested Abortion	0.05	(0.22)	0.11	(0.32)	0.14	(0.34)
Child will not have Father’s Last Name	0.05	(0.21)	0.16	(0.37)	0.26	(0.44)
Father’s Name is not on Birth Certificate	0.03	(0.17)	0.10	(0.31)	0.12	(0.33)
Father did not visit Mother in Hospital for Child’s Birth	0.04	(0.19)	0.17	(0.37)	0.29	(0.45)
Length of time you knew Father before Pregnancy	5.50	(4.66)	3.92	(4.39)	4.06	(3.92)

Data: FFCWS.
Standard deviations are in parentheses.

Table III. Replication of Columns (1) & (2) of *Tables 3 & 4* of Lang and Zagorsky (2001)

	Boys & Girls		Boys		Girls	
	(1)	(2)	(3)	(4)	(5)	(6)
Lang & Zagorsky (2001)	-	-	***8.94***	***3.26***	***9.89***	***2.56***
			(0.96)	***(0.83)***	***(0.79)***	***(0.75)***
Child lives with mother all the time	2.456	1.771	1.420	1.245	4.118	3.015
	(2.157)	(2.067)	(2.711)	(2.703)	(3.469)	(3.089)
Fraction of time father is present	***5.450***	0.747	***4.089***	0.724	***6.727***	0.651
	(0.776)	(0.863)	***(1.108)***	(1.254)	***(1.078)***	(1.196)
Number of children in the household		-0.214		0.142		-0.484
		(0.264)		(0.397)		(0.358)
Mother Black		***-4.977***		***-6.082***		*-3.579*
		(1.454)		***(2.250)***		*(1.856)*
Mother Hispanic		***-3.307***		-3.467		*-3.128*
		(1.274)		(2.031)		*(1.608)*
Father Black		***-3.829***		-2.358		***-5.814***
		(1.491)		(2.339)		***(1.853)***
Father Hispanic		**-2.747**		-1.33		***-4.471***
		(1.331)		(2.158)		***(1.684)***
Mother's age at child's birth		0.040		-0.063		0.159
		(0.096)		(0.141)		(0.131)
Father's age at child's birth		-0.091		-0.061		-0.139
		(0.072)		(0.112)		(0.092)
Father uses alcohol		-0.668		-1.486		0.499
		(1.197)		(1.748)		(1.631)
Father uses alcohol (missing)		-0.205		-0.115		-0.142
		(1.263)		(1.807)		(1.760)
Mother uses alcohol (2^{nd} wave)		***3.008***		**2.552**		***3.325***
		(0.734)		**(1.076)**		***(0.984)***
Mother has some high school		0.060		0.110		-0.365
		(0.830)		(1.148)		(1.227)
Mother has some college		***3.996***		***3.717***		***4.081***
		(0.961)		***(1.148)***		***(1.270)***
Mother has college degree and beyond		***10.772***		***10.439***		***11.659***
		(1.609)		***(2.444)***		***(1.949)***
Father has some high school		**-1.676**		-1.341		-1.902
		(0.835)		(1.137)		(1.267)
Father has some college		*1.787*		2.139		1.448
		(0.987)		(1.430)		(1.387)
Father has college degree and beyond		*2.966*		3.038		2.579
		(1.653)		(2.590)		(1.964)
R_Squared	0.05	0.18	0.03	0.14	0.08	0.26
Observations	2171	2171	1129	1129	1042	1042

Data: FFCWS. *Italics,* **bold** and ***bold-italics*** denote statistical significance at the 10%, 5% and 1% levels respectively. Robust standard errors are in parentheses. All regressions include interview-year and region-of-birth dummies.

Table IV. Estimated Effects of Paternal Presence on Peabody Picture Vocabulary Test (PPVT-R) Scores

	A[1] No Controls		**B**[2] Exogenous Controls Only		**C**[3] No Proxy Variables		**D**[4] All Variables		**E**[5] Without H. Income	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1) Father present since child's birth	***3.946***	***3.393***	0.477	0.205	-1.244	-1.510	-1.171	-1.403	-1.075	-1.314
	(1.010)	***(0.998)***	(1.020)	(1.014)	(1.062)	(1.057)	(1.105)	(1.103)	(1.106)	(1.104)
2) Father is no longer present but Social Father is now present	***-7.868***	***-7.773***	***-10.346***	***-10.410***	***-8.666***	***-8.762***	***-9.880***	***-9.939***	***-9.918***	***-9.969***
	(2.844)	***(2.830)***	***(2.815)***	***(2.785)***	***(2.767)***	***(2.751)***	***(2.897)***	***(2.892)***	***(2.909)***	***(2.904)***
3) Father is no longer present and Mother is now single	-0.955	-1.038	-1.831	-1.920	-2.186	*-2.296*	**-2.693**	**-2.830**	*-2.619*	**-2.763**
	(1.433)	(1.422)	(1.349)	(1.348)	(1.346)	*(1.345)*	**(1.375)**	**(1.374)**	*(1.372)*	**(1.372)**
4) Father has never been present but Social Father is now present	**-3.444**	**-3.289**	**-3.988**	**-3.932**	**-3.957**	**-3.956**	**-3.480**	**-3.465**	**-3.402**	**-3.392**
	(1.689)	**(1.681)**	**(1.708)**	**(1.703)**	**(1.691)**	**(1.684)**	**(1.660)**	**(1.650)**	**(1.667)**	**(1.657)**
5) Interim Relationships	-1.664	-1.906	-2.390	-2.425	*-2.501*	*-2.635*	*-2.489*	*-2.603*	-2.415	*-2.534*
	(1.559)	(1.557)	(1.503)	(1.495)	*(1.497)*	*(1.494)*	*(1.499)*	*(1.494)*	(1.499)	*(1.495)*
Parents' Region of Birth	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
R-Squared	0.05	0.03	0.15	0.15	0.22	0.22	0.24	0.23	0.24	0.23
Observations	1745	1745	1745	1745	1745	1745	1745	1745	1745	1745

Data: FFCWS. *Italics*, **bold** and ***bold-italics*** denote statistical significance at the 10%, 5% and 1% levels respectively.
All regressions include interview-year dummies. Robust standard errors are in parentheses. Father's complete absence since child's birth (6) is the excluded category. Full regression results are available upon request.

[1] Regressions include no control variables listed in the Table I summary statistics but control for parents' region of birth in column (1).
[2] Regressions include only the control variables listed in section *B* of Table I summary statistics.
[3] Regressions include only the control variables listed in sections *B* and *C* of Table I summary statistics.
[4] Regressions include all the control variables listed in sections *B*, *C* and *D* of Table I summary statistics.
[5] Regressions include all the control variables listed in sections B, C and D of Table I summary statistics, except household income.

Table V. Estimated Effects of Paternal Presence on Boys' Peabody Picture Vocabulary Test (PPVT-R) Scores

	A[1] No Controls		**B**[2] Exogenous Controls Only		**C**[3] No Proxy Variables		**D**[4] All Variables	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1) Father present since child's birth	**3.121**	*2.681*	0.327	0.205	-0.626	-0.844	-0.135	-0.241
	(1.502)	*(1.462)*	(1.500)	(1.471)	(1.615)	(1.593)	(1.672)	(1.660)
2) Father is no longer present but Social Father is now present	**-6.124**	*-5.981*	**-8.617**	**-8.695**	**-6.836**	**-6.874**	**-7.470**	**-7.554**
	(3.103)	*(3.078)*	**(3.441)**	**(3.413)**	**(3.058)**	**(3.046)**	**(3.174)**	**(3.157)**
3) Father is no longer present and Mother is now single	-2.148	-2.327	-2.779	-2.853	-3.289	*-3.317*	-3.204	-3.226
	(2.107)	(2.082)	(1.985)	(1.971)	(2.008)	*(1.990)*	(2.073)	(2.060)
4) Father has never been present but Social Father is now present	-2.624	-2.401	-3.277	-3.198	-3.414	-3.276	-2.653	-2.590
	(2.310)	(2.293)	(2.343)	(2.335)	(2.311)	(2.292)	(2.336)	(2.323)
5) Interim Relationships	-1.909	-1.857	-1.911	-1.703	-2.546	-2.373	-2.592	-2.357
	(2.104)	(2.081)	(2.082)	(2.055)	(2.060)	(2.042)	(2.046)	(2.039)
Parents' Region of Birth	Yes	No	Yes	No	Yes	No	Yes	No
R-Squared	0.05	0.03	0.14	0.13	0.20	0.19	0.23	0.22
Observations	909	909	909	909	909	909	909	909

Data: FFCWS. *Italics,* **bold** and ***bold-italics*** denote statistical significance at the 10%, 5% and 1% levels respectively.
All regressions include interview-year dummies. Robust standard errors are in parentheses. Father's complete absence since child's birth (6) is the excluded category. Full regression results are available upon request.

[1] Regressions include no control variables listed in the Table I summary statistics but control for parents' region of birth in column (1).
[2] Regressions include only the control variables listed in section *B* of Table I summary statistics.
[3] Regressions include only the control variables listed in sections *B* and *C* of Table I summary statistics.
[4] Regressions include all the control variables listed in sections *B*, *C* and *D* of Table I summary statistics.

Table VI. Estimated Effects of Paternal Presence on Girls' Peabody Picture Vocabulary Test (PPVT-R) Scores

	A[1] No Controls		**B**[2] Exogenous Controls Only		**C**[3] No Proxy Variables		**D**[4] All Variables	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1) Father present since child's birth	***4.748***	***3.932***	0.837	0.259	-1.718	*-2.354*	-2.072	*-2.655*
	(1.328)	***(1.331)***	(1.398)	(1.409)	(1.416)	*(1.431)*	(1.465)	*(1.479)*
2) Father is no longer present but Social Father is now present	**-10.105**	**-9.612**	***-12.145***	***-11.611***	**-10.925**	**-10.579**	***-13.111***	***-12.824***
	(5.002)	**(4.900)**	***(4.493)***	***(4.412)***	**(4.838)**	**(4.801)**	***(4.876)***	***(4.861)***
3) Father is no longer present and Mother is now single	0.480	0.299	-0.425	-0.685	-0.347	-0.980	-1.105	-1.774
	(1.875)	(1.886)	(1.791)	(1.822)	(1.734)	(1.779)	(1.760)	(1.801)
4) Father has never been present but Social Father is now present	*-4.558*	*-4.412*	**-5.000**	*-4.765*	*-4.226*	*-4.173*	-3.367	-3.229
	(2.508)	*(2.489)*	**(2.538)**	*(2.517)*	*(2.520)*	*(2.498)*	(2.434)	(2.403)
5) Interim Relationships	-1.600	-2.128	-2.820	-2.979	-1.988	-2.485	-1.869	-2.369
	(2.328)	(2.356)	(2.225)	(2.231)	(2.323)	(2.317)	(2.358)	(2.343)
Parents' Region of Birth	Yes	No	Yes	No	Yes	No	Yes	No
R-Squared	0.09	0.04	0.20	0.17	0.30	0.27	0.32	0.28
Observations	836	836	836	836	836	836	836	836

Data: FFCWS. *Italics,* **bold** and ***bold-italics*** denote statistical significance at the 10%, 5% and 1% levels respectively.
All regressions include interview-year dummies. Robust standard errors are in parentheses. Father's complete absence since child's birth (6) is the excluded category. Full regression results are available upon request.

[1] Regressions include no control variables listed in the Table I summary statistics but control for parents' region of birth in column (1).
[2] Regressions include only the control variables listed in section *B* of Table I summary statistics.
[3] Regressions include only the control variables listed in sections *B* and *C* of Table I summary statistics.
[4] Regressions include all the control variables listed in sections *B*, *C* and *D* of Table I summary statistics.

Table VII. Robustness Checks

	A[1] Full Regressions (1)	(2)	**B**[2] Using National Weights (3)	(4)	**C**[3] Preceding Conditions (5)	(6)
1) Father present since child's birth	-1.403	-1.171	***-3.791***	***-4.433***	0.277	0.253
	(1.103)	(1.105)	***(1.386)***	***(1.391)***	(1.886)	(1.89)
2) Father is *no longer present* but Social father is now present	***-9.939***	***-9.880***	***-13.720***	***-14.350***	**-9.787**	**-9.923**
	(2.892)	***(2.897)***	***(4.033)***	***(4.023)***	**(3.943)**	**(3.960)**
3) Father is *no longer present* and Mother is now single	**-2.830**	**-2.693**	-1.053	-1.410	-1.726	-1.572
	(1.374)	**(1.375)**	(1.699)	(1.693)	(1.706)	(1.714)
4) Father has *never been present but* Social father is now present	**-3.465**	**-3.480**	-1.590	-2.590	-4.012	-4.022
	(1.650)	**(1.660)**	(2.078)	(2.079)	(2.614)	(2.616)
5) Interim Relationships	*-2.603*	*-2.489*	**-3.917**	**-4.409**	***-7.749***	***-7.723***
	(1.494)	*(1.499)*	**(1.871)**	**(1.871)**	***(2.771)***	***(2.782)***
Region of Birth	No	Yes	No	Yes	No	Yes
R-Squared	0.23	0.24	0.32	0.33	0.24	0.24
Observations	1735	1735	1253	1253	1198	1198

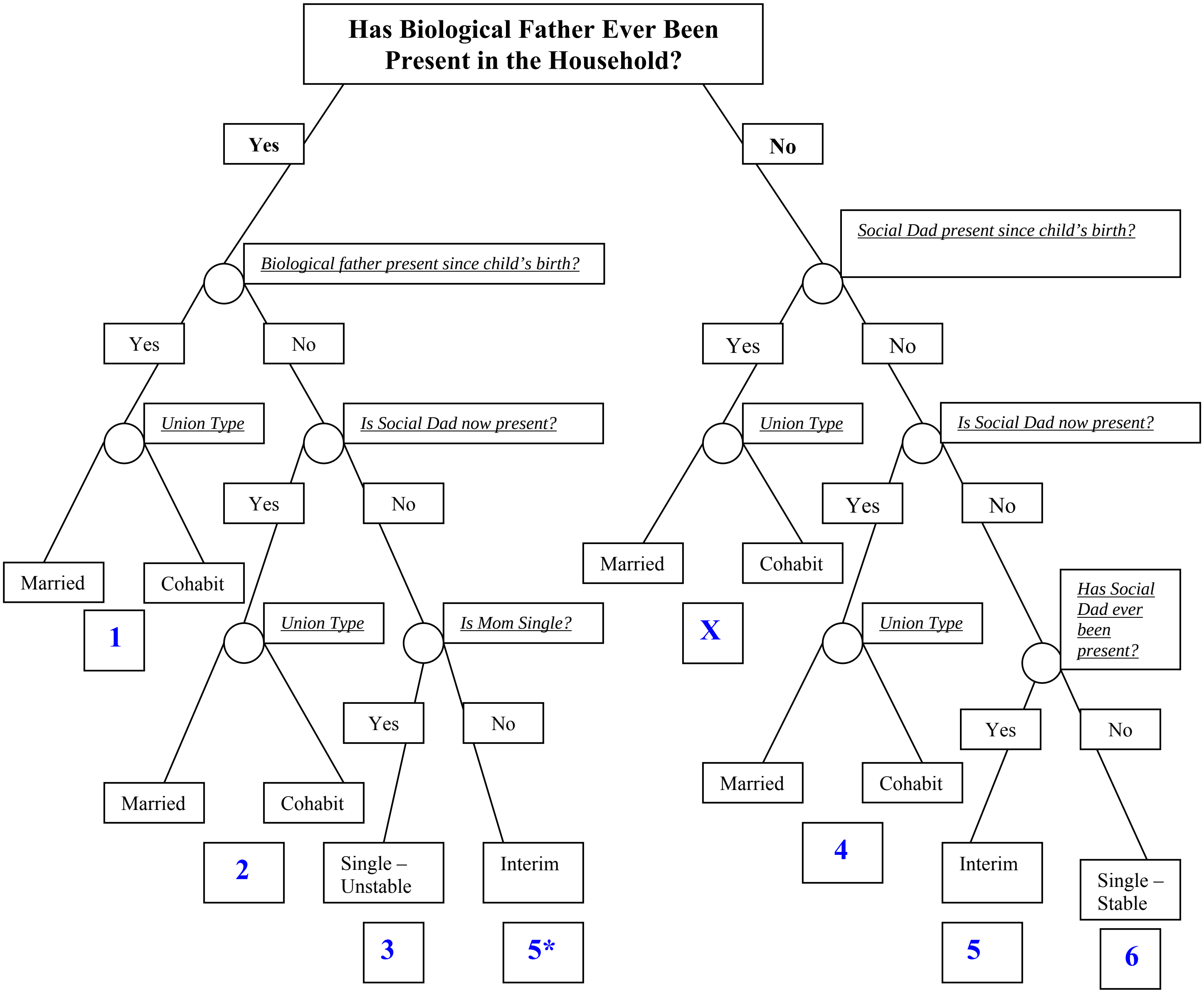
Data: FFCWS. *Italics,* **bold** and ***bold-italics*** denote statistical significance at the 10%, 5% and 1% levels respectively.
All regressions include year dummies. Robust standard errors are in parentheses. Father's complete absence since child's birth (6) is the excluded category. Full regression results are available upon request.

[1] Regressions include all the control variables listed in sections *B*, *C* and *D* of Table I summary statistics. The results are the same as Table IV column set (D) results.
[2] Regressions include all the control variables listed in sections *B*, *C* and *D* of Table I summary statistics; data are weighted using national sampling weights.
[3] Regressions include all the control variables listed in sections *B*, *C* and *D* of Table I summary statistics as well as mother's education since child's birth, parents' drug use over all three waves, the average number of adults and children in the household over all three waves and household income over all three waves.

Appendix

Constructed Variables	***Definition***
1) Fraction of time Father is Present	The total number of years father has spent living with the child divided by age of the child.
2) Household Income/Person	Household income divided by household size.
3) Paternal Importance	Average of the questions reflecting the mother's evaluation of the importance of the father's involvement in the upbringing of the child. Likert scale: {(1) Very important, (2) somewhat important and (3) not important} ▪ How important is it for father to teach child about life? ▪ How important is it for father to provide direct care to child? ▪ How important is it for father to show love and affection to the child? ▪ How important is it for father to provide protection for child? ▪ How important is it for father to serve as authority figure and to discipline the child?
4) Mental/Emotional problems	The parent is characterized as having mental or emotional problems if he/she is taking medications for mental illnesses such as anxiety, depression or ADD.
5) Other father figures present	Defined as all men over the age of eighteen, living in the child's household aside from the male spouse/partner.
6) Parents' Drug Use	Parents' level of smoking, alcohol consumption and illegal drug use over the all three waves.
7) Parent Reports Parental Aggravation	Both parents answer four questions on aggravation on a scale of 1 to 4 (1 being the most aggravated). He/She is classified as aggravated if he/she rates his/her aggravation as 1 or 2 on the aggravation scale.
8) Residential Instability	The total number of residential moves the child has experienced since birth.

Figure I. Tree Diagram of all Possible Family Structure Types



All family structure types can be condensed as follows:
1 – Biological father has been present in the home since child's birth *(Stable two-parent family structure)*
2 – Biological father is no longer in the home but the social father is now present *(Disruptive two-parent family structure)*
3 – Biological father is no longer in the home but mother is now single *(Disruptive single-parent family structure)*
X – Social father has been present in the home since child's birth [Not observable in the data]
4 – Biological father has never been present in the home but social father is now present *(Disruptive two-parent family structure)*
5* – Interim relationships include: father present at birth, absent at one-year follow-up and returns in third-year follow-up; father absent at birth, absent at one-year follow-up and returns in third-year follow-up; father absent at birth, present at one-year follow-up and third-year follow-up; father present at birth, social father present at one-year follow-up and father returns in third-year follow-up; father absent at birth, social father present at one-year follow-up and father returns in third-year follow-up. *(Disruptive two-parent family structure)*
5 – Interim relationships include: no father present at child's birth, social father present at one-year follow-up and mother is single by third-year follow-up. *(Disruptive single-parent family structure)*
6 – Mother has been single since child's birth *(Stable single-parent family structure)*