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The Effects of Teenage Childbearing on Adult Soft Skills Development

Jason Fletcher and

Associate Professor of Public Affairs, University of Wisconsin, 1180 Observatory Drive, Madison WI 53706 (USA)

Norma Padrón

Research Scientist, Center for Health Innovation, New York Academy of Medicine, 1216 Fifth Avenue, New York, NY 10029

Abstract

Research examining impacts of teenage childbearing on economic and social outcomes has focused on completed schooling and labor force outcomes. In this paper, we examine outcomes that have remained largely unexplored, soft-skills and personality. We use Add Health data to construct relevant controls for teenage mothers and explore a set of measures that proxy for what is usually deemed in economics as “non-cognitive” or “soft-skill” traits. We find that teenage childbearing increases impulsivity, a trait that has been found to have negative effects on a large set of outcomes and has a negative effect on other personality traits perceived as positive, such as openness to experiences. Our results remain consistent through a set of robustness checks, and we interpret our findings to suggest that adolescence may be a sensitive period for the development of soft skills and that childbearing may interrupt this process.

Keywords

Soft Skills; Teenage Childbearing; Personality; Non-Cognitive Skills

JEL Codes

J13; J24

Correspondence to: Jason Fletcher.

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I. Introduction

In this study, we explore teenage childbearing and its effects on non-cognitive or soft-skills later in life. Our focus is on adolescence because of the timing of the development of soft skills such as personality, risk preferences and planning abilities (Johnson, Blum, & Giedd, 2009), and disrupted development during adolescence may have important repercussions on socioeconomic life trajectories. The previous literature on the causal effects of teenage childbearing on later life outcomes has focused on educational and earnings indicators, however other developmental and psychological outcomes that are plausibly affected as a result of a pregnancy during adolescence have not been studied.

There is a consensus across several literatures that non-cognitive skills represent an important source of unobserved heterogeneity in economic behavior, and have a direct effect on the returns to schooling and other forms of human capital (Heckman, Stixrud, and Urzua 2006). At the same time, developments in neuroscience and related fields show that these skills are shaped largely during *sensitive periods* over the life cycle when brain structures and processes are developed.²

We follow Fletcher and Wolfe (2009) and Ashcraft et al. (2013) in estimating both OLS and instrumental variables models that employ different comparison groups and make different assumptions to investigate a range of estimates that likely bound the “true” causal impacts. Additionally, we complement our analyses with a set of alternate specifications to investigate the robustness of our results.

We find that teenage childbearing has a negative effect on some measures of personality in adulthood. In particular, women who had a child as teenagers had lower openness to experience (one of the Big Five personality traits) and greater impulsivity than women who did not have a child as a teenager. Our estimates should be interpreted as the effects of teenage childbearing, compared to women who have a child later in life, on personality and soft skills measured around age 30. Since by age 30, most women have had a child, the effects we are estimating suggest that childbearing during adolescence may interrupt a sensitive period of development for non-cognitive skills and traits—that is, we are implicitly estimating interaction effects of childbearing and developmental period rather than the effects of childbearing on soft skill development³.

II. Overview of the Existing Literature

For the most part, past literature has studied the effects of teenage childbearing on human capital measures, such as educational attainment and wages. Other, related, outcomes that have been studied are marital status, hours of work, and being the recipient of welfare assistance (Fletcher and Wolfe 2009), short term health behavioral outcomes (Fletcher and

²In particular, the cerebral neocortex—an area of the brain governing perception, behavior, and cognition—undergoes two waves of development: First during pre-natal and early childhood periods, and a second one during late childhood and adolescence (Pletikos et al. 2013). In this sense, adolescence can be considered a sensitive period of human development where personality traits and other non-cognitive abilities and soft skills are shaped, and which can be affected by life events such as teenage childbearing.

³An alternative interpretation is that having a miscarriage as a teenage may affect non-cognitive skill development. We know of no evidence of the magnitude of these potential effects and view them as an unlikely explanation of our findings.

Wolfe 2012), and depression later in life and the socio-economic outcomes of children of teenage mothers (Jutte et al. 2010).⁴

There are both biological and environmental reasons why teenage childbearing might have an impact on non-cognitive abilities or soft skills later in life. First, adolescence is a period of active brain development. In particular, there is evidence that a series of neurodevelopmental processes during adolescence occur in brain regions associated with motivation and impulsivity, due to maturational changes in frontal cortical and subcortical monoaminergic systems (Chambers, Taylor, and Potenza 2003). These areas of the brain coordinate higher-order cognitive processes needed for goal-directed behavior, planning, response-inhibition, working memory and attention and hence have effects on many aspects of behavior and habits. It is plausible that some life events—such as childbirth—might interrupt the processes that are developing and shaping the brain’s “connectivity”.

Second, there is evidence that important soft skills are developed and learned in high school. The formation of social structures and peer behavior in high school have also been found to have far-reaching and lasting effects (Mora and Oreopoulos 2011). By the same token, there is evidence of the importance of the “high school experience.” Heckman (2012) finds that even after accounting for pre-existing cognitive ability, GED recipients perform much worse in the labor market than high school graduates. It is likely that the experience of high school itself—beyond its completion—is altered for girls who become mothers as teenagers. There is also ample evidence on the non-pecuniary benefits of attending school in general, and high school in particular, where important social networks are formed (Rosenbaum et al. 1990, Oreopoulos and Salvanes 2011).

These previous strands of literature suggest that childbearing could differentially impact the development of soft skills based on the timing of the birth—whether during adolescence or as an adult. In this paper, we use the nationally representative Add Health data to compare the adult non-cognitive outcomes and traits of women who became pregnant in high school but miscarried with women who became pregnant and gave birth. Since the non-cognitive traits are measured during adulthood (approximately age 30), nearly all the women in our sample have had a child. Thus, we interpret our results as an interactive effect between childbearing and developmental period (adult vs adolescent) that may indicate that adolescence is a sensitive period for the development of non-cognitive traits and personality.

III. Estimation

As summarized by Fletcher and Wolfe (2009) (and earlier by Ribar (1994)) the academic literature on the subject can be divided in three large sets: Initially, studies used an OLS regression approach with a set of controls to estimate the effects of teenage childbearing on educational attainment (Moore and Waite (1997); Mott and Marsiglio (1985)). This line of research considered fertility as exogenous to educational attainment, and found large and negative associations. A second set of studies focused on the timing of births to account for

⁴While nearly all research in this area is focused estimating the effects of teenage motherhood, some research has begun to examine teenage fatherhood (Fletcher 2012). A separate literature has explored peers as an important determinant of teenage pregnancy (Yakusheva and Fletcher 2015, Fletcher and Yakusheva in press).

the endogeneity of fertility found a smaller, but still negative effect, on schooling outcomes. Subsequent studies used an instrumental variables approach to use teenagers who were pregnant as teens but miscarried to teens who gave birth (Hotz et al. 2005). This study found no negative effect from giving birth as a teen on schooling and even a positive effect. The most recent literature has placed considerable effort in defining the appropriate counterfactual group. Reduced to its simplest idea, the research on the effects from teenage pregnancy on educational outcomes posits the following thought experiment: *what would have been the life trajectories of women who had a teenage childbirth been had they not experienced a teenage childbirth* (or had teenage childbirth been assigned completely at random). In the absence of lab experiments where true randomization could be produced, defining the comparison (counterfactual) group is crucial for estimation.

Ashcraft and Lang (2013) showed evidence of the susceptibility of the Hotz et al. results to bias due to not establishing an accurate comparison group. They showed that using miscarriage as an instrument is biased towards a ‘benign view’ because while “*the assignment of miscarriage might be random conditional on key risk factors, the event of miscarriage is frequently censored by a woman having an abortion.*” In a separate study, Fletcher and Wolfe (2009) also provide evidence that girls who miscarry come from more disadvantaged backgrounds. In this sense, the IV estimator using miscarriage underestimates the effects of teenage childbearing and results in a biased (downward) interpretation. On the other hand, the OLS estimates of effects from teenage childbearing are biased upward. Intuitively, this is because women who miscarry could be either ‘abortion types’ or ‘non-abortion types’ and therefore belong to a more favored population than women who gave birth (strictly ‘non-abortion’ types). Women who have abortions were found to be of more privileged backgrounds in both Fletcher and Wolfe (2009) and Ashcraft, Fernandez-Val, and Lang (2013). Further discussion on the direction of the bias in these estimates can be found in Ashcraft and Lang (2013).

In this article we use three specifications: 1) OLS estimates with a set of controls as in the initial literature (estimate will be biased upward); 2) IV estimates using miscarriage as an instrument for the timing of the birth (estimate will be biased downward); and 3) our preferred specification, which drops teenage abortions from the sample and uses the group of girls who experience a miscarriage as the control group of those who experience a teenage birth⁵. The estimates from this last specification are ‘bounded’ by specification 1 and 2.

The primary relationship of interest is:

$$\text{Outcome} = \beta_0 + \beta_1 \text{Teen Birth} + \beta_2 X + \varepsilon$$

In this basic OLS specification, the control group is women who had a teen pregnancy that resulted in either miscarriage or abortion. Girls who choose an abortion are, on average,

⁵Ashcraft, Fernandez-Val, and Lang (2013) develop a consistent estimator assuming that miscarriage is random conditional on some controls. We proceed in this spirit and use the same type of control variables (age at conception and smoking status during pregnancy) in our preferred specification.

from more advantaged backgrounds than girls who miscarry (for a detailed discussion see (Ashcraft, Fernández-Val, and Lang 2013, Fletcher and Wolfe 2009); hence, using this control group overestimates the true cost of teenage childbirth.

Hotz et al. (2005) proposed using the nature of miscarriages as a “natural experiment”, and used miscarriages as an instrument for live birth status for women who became pregnant as teenagers. The set of equations estimated are:

$$\begin{aligned}\text{Outcome} &= \beta_0 + \beta_1 \text{Teen Birth} + \beta_2 X + \varepsilon \\ \text{Teen Birth} &= \delta_0 + \delta_1 \text{Miscarriage} + \beta_2 X + \nu\end{aligned}$$

This strategy may still result in biased estimates as the group of women who miscarry may not be random.

Our third—and preferred strategy—uses an ordinary least square (OLS) approach as in the first strategy, but excludes abortions from the estimation. Therefore the control group is composed of only women whose teenage pregnancy ended in a miscarriage. To be clear, the sample in these analyses is of women who had a teenage pregnancy and ended either in childbirth or miscarriage (not in abortion).

IV. Data

The dataset used in this paper is the National Longitudinal Study of Adolescent Health (Add Health). This is a nationally representative survey of 20,745 students in 132 high schools. As in Fletcher and Wolfe (2009), we limit our analysis to the first pregnancies of women who were pregnant as adolescents (pregnancies that ended before age 18 years and 9 months). Outcomes are measured at wave IV of the dataset (when the respondents are for the most part in their late twenties to their mid-thirties). Reported miscarriages and still-births are coded into one category as “miscarriages”.

There are 41 survey items in the personality module of Wave IV of the Add Health data. With the exception of the Big Five personality scale, we present results from these variables and “factors” which we constructed to proxy for specific traits or soft skills. We describe each of the variables in detail in Appendix A.

V. Results—The Effects of Teenage Childbearing on Adult Outcomes

Table 1 shows basic summary statistics for the sample (it includes all women who reported having a teenage pregnancy which could have concluded in miscarriage, abortion or childbirth). As other studies on teenage pregnancy and childbirth conducted with these data have noted, an advantage of the Add Health data is that respondents use computer-assisted personal interview technology (CAPI). Hence respondents do not have to verbally answer sensitive questions, and the potential for misreporting is lower than with other available data (Fletcher and Wolfe 2009). In our sample, 24% of first pregnancies end in abortion and 17% end in miscarriage.

Table 2 reports the summary statistics (of all women who experienced a teen pregnancy) by pregnancy outcome. As in previous studies, it emerges that even in these simple descriptive statistics, women who end pregnancies in abortion had more privileged family characteristics (higher maternal education and higher family income). Women who had an abortion also scored higher on the Peabody Picture Vocabulary Test and were also in better overall health. We also note that the table suggests slight socio-demographic advantages for females who report a miscarriage compared to women who report a live birth. These small differences may suggest that our results that compare the two groups may be biased towards finding worse outcomes for women who report a live birth compared with those who report a miscarriage.

Personality—International Personality Item Pool five-factor mode

In Table 3 we show the results of the three estimation approaches described in our empirical strategy to investigate the effects of teenage childbirth on the Big Five personality variables. The first column compares the personality component between women who experienced a teenage childbirth and individuals who did not have a completed pregnancy (abortion or miscarriage), and controls for factors that have been identified in the literature as risk factors for miscarriage (Hotz, McElroy, and Sanders 2005, Garcia-Enguidanos et al. 2002, Fletcher and Wolfe 2009).

The personality measures are standardized in the results, so the results are in standard deviation units and show relatively large but imprecisely measured effects. The results suggest that women who experienced a teenage childbirth score (statistically significantly) lower on the personality items of extraversion ($-.18$ of a SD), agreeableness ($-.117$), and openness ($-.249$). The items of neuroticism and conscientiousness were higher among women who experienced a teenage childbirth, but these estimates are very modest and not statistically significant.

Column 2 shows results for the instrumental variable specification where we follow Hotz et al. (2005) and use miscarriage as an instrument for live births. These results, which are biased toward finding favorable outcomes of childbearing, suggest that there is no statistically significant relationship between teenage childbearing and any of the personality measures (with the exception of neuroticism which is $-.320$ of SD).

Column 3 presents results from our preferred specification. As discussed above, this specification will have estimates that are expected to be ‘bounded’ by those in columns 1 and 2. Although the direction of the estimates remains for the most part unchanged—none of the measures of personality are statistically significant. Many of the coefficients are quite small, but the results for openness to experience are suggestive—the first column estimate is nearly a 0.25 standard deviation reduction and the preferred third column is still close to 0.18, though with larger standard errors (p-value <0.11).

Impulsivity

Table 4 shows the results for our factor measure of impulsivity and its components. As discussed above, we formed a series of factor variables using the available data from the

personality module of the Add Health data via factor analysis. We present the results for the factor and its components separately⁶.

The specification in column 1 compares women who had childbirth as teenagers and women for whom their teenage pregnancy ended in miscarriage or abortion. The constructed factor for impulsivity is statistically significant and positive (.096). However, “*I go with my gut feeling*” a measure used previously as a proxy for impulsivity (Fletcher, Deb, Sindelar 2009) is only statistically significant in columns 2 and 3. As expected, the results from column 3 lie within those of columns 1 and 2. As an additional test on the potential for selection into miscarriage vs. teen birth, we estimate the “*I go with my gut feeling*” measure at Wave I and find no effect in our preferred specification (coefficient: 0.012 standard error: 0.114; full results available upon request).

Column 3 shows that women whose teenage pregnancy resulted in a childbirth had scores .263 higher than women for whom their teenage pregnancy ended in a miscarriage. The measure of “*I live my life without much thought for the future*” in the last row is also higher across all specifications for women who had a teenage childbirth but only statistically significant when comparing women whose teenage pregnancy resulted in childbirth compared to women whose teenage pregnancy ended in miscarriage.

Locus of Control

Table 5 shows the results for the factor measure of ‘locus of control’ and its components. The results indicate that across all measures, the specification that compares teenage childbirth with no birth (bias to overestimate the effects of teenage childbirth) shows a negative effect of teenage childbirth. The measures are on a one to five likert scale, and the magnitudes are relatively modest. With the exception of the variable “there are many things that interfere with what I want to do” (−.127), none of the estimates are statistically significant at conventional levels. For the other two specifications, the direction of the effects is positive and small although none of the estimates are statistically significant.

Depression, Optimism, Pessimism

Table 6 presents the results for the measures of depression, optimism and pessimism. The second and third specifications indicate that women who had a teenage childbirth were less likely to have ever received a diagnosis of depression, though this effect could be reflecting different receipt of regular care. The next row shows results of the depression scale (minimum value of zero and maximum of 15). Women who had a teenage childbirth scored higher (.355), but the direction and magnitude of the estimate changed in the other specifications.

Rows 3–5 present the results for the factor measure of ‘optimism’ and its components. The first specification, which compares teenage childbirth with no childbirth (either abortion or miscarriage) indicate a small but positive effect on the optimism factor measure and one of its individual components (“*overall I expect good things to happen to me*”). The variable “*I*

⁶Results in Bond and Lang (2014) suggest that results using variables measured using Likert scales can be difficult to interpret. We present results for both the overall factor scores for these combined variables as well as the variables separately.

am always optimistic about my future” is found to be negative for women who had a teenage childbirth in this specification. None of the measures are statistically significant in our third (preferred) specification.

VI. Robustness Checks and Extensions

We explore four sets of robustness checks to investigate the potential effects of teenage childbearing on later life outcomes across soft skills, personality and depression.

First, using our third specification we investigate whether there are any differences in outcomes by “hormonal age”, which we measure by the time since menarche. The rationale for this set of analyses is that variation on the onset of puberty may result in differential levels of certain hormones (such as gonadal steroid hormones) which may in turn make some women be more or less susceptible to life events or result in differential effects from childbearing during adolescence on our outcomes of interest (Hirsch and Brizendine 2007, Dahl 2004, Sisk and Zehr 2005).

Second, we investigate whether there are differential effects if the teenage mother’s mother was also a teenage mom herself. While there is not an overall consensus on whether children of teenage parents are more likely to be teenage parents themselves, there is still a perception that this is the case. Indeed, there is some evidence of intergenerational correlations of fertility decisions (Furstenberg Jr, Levine, and Brooks-Gunn 1990, Kahn and Anderson 1992). We investigate an interaction effect of “live birth” (treatment) and being the child of a teenage mother.

In addition, we replicate our empirical strategy using quantile regressions to investigate whether there are differential effects along the distribution of the outcomes of interest and finally, we rerun our analyses on a subsample of women who did not have other children by wave 4 besides their teenage pregnancy.

Results from Robustness Checks

To explore the robustness of our results we examined whether age since menarche or whether having a teenage mother played a role influencing the outcomes we study. Here, our focus is on whether there are other factors that ‘split the sample’ and can give us a better understanding of the robustness of the magnitude and direction of our results. We re-estimated all of our regressions for our third specification (OLS with those who had a teenage childbirth and those who experienced a miscarriage). Results are shown in Appendix C and include controls for “hormonal age” (and its interaction with the treatment), and having a teen mom (and its interaction with the treatment) for all outcomes.

In Table C-1 we can see the results for the big-five personality measures. While time since menarche is not significant, our results on openness are robust for those who had a teen mom (−.365 of a standard deviation). Thus our results suggest a larger negative influence for those women who had a child while teenager and their mothers were teenage mothers themselves.

Table C-2 shows the results for impulsivity. Here, our results are robust to the specifications including “hormonal age”. The factor of impulsivity (.177), “gut feeling” (.240) and “live my life without much thought about the future” (.191) indicate that for those women whose menarche was below the median age the effects from having a child as a teenager on impulsivity are larger.

In separate checks we ran all three specifications using quantile regressions to investigate whether the effects on our outcomes of interest were concentrated on specific points of the distribution (median, 75th, 90th). We find that the results for openness (from the Big Five) and impulsivity are similar. In addition, we re-ran our estimation using the sub-sample of women who did not have children by wave 4 after having reported a teenage pregnancy. Despite larger standard errors (because this is smaller sample), the results of impulsivity (factor) and gut feeling remain statistically significant and positive indicating that women who had a child as teenagers have a higher impulsivity and are more likely to report taking decisions by “gut feeling”.

VII. Conclusions

This paper builds on the literature on the long term effects of teenage childbearing and explores a set of outcomes that has remained largely unexplored: “soft skills”, personality and depression. While we are constrained by the available measures in the Add Health, our results suggest that there are causal effects of teenage childbearing on some personality and soft-skill outcomes. As better and more varied measures become available this should be further explored.

In line with the latest methodological research on teenage childbearing, we pay careful attention to the potential for bias in our estimates and complement our analyses with an extensive set of specifications and robustness checks. In particular, we highlight the importance of constructing the relevant control groups for the estimation and interpretation of the causal effects of teenage childbearing.

The story that emerges is that teenage childbearing increases impulsivity (the factor variables as well as its components) and decreases the measure of openness. In addition, adult women who were teenage mothers were marginally less likely to report ever having a diagnosis of depression. The remaining measures were not consistently found to be statistically significant, in line with previous research reporting small later life effects from teenage childbirth, and with the limited literature on longitudinal stability of personality traits.

An inherent disadvantage in self-reported survey data is that questions are asked during periods of “cold cognition”, that is via hypothetical questions during circumstances of low stress. This issue may be particularly important for measurement error in the available ‘non-cognitive’ variables.

What we present here are the components of the factors that resulted in significant loadings. Our goal is not to propose these as validated measures but rather to investigate if in these

‘crude proxies’ we could explore the effects of teenage childbearing on a series of soft skills and personality outcomes.

It is difficult to put the magnitude of our results in context as it has not been previously explored in the literature, but as more and better data becomes available exploring these issues should be explored further. In particular—as our results point out—while not all aspects of personality and soft skills may be affected, impulsivity, a trait with far reaching effects on many aspects of economic and social activity is affected by teenage pregnancy (Fletcher 2013).

Current political discourse centers on outcomes of educational attainment and earnings. It has been estimated that the public cost of teenage pregnancy is of about \$9 billion, and that public programs of sex education and teenage pregnancy campaigns could save \$356 million (Thomas 2012). Understanding the effects of teenage childbearing on non-cognitive outcomes and soft skills later in life would help in having a more complete political and economic debate on how to allocate policy resources.

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Appendix A. Variables

Personality

Although there is strong evidence that personality has effects on an individual's socio-economic trajectory, there is little evidence on the extent to which personality traits are developed, changed or remain stable over the life cycle (Almlund et al. 2011). Our goal is to explore whether the 'treatment' of becoming a teenage mother results in observable differences in personality later in life.

The Add Health survey fielded a 20-item short-form version of the 50-item International Personality Item Pool-Five-Factor Model known as the Mini-IPIP. Previous studies have validated this instrument's consistency (Donnellan et al. 2006). The Mini-IPIP scale has four items per Big Five trait: Extraversion, neuroticism, agreeableness, conscientiousness, and openness. Responses to each item were coded in a five point likert scale ranging from 1

(strongly agree) to 5 (strongly disagree); with a neutral point 3 (neither agree nor disagree). As discussed in (Almlund et al. 2011) the “Big Five” posits a hierarchical organization of personality traits. In this context, the five components of the Big Five are at the highest level and summarize a larger set of more specific personality facets. In appendix A, we present a table with brief descriptions of the components of the Big Five.

Impulsivity

Modern literature in the field of psychology defines impulsivity as “*a predisposition toward rapid, unplanned reactions to internal or external stimuli without regard to the negative consequences of these reactions to the impulsive individual or to others*” (Moeller et al. 2001) (Grant and Potenza 2011)). Studies on addiction, delinquency and crime have investigated the association of impulsivity and these behaviors as well as its effects on the treatment outcomes for addiction and other conditions (Krishnan-Sarin et al. 2007, Nagin and Pogarsky 2003, Mitchell 1999). In general, high levels of impulsivity are associated with preferences for immediate gratification, risky activities, novel sensations, and easier routes to self-gratification, as well as an inability to persist at a task and shorter reaction times (Mitchell 1999).

Although some measures of impulsivity are widely used (such as the Barratt’s Impulsivity Scale (BIS)), we are constrained by the survey questions available in the Add Health survey. For our measure of self-control we follow Nagin and Pogarsky (2003) and Fletcher et al., (2003) (Fletcher, Deb, and Sindelar 2009, Nagin and Pogarsky 2003)) and use the survey question “*When making decisions, you usually go with your gut feeling without thinking too much about the consequences of each alternative.*” This question has been used previously as a proxy for impulsivity, and is in line with Barratt’s measure of *Motor impulsivity*. The answers include five categories from “strongly agree” through “strongly disagree” (the neutral response is the omitted category). In addition, we use two other survey questions: “I like to take risks” and “I live my life without much thought for the future”, and a factor variable of the three measures available in the survey.

There is ample evidence on the association of impulsivity and addictive behaviors, delinquency and treatment outcomes. In addition, laboratory task investigations have indicated that individuals with high impulsivity tend to perform poorly on fine perceptual-motor performance tasks (Barratt et al., 1981). This indicates that this individual trait may have large effects on an individual’s returns to education and ultimately on his ability to perform in the labor market and as a parent.

Locus of Control

Locus of control has been increasingly studied in the economics literature as part of the wave of studies that for the last decade have focused on the economic returns to non-cognitive or ‘soft’ skills (Heckman, Stixrud, and Urzua 2006, Coleman and DeLeire 2003). Measures of locus of control have also been explored in the public health context, and evidence indicates that a stronger internal locus of control is associated with better outcomes

and adherence to treatment, as well as other positive behavioral outcomes (AbuSabha and Achterberg 1997, Currie 2009).

Locus of control measures the extent to which individuals believe they have control over their lives and outcomes. There is a substantial discussion in the literature on the development of locus of control and personality during childhood (Bradley and Corwyn 2002, Cobb-Clark and Schurer 2011). However, whether events later in life have or not an effect on an individual's locus of control has been somewhat less studied.

Cobb-Clarke and Schurer (2011) find that at least in a four year period, the measure they use is stable within individuals. Relevant to our study, they investigate whether negative/positive life events resulted in a change to an individual's baseline locus of control. However none of their 'life event' measures included a teenage childbirth.

We use the following available variables independently, and present also results of the factor: *"There is little I can do to change the important things in my life"*; *"Other people determine most of what I can and cannot do"*; *"There are many things that interfere with what I want to do"*; *"I have little control over the things that happen to me"*; *"There is really no way I can solve the problems I have."*

Optimism

The literature on *dispositional optimism* defines optimism as "generalized positive expectations about future events" (Puri and Robinson 2007). Different measures and instruments of optimism have consistently found that optimism has large and far reaching effect over a wide set of outcomes. For instance, optimism is positively associated with coping habits and behavior (Carver, Scheier, and Segerstrom 2010), as well as faster recovery from surgery (Kiecolt-Glaser et al. 1998). In the economics realm, optimism has also been found to be related to many work and life choices. In particular, optimistic people are found to work harder, expect to retire later, invest more in individual stocks, and save more (Puri and Robinson 2007) (Laajaj 2013).

The question whether life events may change an individual's optimism has not yet been answered conclusively. Although some evidence indicates that adverse health circumstances (such as the risk of death from coronary disease) decreases the level of an individual's optimism (Giltay et al. 2006, Mols et al. 2010). However, whether teenage childbearing in particular has an effect on an individual's optimism and how persistent this effect is has not been studied before.

We use two separate measures and also present results of the factor of the two: *"I'm always optimistic about my future"* and *"Overall, I expect more good things to happen to me than bad."* In addition, we explore a separate variable as a proxy for *pessimism*: *"I rarely count on good things happening to me."*

Depression

We explore two separate measures for depression. One is measured using the Center for Epidemiological Studies Depression Scale (CES-D 10), a widely used instrument in depression research, and for which a short form is available in the Add Health. This measure is designed to capture current levels of depressive symptoms.

A separate measure is the answer to the question: “*Has a doctor, nurse or other health care provider ever told you that you have or had: depression?*”

Control Variables

As discussed in Fletcher and Wolfe (2009) and Ashcraft, Fernandez-Val and Lang (2013), including variables that are correlated with both the outcomes of interest and the birth outcomes could worsen results or change the sign of the bias in our estimating equations; So we follow Fletcher and Wolfe (2009) and Ashcraft, Fernandez-Val and Lang (2013), and only control for factors that have been cited in the literature as being risk factors for miscarriage such as whether pregnancy occurred before age 15 and whether teenage smoke, drank alcohol, or used drugs during pregnancy. We include race (Black, Hispanic and reference group, White), age at wave four, maternal education and a dummy for parent in the household.

Appendix B

The Big Five Personality Traits	
<i>Openness</i>	There is some evidence that it can be considered a ‘primarily cognitive’ trait (DeYoung, Peterson, and Higgins 2005). Generally, is defined as a tendency to be open to new intellectual and aesthetic experiences.
<i>Conscientiousness</i>	Tendency to be organized, responsible and hard-working. This trait has been linked to longevity and better health (Penley and Tomaka 2002).
<i>Extraversion</i>	It has been linked to higher returns of education, and leadership roles (Heineck and Anger 2010). It is broadly defined as a tendency for sociability and positive affect.
<i>Agreeableness</i>	Tendency to act in an unselfish and cooperative manner.
<i>Neuroticism</i>	In economics it has been found to be associated with risk aversion (Borghans et al. 2009). A broad definition is that neuroticism is a chronic level of emotional instability and/or proneness to psychological distress (Almlund et al. 2011).

This table is adapted from (Almlund et al. 2011).

Appendix C. Robustness checks

Table C-1

Robustness Results

VARIABLES	Hormonal Age Extraversion	Teen Mom Extraversion	Hormonal Age Neuroticism	Teen Mom Neuroticism	Hormonal Age Agreeableness	Teen Mom Agreeableness
Live Birth	−0.055 (0.116)	−0.106 (0.156)	−0.115 (0.117)	−0.171 (0.151)	−0.031 (0.099)	−0.105 (0.109)
Age (at wave 4)	−0.061 ** (0.025)	−0.060 ** (0.025)	0.038 (0.025)	0.041 * (0.024)	−0.009 (0.020)	−0.016 (0.021)

VARIABLES	Hormonal Age Extraversion	Teen Mom Extraversion	Hormonal Age Neuroticism	Teen Mom Neuroticism	Hormonal Age Agreeableness	Teen Mom Agreeableness
Conception before 15	-0.236 (0.167)	-0.240 (0.161)	0.177 (0.158)	0.145 (0.161)	-0.276 ^{***} (0.100)	-0.291 ^{***} (0.101)
Black	-0.118 (0.114)	-0.114 (0.115)	0.077 (0.095)	0.069 (0.095)	-0.049 (0.093)	-0.058 (0.095)
Hispanic	0.097 (0.113)	0.102 (0.113)	-0.189 [*] (0.103)	-0.206 ^{**} (0.103)	-0.107 (0.106)	-0.110 (0.105)
Smoke during pregnancy	0.015 (0.114)	0.015 (0.113)	0.112 (0.101)	0.105 (0.100)	-0.110 (0.100)	-0.099 (0.096)
Married	-0.001 (0.091)	-0.018 (0.093)	-0.181 ^{**} (0.088)	-0.173 ^{**} (0.087)	0.208 ^{**} (0.080)	0.196 ^{**} (0.079)
Maternal Education	0.053 ^{**} (0.020)	0.051 ^{**} (0.021)	-0.040 ^{**} (0.019)	-0.039 ^{**} (0.019)	0.068 ^{***} (0.022)	0.058 ^{***} (0.021)
Parent in Household (dummy)	-0.003 (0.075)	0.022 (0.078)	0.106 (0.081)	0.092 (0.079)	-0.005 (0.072)	0.015 (0.075)
Hormone Median	-0.277 (0.455)		0.397 (0.391)		-0.127 (0.342)	
Hormone × Live Birth (interaction)	0.371 (0.487)		-0.226 (0.420)		0.153 (0.369)	
Teen Mom		-0.415 [*] (0.215)		0.101 (0.195)		-0.481 ^{***} (0.171)
(Missing) Teen mom		-0.093 (0.127)		0.030 (0.114)		-0.073 (0.105)
Teen Mom × Live Birth (interaction)		0.365 [*] (0.214)		0.008 (0.208)		0.443 ^{**} (0.194)
Constant	1.188 (0.758)	1.278 [*] (0.752)	-0.086 (0.742)	-0.153 (0.711)	-0.516 (0.624)	-0.085 (0.630)
	690	696	691	697	691	697
Observations	0.029	0.034	0.037	0.035	0.044	0.049

VARIABLES	Hormonal Age Conscientiousness	Teen Mom Conscientiousness	Hormonal Age Openness	Teen Mom Openness
Live Birth	0.069 (0.106)	-0.053 (0.118)	-0.260 ^{**} (0.124)	-0.365 ^{***} (0.131)
Age (at wave 4)	0.061 ^{**} (0.026)	0.070 ^{***} (0.024)	-0.026 (0.020)	-0.036 [*] (0.019)
Conception before 15	-0.090 (0.149)	-0.147 (0.155)	-0.107 (0.139)	-0.114 (0.139)
Black	0.067 (0.108)	0.051 (0.107)	0.103 (0.107)	0.101 (0.108)
Hispanic	0.178 (0.116)	0.169 (0.115)	0.145 (0.130)	0.145 (0.128)
Smoke during pregnancy	-0.181 [*] (0.098)	-0.172 [*] (0.103)	-0.094 (0.093)	-0.098 (0.089)
Married	0.026 (0.088)	0.026 (0.089)	0.115 (0.087)	0.106 (0.085)
Maternal Education	0.049 ^{**} (0.019)	0.047 ^{**} (0.018)	0.037 ^{**} (0.016)	0.028 [*] (0.017)
Parent in Household (dummy)	-0.031 (0.093)	0.031 (0.090)	-0.103 (0.079)	-0.100 (0.077)
Hormone Median	0.274 (0.261)		-0.494 (0.484)	
Hormone × Live Birth (interaction)	-0.279 (0.326)		0.505 (0.510)	

VARIABLES	Hormonal Age Conscientiousness	Teen Mom Conscientiousness	Hormonal Age Openness	Teen Mom Openness
Teen Mom		-0.241 (0.181)		-0.717 *** (0.254)
(Missing) Teen mom		-0.178 (0.119)		-0.001 (0.113)
Teen Mom × Live Birth (interaction)		0.381 * (0.202)		0.677 ** (0.270)
Constant	-2.354 *** (0.811)	-2.481 *** (0.731)	0.172 (0.587)	0.687 (0.565)
Observations	691	697	687	693
R-squared	0.032	0.041	0.032	0.044

Robust standard errors in parentheses

p<0.01,**
p<0.05,*
p<0.10

Table –C2

Robustness Results

VARIABLES	Hormonal Age	Teen Mom	Hormonal Age	Teen Mom	Hormonal Age	Teen Mom	Hormonal Age	Teen Mom
	Impulsiveness (Factor)	Impulsiveness (Factor)	When making decisions I go with my gut feeling	When making decisions I go with my gut feeling	I like to take risks	I like to take risks	I live my life without much thought for the future	I live my life without much thought for the future
Live Birth	0.177 ** (0.078)	0.129 (0.093)	0.240 ** (0.119)	0.228 (0.144)	0.080 (0.106)	0.050 (0.116)	0.191 * (0.098)	0.089 (0.114)
Age (at wave 4)	0.012 (0.017)	0.015 (0.018)	-0.021 (0.026)	-0.015 (0.028)	0.048 * (0.025)	0.052 ** (0.025)	0.020 (0.020)	0.020 (0.020)
Conception before 15	0.033 (0.100)	0.057 (0.102)	0.053 (0.150)	0.083 (0.153)	0.118 (0.129)	0.144 (0.135)	-0.044 (0.122)	-0.027 (0.119)
Black	0.138 ** (0.066)	0.137 ** (0.066)	0.106 (0.096)	0.114 (0.097)	0.098 (0.101)	0.089 (0.101)	0.208 *** (0.073)	0.203 *** (0.074)
Hispanic	-0.046 (0.080)	-0.053 (0.079)	-0.058 (0.124)	-0.058 (0.124)	-0.114 (0.141)	-0.125 (0.135)	0.008 (0.087)	-0.007 (0.085)
Smoke during pregnancy	-0.068 (0.070)	-0.062 (0.070)	-0.090 (0.101)	-0.074 (0.103)	-0.012 (0.109)	0.002 (0.108)	-0.090 (0.081)	-0.097 (0.083)
Married	0.101 (0.068)	0.111 (0.067)	0.112 (0.107)	0.126 (0.107)	0.101 (0.095)	0.091 (0.096)	0.095 (0.076)	0.114 (0.074)
Maternal Education	0.036 ** (0.015)	0.039 *** (0.015)	0.040 * (0.021)	0.045 ** (0.021)	0.002 (0.020)	0.004 (0.020)	0.058 *** (0.017)	0.061 *** (0.017)
Parent in Household (dummy)	0.084 (0.054)	0.095 * (0.055)	0.138 (0.087)	0.162 * (0.085)	0.116 (0.087)	0.145 (0.088)	0.008 (0.054)	-0.009 (0.061)
Hormone Median	-0.190 (0.410)		-0.389 (0.475)		-0.091 (0.497)		-0.072 (0.360)	
Hormone × Live Birth (interaction)	0.159 (0.435)		0.310 (0.505)		0.194 (0.542)		-0.006 (0.387)	
Teen Mom		-0.137 (0.204)		-0.115 (0.249)		-0.118 (0.262)		-0.181 (0.212)
(Missing) Teen mom		-0.040 (0.086)		-0.103 (0.142)		-0.104 (0.124)		0.070 (0.089)
Teen Mom × Live Birth (interaction)		0.230 (0.210)		0.157 (0.259)		0.206 (0.272)		0.337 (0.217)
Constant	-1.010 * (0.543)	-1.118 ** (0.560)	3.162 *** (0.766)	2.925 *** (0.814)	1.524 * (0.837)	1.425 * (0.812)	2.437 *** (0.631)	2.449 *** (0.670)
Observations	690	696	691	697	691	697	690	696
R-squared	0.052	0.057	0.032	0.031	0.020	0.023	0.063	0.072

Robust standard errors in parentheses

p<0.01,
**
p<0.05,
*
p<0.10

Table –C3

Robustness Results

VARIABLES	Hormonal Age Optimism (Factor)	Teen Mother Optimism (Factor)	Hormonal Age Optimistic About the Future	Teen Mother Optimistic About the Future	Hormonal Age Overall Expect Good Things	Teen Mother Overall Expect Good Things
Live Birth	–0.048 (0.077)	–0.048 (0.091)	0.251 (0.280)	0.238 (0.346)	–0.044 (0.098)	–0.094 (0.115)
Age (at wave 4)	0.008 (0.014)	0.010 (0.014)	0.021 (0.057)	0.013 (0.055)	0.015 (0.021)	0.019 (0.021)
Conception before 15	0.010 (0.091)	–0.019 (0.092)	–0.024 (0.459)	–0.024 (0.452)	–0.023 (0.136)	–0.052 (0.134)
Black	–0.191 *** (0.056)	–0.188 *** (0.058)	0.787 *** (0.238)	0.763 *** (0.245)	–0.208 ** (0.083)	–0.198 ** (0.084)
Hispanic	–0.206 *** (0.069)	–0.205 *** (0.068)	0.880 *** (0.236)	0.878 *** (0.245)	–0.174 * (0.101)	–0.166 * (0.099)
Smoke during pregnancy	0.153 *** (0.058)	0.155 ** (0.060)	–0.611 ** (0.265)	–0.590 ** (0.274)	0.221 ** (0.095)	0.224 ** (0.093)
Married	–0.048 (0.060)	–0.050 (0.061)	0.540 ** (0.230)	0.552 ** (0.229)	–0.027 (0.085)	–0.028 (0.086)
Maternal Education	–0.017 (0.012)	–0.018 (0.012)	0.191 *** (0.049)	0.184 *** (0.048)	–0.027 * (0.015)	–0.028 * (0.015)
Parent in Household (dummy)	–0.049 (0.043)	–0.035 (0.047)	–0.051 (0.195)	–0.023 (0.210)	0.002 (0.070)	0.025 (0.073)
Hormone Median	–0.071 (0.246)		–0.204 (0.621)		0.011 (0.319)	
Hormone × Live Birth (interaction)	0.143 (0.263)		–0.331 (0.736)		0.053 (0.354)	
Teen Mom		–0.082 (0.156)		–0.054 (0.419)		–0.229 (0.174)
(Missing) Teen mom		–0.058 (0.068)		0.014 (0.298)		–0.104 (0.091)
Teen Mom × Live Birth (interaction)		0.044 (0.153)		0.075 (0.459)		0.205 (0.169)
Constant	0.209 (0.420)	0.193 (0.406)	10.644 *** (1.760)	10.881 *** (1.722)	2.139 *** (0.645)	2.085 *** (0.642)
Observations	688	694	691	697	690	696
R-squared	0.052	0.053	0.077	0.069	0.035	0.038

Robust standard errors in parentheses

p<0.01,
**
p<0.05,
*
p<0.10

Table –C4

Robustness Results

VARIABLES	Hormonal Age Pessimism	Teen Mom Pessimism
Live Birth	0.104 (0.113)	0.138 (0.142)
Age (at wave 4)	0.021 (0.023)	0.021 (0.022)
Conception before 15	–0.048 (0.181)	–0.102 (0.182)
Black	0.156 (0.098)	0.156 (0.098)
Hispanic	0.186 * (0.111)	0.195 * (0.115)
Smoke during pregnancy	–0.127 (0.100)	–0.111 (0.103)
Married Parents	0.286 *** (0.093)	0.287 *** (0.092)
Maternal Education	0.083 *** (0.017)	0.078 *** (0.018)
Parent in Household (dummy)	–0.153 * (0.085)	–0.118 (0.088)
Hormone Median	–0.242 (0.360)	
Hormone × Live Birth (interaction)	0.157 (0.403)	
Teen Mom		–0.092 (0.224)
(Missing) Teen mom		–0.097 (0.135)
Teen Mom × Live Birth (interaction)		–0.015 (0.258)
Constant	1.578 ** (0.723)	1.636 ** (0.711)
Observations	691	697
R-squared	0.061	0.058

p<0.01,**
p<0.05,*
p<0.10**Table –C5**

Robustness Results

VARIABLES	Hormonal Age Locus of Control (factor)	Teen Mom Locus of Control (factor)	Hormonal Age Little I can do to change important things	Teen Mom Little I can do to change important things
Live Birth	0.093 (0.104)	–0.051 (0.102)	0.043 (0.084)	–0.020 (0.099)
Age (at wave 4)	0.026 (0.020)	0.028 (0.020)	0.015 (0.022)	0.019 (0.022)

VARIABLES	Hormonal Age Locus of Control (factor)	Teen Mom Locus of Control (factor)	Hormonal Age Little I can do to change important things	Teen Mom Little I can do to change important things
Conception before 15	-0.100 (0.169)	-0.079 (0.164)	-0.013 (0.183)	-0.009 (0.178)
Black	0.138 (0.092)	0.139 (0.092)	0.083 (0.099)	0.087 (0.098)
Hispanic	0.009 (0.098)	0.005 (0.098)	0.081 (0.085)	0.084 (0.084)
Smoke during pregnancy	-0.221 *** (0.081)	-0.229 *** (0.083)	-0.128 (0.085)	-0.131 (0.090)
Married	0.216 *** (0.075)	0.219 *** (0.075)	0.201 *** (0.068)	0.208 *** (0.068)
Maternal Education	0.076 *** (0.017)	0.075 *** (0.017)	0.061 *** (0.017)	0.062 *** (0.017)
Parent in Household (dummy)	0.019 (0.075)	0.031 (0.073)	0.012 (0.058)	0.037 (0.063)
Hormone Median	0.254 (0.292)		0.018 (0.328)	
Hormone × Live Birth (interaction)	-0.316 (0.316)		-0.150 (0.353)	
Teen Mom		-0.395 ** (0.185)		-0.197 (0.169)
(Missing) Teen mom		-0.091 (0.100)		-0.094 (0.124)
Teen Mom × Live Birth (interaction)		0.453 ** (0.195)		0.219 (0.189)
Constant	-1.992 *** (0.675)	-1.923 *** (0.661)	2.574 *** (0.723)	2.479 *** (0.712)
Observations	690	696	690	696
R-squared	0.068	0.077	0.041	0.045

VARIABLES	Hormonal Age Other people determine most of what I do	Teen Mom Other people determine most of what I do	Hormonal Age Many things interfere with what I want to do	Teen Mom Many things interfere with what I want to do
Live Birth	-0.012 (0.092)	-0.124 (0.095)	0.072 (0.119)	0.019 (0.115)
Age (at wave 4)	0.009 (0.019)	0.011 (0.019)	-0.004 (0.025)	-0.008 (0.024)
Conception before 15	-0.078 (0.135)	-0.078 (0.129)	-0.101 (0.164)	-0.051 (0.157)
Black	0.161 ** (0.076)	0.160 ** (0.074)	0.029 (0.107)	0.030 (0.106)
Hispanic	0.008 (0.087)	0.003 (0.086)	0.091 (0.115)	0.081 (0.117)
Smoke during pregnancy	-0.216 *** (0.078)	-0.221 *** (0.081)	-0.316 *** (0.093)	-0.336 *** (0.090)
Married	0.059 (0.066)	0.056 (0.066)	0.197 ** (0.093)	0.221 ** (0.093)
Maternal Education	0.054 *** (0.014)	0.052 *** (0.015)	0.054 ** (0.021)	0.058 *** (0.022)
Parent in Household (dummy)	0.086 (0.061)	0.103 (0.065)	-0.005 (0.077)	-0.056 (0.084)

VARIABLES	Hormonal Age Other people determine most of what I do	Teen Mom Other people determine most of what I do	Hormonal Age Many things interfere with what I want to do	Teen Mom Many things interfere with what I want to do
Hormone Median	0.071 (0.200)		0.039 (0.297)	
Hormone × Live Birth (interaction)	−0.040 (0.226)		−0.159 (0.358)	
Teen Mom		−0.391 ** (0.166)		0.022 (0.218)
(Missing) Teen mom		−0.089 (0.097)		0.173 (0.117)
Teen Mom × Live Birth (interaction)		0.423 ** (0.184)		0.108 (0.243)
Constant	3.094 *** (0.550)	3.180 *** (0.565)	2.528 *** (0.762)	2.580 *** (0.747)
Observations	691	697	691	697
R-squared	0.053	0.064	0.033	0.038

VARIABLES	Hormonal Age I have little control over what happens to me	Teen Mom I have little control over what happens to me	Hormonal Age There is no way I can solve the problems I have	Teen Mom There is no way I can solve the problems I have
Live Birth	0.077 (0.105)	−0.043 (0.105)	0.108 (0.074)	0.012 (0.079)
Age (at wave 4)	0.026 (0.019)	0.028 (0.019)	0.023 (0.014)	0.024 * (0.015)
Conception before 15	−0.109 (0.142)	−0.088 (0.139)	−0.045 (0.105)	−0.033 (0.102)
Black	0.085 (0.074)	0.088 (0.076)	0.071 (0.062)	0.070 (0.061)
Hispanic	−0.006 (0.089)	−0.008 (0.091)	−0.059 (0.068)	−0.063 (0.068)
Smoke during pregnancy	−0.191 ** (0.095)	−0.192 ** (0.094)	−0.019 (0.058)	−0.023 (0.058)
Married	0.118 (0.076)	0.119 (0.077)	0.167 *** (0.058)	0.164 *** (0.059)
Maternal Education	0.051 *** (0.016)	0.050 *** (0.016)	0.039 *** (0.014)	0.037 *** (0.014)
Parent in Household (dummy)	−0.023 (0.083)	−0.015 (0.082)	−0.004 (0.049)	0.006 (0.048)
Hormone Median	0.211 (0.286)		0.335 * (0.178)	
Hormone × Live Birth (interaction)	−0.276 (0.303)		−0.324 (0.198)	
Teen Mom		−0.316 (0.208)		−0.254 * (0.133)
(Missing) Teen mom		−0.062 (0.086)		−0.089 (0.066)
Teen Mom × Live Birth (interaction)		0.359 * (0.206)		0.273 ** (0.129)
Constant	2.346 *** (0.629)	2.408 *** (0.604)	2.710 *** (0.472)	2.801 *** (0.475)
Observations	691	697	691	697
R-squared	0.038	0.043	0.045	0.048

Robust standard errors in parentheses

p<0.01,

**

p<0.05,

*

p<0.10

Summary Statistics: National Longitudinal Study of Adolescent Health Sample of females who were pregnant by age 18

Table 1

Full Sample (Weighted)					
Variable	Obs	Mean	Std Dev	Min	Max
Birth Outcomes					
Live Birth	889	0.59	0.49	0.00	1
Miscarriage	889	0.17	0.37	0.00	1
Abortion	889	0.24	0.43	0.00	1
Outcomes					
Extraversion	886	0.07	0.99	-3.00	2.20
Neuroticism	887	0.35	0.97	-2.36	3.40
Agreeableness	887	0.17	0.93	-3.44	1.97
Conscientiousness	887	0.05	0.95	-3.57	1.98
Openness	883	-0.26	0.95	-3.04	2.27
Impulsivity (factor)	886	0.06	0.65	-2.10	1.46
Go with my Gut Feeling	887	3.43	1.02	1.00	5
Like to take Risks	887	3.14	0.97	1.00	5
Live Life without Future Thought	886	4.01	0.72	1.00	5
Locus of Control (factor)	886	-0.10	0.83	-3.27	1.55
Little Control to Change Important Things	886	3.93	0.78	1.00	5
Other People Determine what I can Do	887	4.11	0.78	1.00	5
Many Things Interfere with what I Want to Do	887	3.21	1.02	1.00	5
I Have Little Control Over Things that Happen to me	887	3.83	0.82	1.00	5
There is Really no Way I can Solve my Problems	887	4.05	0.62	1.00	5
Optimism (factor)	883	0.10	0.58	-0.95	1.67
Optimistic About the Future	887	14.42	2.42	6.00	20.00
Overall I Expect more Good Things than Bad	886	2.14	0.81	1.00	5
Pessimism	887	3.50	0.96	1.00	5
Depression Diagnosis	889	0.34	0.47	0.00	1
Depression Scale	889	3.46	2.82	0.00	15
Individual Characteristics					

Full Sample (Weighted)					
Variable	Obs	Mean	Std Dev	Min	Max
Age (at wave 4)	889	28.45	1.66	25.17	33.33
White	889	0.56	0.50	0.00	1
Black	889	0.26	0.44	0.00	1
Hispanic	889	0.15	0.36	0.00	1
PPVT Test Score	889	96.86	12.81	58.00	131
General Health	889	2.36	0.96	1	5
Number of Births by wave 4	862	2.08	1.23	0.00	7
<u>Family Characteristics</u>					
Mother's Education	889	12.63	1.86	0.00	17
Family Income (In thousands of dollars)	889	37.55	25.58	0.00	426
Parents Married (=1)	889	0.62	0.45	0.00	1
Mother Work	889	0.69	0.42	0.00	1
Parent Missing Data	889	0.36	0.48	0.00	1
Age of Parent	889	40.29	6.78	18.00	80
<u>Pregnancy Variables</u>					
Conception Before age 15	889	0.07	0.26	0.00	1
Smoke During Pregnancy	874	0.27	0.44	0.00	1

Sample of Females who were pregnant by age 18. Statistics weighted using wave IV weights.

Miscarriages includes stillbirths

Summary Statistics: National Longitudinal Study of Adolescent Health By pregnancy outcome

Table 2

(Weighted) Variable	Live Births		Abortions		Miscarriages	
	Mean	SD	Mean	SD	Mean	SD
Outcomes						
Extraversion	-0.002	1.048	0.343	0.819	-0.050	0.925
Neuroticism	0.373	0.938	0.230	1.053	0.427	0.959
Agreeableness	0.090	0.924	0.448	0.769	0.081	1.057
Conscientiousness	0.086	0.920	-0.047	0.977	0.064	1.018
Openness	-0.354	0.887	-0.002	0.946	-0.318	1.107
Impulsivity (factor)	0.099	0.615	0.092	0.614	-0.117	0.800
Go with my Gut Feeling	3.484	1.016	3.469	0.936	3.176	1.108
Like to take Risks	3.186	0.965	3.099	0.953	3.046	0.993
Live Life without Future Thought	4.028	0.680	4.091	0.670	3.846	0.868
Locus of Control (factor)	-0.143	0.788	0.090	0.854	-0.193	0.895
Little Control to Change Important Things	3.929	0.768	4.049	0.708	3.791	0.867
Other People Determine what I can Do	4.064	0.783	4.191	0.812	4.133	0.724
Many Things Interfere with what I Want to Do	3.159	1.029	3.392	0.975	3.150	1.023
I Have Little Control Over Things that Happen to me	3.776	0.826	3.954	0.780	3.826	0.821
There is Really no Way I can Solve my Problems	4.035	0.574	4.186	0.638	3.923	0.698
Optimism (factor)	0.080	0.577	0.097	0.567	0.163	0.624
Optimistic About the Future	14.386	2.382	14.911	2.334	13.857	2.549
Overall I Expect more Good Things than Bad	2.132	0.805	2.096	0.796	2.238	0.866
Pessimism	3.446	0.938	3.739	0.856	3.323	1.104
Depression Diagnosis	0.340	0.474	0.244	0.429	0.464	0.499
Depression Scale	3.555	2.845	2.873	2.670	3.936	2.821
Individual Characteristics						
Age	28.549	1.674	28.379	1.697	28.230	1.508
White	0.515	0.500	0.601	0.490	0.682	0.466
Black	0.301	0.459	0.228	0.419	0.160	0.367
Hispanic	0.166	0.372	0.106	0.307	0.150	0.357

(Weighted) Variable	Live Births			Abortions			Miscarriages		
	Mean	SD		Mean	SD		Mean	SD	
PPVT Test Score	95.268	12.500		101.099	12.255		96.482	13.277	
General Health	2.356	0.978		2.415	0.946		2.313	0.903	
Family Characteristics									
Mother's Education	12.392	1.666		13.126	2.125		12.797	1.943	
Family Income (In thousands of dollars)	35.179	23.402		43.597	27.099		37.356	29.086	
Parent Married (=1)	0.595	0.449		0.641	0.460		0.681	0.424	
Mother Work	0.672	0.416		0.792	0.378		0.604	0.449	
Age of Parent	40.246	7.196		40.362	5.074		40.359	7.381	
Pregnancy Variables									
Conception Before age 15	0.053	0.224		0.126	0.332		0.068	0.253	
Smoke During Pregnancy	0.206	0.405		0.330	0.470		0.382	0.486	

Sample of Females who were pregnant by age 18. Statistics weighted using wave IV weights.

Miscarriages includes still births

Table 3

Effects of Teenage Childbearing on Adult Outcomes

	OLS		OLS
	Birth/No birth	Miscarriage as an IV	Birth or Miscarriage (No abortions)
Personality Item Pool-Five-Factor Model			
<i>Extraversion</i>	-0.180** (0.074)	0.173 (0.174)	-0.018 (0.117)
Observations	929	929	696
R-squared	0.036	0.01	0.027
<i>Neuroticism</i>	0.097 (0.080)	-0.320* (0.174)	-0.164 (0.119)
Observations	930	930	697
R-squared	0.03	-0.006	0.033
<i>Agreeableness</i>	-0.117* (0.070)	0.096 (0.150)	0.006 (0.100)
Observations	930	930	697
R-squared	0.038	0.027	0.039
<i>Conscientiousness</i>	0.041 (0.072)	-0.034 (0.163)	0.038 (0.099)
Observations	930	930	697
R-squared	0.026	0.025	0.030
<i>Openness</i>	-0.249*** (0.076)	-0.080 (0.207)	-0.182 (0.110)
Observations	926	926	693
R-squared	0.050	0.043	0.025

Controls: Age, indicator for conception <15 years old, smoke during pregnancy. Each cell is a separate regression

 $p=1\%$,**
 $p=5\%$,*
 $p=10\%$

Table 4

Effects of Teenage Childbearing on Adult Outcomes

	OLS		OLS
	Birth/No birth	Miscarriage as an IV	Birth or Miscarriage (No abortions)
Impulsiveness	0.096 ** (0.047)	0.204 (0.130)	0.189 ** (0.086)
Observations	929	929	696
R-squared	0.029	0.023	0.051
<hr/> <u>Factor Components</u> <hr/>			
<i>When making a decision, I go with my 'gut feeling' and don't think much about the consequences of each alternative</i>	0.122 (0.077)	0.390 ** (0.194)	0.263 ** (0.126)
Observations	930	930	697
R-squared	0.016	0.002	0.029
<i>I like to take risks</i>	0.126 ** (0.063)	-0.047 (0.153)	0.099 (0.101)
Observations	930	930	697
R-squared	0.013	0.006	0.019
<i>I live my life without much thought for the future</i>	0.051 (0.058)	0.206 (0.153)	0.188 * (0.099)
Observations	929	929	696
R-squared	0.048	0.039	0.063

Controls: Age, indicator for conception <15 years old, smoke during pregnancy. Each cell is a separate regression;

 $p=1\%$,**
 $p=5\%$,*
 $p=10\%$

Table 5

Effects of Teenage Childbearing on Adult Outcomes

	OLS		OLS
	Birth/No birth	Miscarriage as an IV	Birth or Miscarriage (No abortions)
Locus of control	−0.079 (0.063)	0.183 (0.141)	0.064 (0.085)
Observations	929	929	696
R-squared	0.055	0.035	0.067
<hr/> <u>Factor Components</u> <hr/>			
<i>There is little I can do to change the important things in my life</i>	−0.037 (0.056)	0.134 (0.143)	0.031 (0.081)
Observations	929	929	696
R-squared	0.035	0.026	0.041
<i>Other people determine most of what I can and cannot do</i>	−0.062 (0.059)	−0.041 (0.119)	−0.017 (0.077)
Observations	930	930	697
R-squared	0.042	0.041	0.054
<i>There are many things that interfere with what I want to do</i>	−0.127 [*] (0.070)	0.153 (0.169)	0.065 (0.108)
Observations	930	930	697
R-squared	0.038	0.023	0.034
<i>I have little control over the things that happen to me</i>	−0.053 (0.061)	0.147 (0.139)	0.049 (0.087)
Observations	930	930	697
R-squared	0.033	0.020	0.037
<i>There is really no way I can solve the problems I have</i>	−0.033 (0.047)	0.193 [*] (0.110)	0.078 (0.064)
Observations	930	930	697
R-squared	0.025	−0.002	0.040

Controls: Age, indicator for conception <15 years old, smoke during pregnancy. Each cell is a separate regression;

 $p=1\%$,**
 $p=5\%$,*
 $p=10\%$

Table 6

Effects of Teenage Childbearing on Adult Outcomes

	OLS		OLS
	Birth/No birth	Miscarriage as an IV	Birth of Miscarriage (No abortions)
Depression Diagnosis	0.003 (0.031)	-0.203 *** (0.074)	-0.097 ** (0.049)
Observations	932	932	699
R-squared	0.046	0.003	0.067
Depression Scale	0.355 * (0.208)	-0.812 (0.523)	-0.215 (0.347)
Observations	932	932	699
R-squared	0.021	-0.010	0.025
Optimism	0.012 (0.043)	-0.103 (0.119)	-0.042 (0.075)
Observations	926	926	694
R-squared	0.053	0.045	0.051
<u>Factor Components</u>			
<i>I'm always optimistic about my future</i>	-0.327 * (0.181)	0.745 * (0.426)	0.260 (0.269)
Observations	930	930	697
R-squared	0.061	0.021	0.069
<i>Overall, I expect more good things to happen to me than bad</i>	0.023 (0.059)	-0.099 (0.146)	-0.048 (0.095)
Observations	929	929	696
R-squared	0.042	0.037	0.035
Pessimism			
<i>I rarely count on good things happening to me</i>	-0.118 (0.084)	0.268 (0.181)	0.123 (0.115)
Observations	930	930	697
R-squared	0.051	0.018	0.056

Controls: Age, indicator for conception <15 years old, smoke during pregnancy. Each cell is a separate regression;

 $p=1\%$,**
 $p=5\%$,*
 $p=10\%$