The Effect of Personality, Physical Attractiveness, and Intelligence on Fertility Outcomes: Evidence from Multiple Surveys[†]

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Abstract

This paper explores the effects of personality traits, intelligence, and physical attractiveness, in addition to socioeconomic indicators, on two important fertility outcomes: timing of childbearing and completed fertility. The central proposition is that an individual's life-course outcome is a holistic process involving the psychological, biological, and socioeconomic influences accumulated over one's life. The results from the WLS, MIDUS, and ACL indicated that extraversion significantly accelerates childbearing and increases number of children. The present study also provides support for the strong and positive correlation between physical attractiveness and reproductive success even among contemporary populations. The effect of intelligence on childbearing appears to be mediated by educational attainment. The intended contribution of this research is to go beyond the prevailing paradigm of proximate determinants for social behaviors by examining more fundamental causes and their functional relations with other features and with the whole individual.

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INTRODUCTION

In most of the industrialized world, marriage and family life decisions have increasingly offered options. Fundamental causes of these changes include economic development that undermines incentives for marriage and childbearing (Notestein 1945; Becker 1981; Caldwell and Schindlmayr 2003; Caldwell 2001); ideological shifts, such as individualization and secularization (Van de Kaa 1987; Lesthaeghe and Surkyn 1988); institutional structure, such as gender equity (McDonald 2000); childcare (Rindfuss, Guzzo, and Morgan 2003); and technological advancement, such as contraception and infertility treatments (Potts 1997; Goldin and Katz 2000; Bailey 2006).

As a result of these structural and normative changes, motivation has increasingly become one of the most important determinants for understanding fertility outcomes in contemporary low-fertility societies (Miller 1992). To this end, Miller (1994) proposed the Traits–Desires–Intentions–Behavior (TDIB) framework suggesting that personality traits lead to fertility desires, either positive or negative, which in turn affect fertility intentions and, finally, actual fertility behaviors. The TDIB framework has three levels: biological, psychological, and social. That is, humans are genetically predisposed to have sex (i.e., biological), to bond with partners—to recognize and interpret each other's minds (i.e., psychological), yet to control conception (i.e., social). Thus, the TDIB theory suggests that human reproductive behaviors should be understood as a holistic conceptual framework: the biological, psychological, and social contextual factors are interrelated. Therefore, meaningful examination must occur through relationships with the whole individual; analysis of a single component in isolation may obscure the role that these factors play in determining reproductive behavior.

However, to date, most research on determinants of human fertility has been conducted

within a single scientific discipline. In particular, demographic studies have tended to treat psychological and biological factors as the unobservable that should be controlled. Even so, consideration of the effects of these previously ignored determinants of fertility outcomes is growing. For example, in addition to Miller's seminal works (Miller 1992; 1994), Jokela and his fellow psychologists (e.g., Jokela et al. 2011; Jokela et al. 2009; Jokela 2009) found significant effects of personality traits and physical attractiveness on fertility outcomes. No studies have examined all three of Miller's levels of organization in a single model to predict reproductive behaviors. Furthermore, differing definitions and measurements of personality traits have led to inconsistent findings across existing studies.

Therefore, the central position guiding the current study is that an individual's reproductive behavior is a holistic process involving psychological, biological, and social influences throughout his or her life. Specifically, by using three large longitudinal studies—Wisconsin Longitudinal Study (WLS), Midlife Development in the United States (MIDUS), and Americans' Changing Lives (ACL)—the current study aims to estimate the effects of personality traits, physical attractiveness, intelligence, and socioeconomic factors on transition to parenthood (i.e., tempo of fertility) and on number of children born (i.e., quantum of fertility).

BACKGROUND

Personality and Fertility

Although recent evidence has shown that fertility is increasing in some highly developed countries (Myrskyla, Kohler, and Billari 2009), weakening biological and societal pressures may make fertility decisions more dependent on individual preferences and predispositions such as personality traits, physical attractiveness, and intelligence. However, the effects of these factors

on fertility outcomes in large samples are almost unexplored. Recently, in a series of papers, Jokela and colleagues investigated the effect of personality and physical attractiveness on fertility outcomes. Using the WLS and MIDUS data, Jokela et al. (2011) reported that high extraversion, low neuroticism, and low openness of both sexes were positively associated with the number of children, whereas high agreeableness and low conscientiousness in women were positively correlated with number of children. Similarly, in a study with a large sample of young Finns, Jokela et al. (2010) found that low novelty seeking, low harm avoidance, high reward dependence, and low persistence were associated with a higher probability of childbearing. Analysis of the same Finnish data (Jokela et al. 2009) suggested that sociability is more important in predicting whether a person will become a parent, whereas emotionality may be more important in predicting stopping behavior beyond the first child.

Using data from the British Household Panel Survey, Tavares (2010) reported results qualitatively similar to Jokela et al. (2011). She found that high levels of agreeableness, extroversion, and neuroticism predicted earlier childbirth, and high levels of conscientiousness and openness were associated with the postponement of motherhood. A longitudinal study of German adolescents who were born in 1970 showed that the level of neuroticism measured at age 14 was associated with a decrease in hazard of childbearing by age 38 (Reis, Dörnte, and Von der Lippe 2011). Alvergne, Jokela, and Lummaa (2010) found a significant effect of personality on fertility even among families living in rural Senegal, a high-fertility, polygynous society. However, the pattern was somewhat different in more developed countries such as the U.S., Finland, and the U. K. Neuroticism in women was positively associated with total number of children, whereas in men extraversion was significantly and positively associated with social status and total number of children.

In addition to the Big Five personality traits, other related personality characteristics have been reported to correlate with fertility outcomes. Using the risk preference measures of the Panel Study of Income Dynamics (PSID), Schmidt (2008) found that among both unmarried and married women, greater tolerance for risk was associated with childbearing at younger ages, which confirms the notion that these women are less likely to use contraceptive methods effectively. Also, women who are high in risk tolerance and are college educated are more likely to delay childbearing as they approach menopause than their more risk-averse counterparts. Similarly, in a prospective study of 1,313 Finnish adolescents, Jokela and Keltikangas-Järvinen (2009) found that men and women with high leadership personalities, that is, status-striving components of type A personality that denote eagerness to win competitions and preference to act as a leader, are more likely to have children by age 39 than those with low leadership.

However, not all studies have found associations between personality traits and fertility outcomes. For example, data from 545 British adults collected from an internet survey showed no significant difference in extraversion between those who had children and those who did not (Nettle 2005). However, those who had children by more than one partner were significantly higher in extraversion than those who had them by only one partner. Similarly, in a large sample of Australian twins, Eaves et al. (1990) failed to find a significant effect of extraversion and neuroticism on the number of offspring. Furthermore, among 82 twin pairs who were reared apart, Mealey and Segal (1993) found that reproductive success was associated only with childhood health, not personality traits. It should be noted that these studies tend to be based on small samples and, thus, the lack of statistical power may have resulted in the null findings. Moreover, these studies may not be representative of the target population. In particular, Nettle's (2005) data from an internet survey are susceptible to the selective sample problem because

internet users tend to be younger and more educated than the general population.

One limitation of Jokela et al. (2011), one of the most prominent studies in this area of research, is that they controlled for a limited number of confounders in their models. In their model predicting total number of children, they controlled only for sex, age, parental socioeconomic status (SES), education, whether ever married, and age at first marriage. Given the complex nature of human fertility, their predictors are vastly insufficient. For instance, Jokela failed to account for the effect of religion on fertility outcomes. Ample evidence suggests that religious affiliation, religious participation, and religious denomination are associated with fertility in the U.S. (Mosher, Williams, and Johnson 1992; McQuillan 2004; Mosher, Johnson, and Horn 1986). Reis et al. (2011) also indicated that Jokela et al. (2011) showed only association and did not elaborate on mechanisms linking personality traits to fertility behavior. In addition to social support, which Reis et al. (2011) mentioned, the effect of other basic socioeconomic indicators, such as income and employment, should be explored.

Physical Attractiveness and Fertility

The evolutionary psychology literature suggests that physical attractiveness has an independent impact on human fertility above and beyond other socioeconomic factors. For example, in an analysis of the WLS data, Jokela (2009) found that, compared to the combined group of not attractive and moderately attractive women, attractive and very attractive women had 16% and 6% more children, respectively. Men in the least attractive quartile had 13% fewer children than those in the others, who did not differ from each other in the average number of children. With respect to timing of fertility, Jokela reported that in women, attractiveness increased the probability of having children. However, after the second child, attractive rather than very

attractive women were most likely to have children. For the third and fourth child, very attractive women were as likely to have children as those in the two lowest attractiveness quartiles. Men in the lowest attractiveness quartile were less likely than men in the other quartiles to have children at all parities.

Some scholars with evolutionary perspectives have postulated that physical attractiveness is associated with mate choice and fertility outcomes (Buss and Schmitt 1993) because it can provide accurate information about a potential mate's health status and fecundibility (Grammer et al. 2003). In addition, considerable evidence supports this notion. For example, Jasienska et al. (2006) collected saliva samples for an entire menstrual cycle from 183 Polish women to measure their estradiol levels. The authors argued that estradiol produced during the menstrual cycle is crucial for successful conception, and levels of estradiol are important indicators of a woman's ability to conceive. They found that women who were more symmetrical had higher levels of estradiol than their less symmetrical counterparts. Similarly, Soler et al. (2003) reported significant correlations between semen quality – measured with sperm motility, morphology, and concentration – and facial attractiveness in a sample of Spanish adult men ($N = 66$). The authors proposed that high-quality semen is an indicator of good physical health, which is closely associated with higher likelihood of conception. However, it should be noted that Peters, Rhodes, and Simmons (2008) failed to support Soler et al.'s results in a larger sample of Australian men.

Unlike the studies based on evolutionary psychology that view physical attractiveness as a manifestation of genetic predisposition, studies from sociobiology have emphasized the role of sexual behaviors as a mediator in the effect of physical attractiveness on fertility outcomes. Mazur et al. (1994) rated facial dominance and submissiveness of high school males ($n = 58$), who were all white and recruited as part of a large longitudinal study during grades 7 and 8,

using high school yearbook photos and observed their sexual activities. They found that dominant-looking students are more attractive and likely to experience sexual intercourse at earlier ages than their submissive-looking counterparts. Similarly, Prokop and Fedor (2011) argued that physically attractive men are more likely to get married than their less attractive counterparts and, therefore, have a greater number of children at the end of their reproductive career.

Given the advancements in modern contraceptive technologies (Potts 1997), however, superior physical attractiveness may not translate into a greater number of offspring. Using photographs of 88 Austrian women in a rural town, Pflüger et al. (2012) found no association between physical attractiveness and number of children among those who used hormonal contraceptives. However, the authors found a significant and positive association between physical attractiveness and number of children among those who did not use hormonal contraceptives. Furthermore, Pawlowski et al. (2008) also found no effect of physical attractiveness on reproductive success among women in rural Poland. The authors suggested that knowledge about contraceptive methods was prevalent and that contraception was widely practiced among rural Polish women, the vast majority of whom are Catholic.

Intelligence and Fertility

The association of intelligence and fertility has been controversial and drawn substantial attention for more than a century (Preston and Campbell 1993; Lynn and Van Court 2004). A negative association between intelligence and fertility, known as dysgenic fertility, was thought to entail a decrease in the mean level of intelligence at the population level over the long run. Retherford and Sewell (1988) examined the reproductive experience of the WLS respondents

and revealed that IQ had a small but statistically significant negative effect on the number of offspring. The negative effect was significantly larger for women than for men. More recently, Rodgers et al. (2000) analyzed IQ scores among the National Longitudinal Study of Youth 1979 (NLSY79) sample and found that low-IQ parents make large families, but large families do not make low-IQ children. However, Olneck and Wolfe (1980) failed to find any significant association between IQ and family size among the Kalamazoo Sample of Brothers and the National Bureau of Economic Research-Thorndike-Hagan (NBER-T-H) sample of Caucasian men. Using the General Social Survey data, Lynn and Van Court (2004) argued that the association between fertility and intelligence, which was based on a vocabulary test score, has been consistently negative for all birth cohorts from 1900-1919 through 1970-1979.

At the population level, Preston and Campbell (1993) demonstrated that the concern that fertility differentials would lead to a decline in the mean level of intelligence is largely based on a fallacious analogy to closed subpopulations. Their simulation studies showed that although a negative correlation between intelligence and fertility may be observed, once mobility between parent and child scores is admitted into a model of IQ inheritance, equilibria were reached in the population IQ distribution even with continued fertility differentials. In other words, the intuition that higher fertility among those with low IQ would lead to lower IQ over time is incorrect because changes in scores from parent to child are common. Furthermore, Flynn (1984) surveyed 73 studies that examined the mean IQ in the U.S. and concluded that Americans experienced a massive increase in IQ between 1932 and 1978.

Retherford and Sewell (1989) argued that the effect of IQ on fertility is mediated by education. Their path analysis of the WLS data revealed that the effects of IQ on fertility are explained almost completely by education. They also found that education explains both the

negative effect of IQ on fertility and its more negative effect for women than men. The authors noted, however, that the result does not necessarily indicate that education can be used as a proxy for IQ given the weak correlation between IQ and education.[1]

More recently, Neiss, Rowe, and Rodgers (2002) addressed the mediating role of education between intelligence and age at first birth using the NSLY79 sample and behavioral genetic models. Their results indicated that education only partially mediates the relationship between intelligence and age at first birth, and intelligence also has a significant direct impact. They suggested that education *per se* may not delay entry into parenthood, but unobserved individual differences may be linked to higher IQ as well as individual propensities to pursue higher education, both of which can lead to delayed fertility. They argued that intelligence can affect fertility outcomes through three pathways: First, higher intelligence may be associated with a greater future orientation which inhibits premature parenthood; second, persons with higher intelligence are more likely to foresee negative consequences of having children; and third, high intelligence is associated with greater use of contraception.

Taken together, the current study addresses three fertility-related hypotheses. First, the present study aims to extend the Jokela et al. (2011) study by incorporating a more extensive number of covariates that can predict the association between Big Five personality traits and timing of births and total number of children. In particular, the effect of employment, income, and religious affiliation and their interactions with gender are explored. Second, this study explores the possibility that physical attractiveness can affect fertility outcomes among the modern human population. Third, the current study explores the association between intelligence and fertility outcomes. In doing so, it examines any mediating variables, such as education,

[1] Retherford and Sewell (1989) noted that among the WLS graduates the correlation between IQ and educational attainment is 0.42, which means that only 18% of the variance in IQ can be explained by education.

between the two variables.

METHOD

Data

The current study draws data from three sources: the WLS, ACL, and MIDUS. The WLS is a study of a random sample of 10,317 males and females who graduated from Wisconsin high schools in 1957 and their randomly selected siblings (Sewell et al. 2003). Survey data were collected from the original respondents or their parents in 1957, 1964, 1975, 1993, 2003, and 2010 (graduate sample) and from selected siblings in 1977, 1994, 2005, and 2010 (sibling sample). The present study uses only the graduate sample because facial attractiveness ratings were conducted only for this sample.[2] All other measures are available in the sibling sample as well. It should be noted that although WLS respondents are generally representative of non-Hispanic white women and men with a high school education, which constitute more than two-thirds of Americans in retirement age, they are not a random sample of the U.S. population (Sewell et al. 2003). In addition, the WLS has only a handful of racial/ethnic minorities (blacks, Hispanics, or Asians).

The MIDUS is a national multistage probability sample of non-institutionalized English-speaking adults ages 25-74 (N = 7,189) recruited by telephone (Brim, Ryff, and Kessler 2004). Telephone interviews and mail questionnaires were administered in 1995-1996 (MIDUS I) and 2004 (MIDUS II). The main strength of the MIDUS is that a team of multidisciplinary scholars designed and collected data on numerous psychological constructs such as personality traits,

[2] Relative body mass index (RBMI), proposed by Reither, Hauser, and Swallen (2009) using the WLS high school yearbook photos, was considered as a proxy for physical attractiveness. However, the measure is also available only for the graduate sample.

sense of control, positive and negative affect, goal commitment, and well-being that can broaden and deepen the scope of demographic research by linking to psychology (Brim et al. 2004). However, it should be noted that the MIDUS participants were more likely to have high school education or above and less likely to be African American than the whole U.S. population in the same age range (Brim et al. 2004). Moreover, the retention rate between the first and second waves was only 75%, indicating considerable attrition.

The ACL is a longitudinal study of middle-aged and older black and white Americans with a particular emphasis on aging, health, and social conditions (House, Kessler, and Herzog 1990; House et al. 1994). The survey began in 1987 (N = 3,617), and the second through fourth waves were administered in 1989, 1994, and 2001/2002, respectively. Although the ACL re-interviewed 1,427 original participants (81% of survivors, including 108 proxy interviews) in 2011/2012,[3] public data are available until the fourth wave (2001/2002) at the time of writing this dissertation. The ACL was designed to understand various psychosocial and behavioral factors on maintenance of health and effective functioning (House, Lantz, and Herd 2005). One strength of the ACL is that the data over-sampled blacks and those aged 60, as well as older non-blacks and those under age 60.

Measures

Facial Attractiveness

During summer 2004, 33 judges who participated in the Madison Senior Scholars program were recruited to rate and code facial attractiveness of WLS respondent yearbook photos. The mean age of the judges was 78.5 years and ranged from 63 to 91. A total of 3,007 WLS respondent

[3] More details of the ACL can be found at http://www.isr.umich.edu/acl/index.htm.

yearbook photos from 1957 and a sub-sample of 258 WLS respondent yearbook photos from 1956 were randomly selected and rated (Meland 2002). Figure 1 provides an example of the facial attractiveness scale. Six men and six women rated each yearbook photo using an 11-point rating scale (1 = *not at all attractive*, 11 = *extremely attractive*).[4] Due to the large volume, the photos were divided into 10 groups, roughly 300 per group, with the last group consisting of photos from 1956. The judges rated 300 photos per coding session and were required to take at least 12 hours off between sessions. Although several judges coded multiple sets of photos, only a few coded all 11 groups. During summer 2008, an additional 5,606 yearbook photos were selected and rated using the same procedures as in 2004. Cases with fewer than 11 ratings and photo ratings with minor errors were removed, leaving a final sample of facial attractiveness that included 8,625 individuals. Mean ratings across 12 judges were computed and standardized (i.e., mean = 1 and SD = 0). It should be noted that measuring physical attractiveness by photographs may be influenced by the quality of the picture (Meland 2002). For instance, some individuals may look better in a photo than in reality. Also, given that the photos were in black and white, the effect of complexion may be obscured.

[Figure 1 About Here]

At the end of the first and second round of the ACL, interviewers rated respondents' appearance and attractiveness with a 5-point scale (1 = *very attractive or beautiful*, 5 = *very unattractive*), which was reversed-coded so that higher values represented greater attractiveness. For those interviewed in the first two rounds of the survey, the means of the two attractiveness ratings were used as overall physical attractiveness. Available values were taken for those who missed one of the first two rounds. Note that although the second wave of the ACL was three

[4] Alwin (1997) suggested that 11-point scales are more reliable and not more vulnerable to shared method variance than 7-point scales.

years after the first wave, there was a statistically significant relationship between the two measures (χ^2 = 785.71, 16 df, $p < 0.001$). Although ratings of attractiveness in the ACL may not have been affected by the extent of being photogenic, the respondent's clothes, accessories, or tidiness of the house could have had an influence. Also, it is possible that the interviewer's rating may have been influenced by friendliness of the respondent.

It should be noted that the MIDUS did not measure physical attractiveness of the respondents. Also, it did not provide any variable that can approximate physical attractiveness.

The Big Five Personality Traits

The WLS administered the BFI-54, a relatively short instrument that assesses the Five-Factor Model of Personality dimensions (Hauser, Kuo, and Cartmill 1999), in telephone surveys (only two items for each dimension) and mail surveys (five or six items for each dimension) during 1992-1993 as well as in mail surveys during 2003-2005. Responses were coded using a 6-point scale (1 = *strongly agree*, 6 = *strongly disagree*). *Extraversion* was measured as the sum of ratings for the following items: I see myself as someone who is talkative; is reserved; is full of energy; tends to be quiet; is sometimes shy, inhibited; generates a lot of enthusiasm. *Agreeableness* was measured as the total score for the following items: I see myself as someone who tends to find fault with others; is sometimes rude to others; is generally trusting; can be cold and aloof; likes to cooperate with others. *Conscientiousness* was represented by the total rating score for the following: I see myself as someone who does a thorough job; is a reliable worker; tends to be disorganized; is lazy at times; does things efficiently; is easily distracted. *Neuroticism* was measured by the total rating scores of these items: I see myself as someone who can be tense; is emotionally stable, not easily upset; worries a lot; remains calm in tense situations; gets

nervous easily. *Openness* was the sum of ratings for the following items: I see myself as someone who prefers the conventional, traditional; prefers work that is routine and simple; values artistic, aesthetic experiences; has an active imagination; wants things to be simple and clear-cut; is sophisticated in art, music, or literature. Note that 14 of the 29 items were reverse-coded when constructing the personality measures, so that a higher total score represents a greater personality trait (e.g., "talkative," "full of energy," and "a lot of enthusiasm" items for extraversion were reverse-coded).

The coefficient of reliability (Cronbach's α) for each personality trait suggested that although extraversion (.76) and neuroticism (.75) indicated satisfactory reliability, the other traits did not. However, Zeng and Hauser (2007) suggested that alpha is not an appropriate measure of reliability in this context because many other factors are at work and because, more importantly, the items were rotated in the instruments. Alternatively, this may be due to random error, which reduces the validity of a scale score. Randomly responding, such as marking answers without thinking about the item content, is a major source of random error; carelessness and misunderstanding questions are also causes (Piedmont et al. 2000). Hill et al. (2011) noted that aberrant response patterns are likely to emerge, thereby increasing the random error particularly when older respondents are asked to answer a lengthy questionnaire. To detect inconsistencies, Tellegen (1988) proposed several indices, including the True Response Inconsistency (TRIN) scale and the Variable Response Inconsistency (VRIN) scale. TRIN is calculated with item pairs that are *opposite* in content, and inconsistency is marked when a respondent answers both items in the same way. For example, if an individual answers "strongly agree" to both "I see myself as someone who is talkative" and "I see myself as someone who tends to be quiet," then this would suggest an aberrant response. On the other hand, the VRIN is based on item pairs that are *similar*

in content and inconsistency results when an individual answers both items in a different way. For instance, if a respondent strongly agreed with the statement “I see myself as someone who is reserved,” but strongly disagreed with “I see myself as someone who tends to be quiet,” then this suggests an aberrant response.[5]

Similar to Hill et al.'s (2011) approach to reduce random errors in the Health and Retirement Survey (HRS) data, I calculated TRIN and VRIN for the five personality traits. First, I formed item pairs within each personality trait: 15 pairs of items for extraversion, agreeableness, conscientiousness, and openness and 10 pairs for neuroticism. Second, because not all the pairs have similar or opposite content, I relied on correlations among the items within a trait. I ranked the top 10 item pairs by the size of their correlation coefficients regardless of the sign (positive or negative). Third, I constructed a series of dummy variables that indicated whether an individual’s answer to each item pair was consistent (1= *inconsistent*; 0 = *consistent*). Finally, I summed the 10 dummy variables for each respondent. Therefore, my inconsistency measure simply reflected the number of aberrant answers. The total number of inconsistent answers ranged from 0 to 23. Hill et al. (2011) eliminated respondents who answered inconsistently to 20% of the items. I excluded individuals who answered 10% of the items inconsistently because the WLS provides a much larger sample than the HRS data Hill et al. used. The results, however, were not promising. Although there were some increases in the alpha values for each trait, they were not substantial. Moreover, the exclusion of respondents who answered inconsistently to only a portion of the large number of items may not necessarily lead

[5] Tellegen (1988) and Piedmont et al. (2000) noted that an individual can be quiet on one occasion and talkative on another. That is, the seemingly aberrant response pattern may represent a real personality trait for the person. Similarly, respondents who answered all questions consistently may not necessarily reveal their true personality (Piedmont et al. 2000). Nonetheless, in practice, it is almost impossible to measure true personality even with informant reports, and random errors may lead to eccentric results.

to better outcomes. Furthermore, given that personality traits were measured in two waves, exclusion of inconsistent responses by a list-wise process would result in substantial loss of cases. Indeed, Tellegen (1988) reviewed several scales and argued that they do not necessarily help to increase validity, suggesting that researchers attempt to build better instruments rather than detect and exclude invalid cases.

On the other hand, in the MIDUS each person was asked about how much he or she agreed with adjectives describing his or her personality using four scales (1 = *a lot*, 2 = *some*, 3 = *a little*, and 4 = *not at all*). If necessary, some variables were reverse-coded so that high scores reflected higher levels of the trait, and means were taken for each item set. Followings are adjectives for each trait: *Openness* – creative, imaginative, intelligent, curious, broadminded, sophisticated, and adventurous; *conscientiousness* – organized, responsible, hardworking, and careless; *extraversion* – outgoing, friendly, lively, active, and talkative; *agreeableness* – helpful, warm, caring, softhearted, and sympathetic; and *neuroticism* – moody, worried, nervous, and calm. The mean value of each trait was taken for those who participated in waves I and II. If a person participated in only one wave, the available value was taken. Then each trait score was standardized – transforming to mean value of 1 and standard deviation of 0. Coefficients of reliability were 0.74, 0.78, 0.77, 0.58, and 0.80 for neuroticism, extraversion, openness, conscientiousness, and agreeableness, respectively.

Finally, the ACL measured only neuroticism and extraversion with a series of questions that asked whether the respondent agreed with the following: *Neuroticism* – would you call yourself a nervous person?; are you a worrier?; does your mood often go up and down?; do you often feel fed up?; would you call yourself tense or “high-strung”? *Extraversion* – are you a talkative person?; do you usually take the initiative in making new friends?; do you tend to keep

in the background on social occasions?; are you mostly quiet when you are with other people? Items for each trait were recoded, if necessary, to make higher scores on the index reflect a higher level of the trait. Note that the ACL measured these personality traits only in the baseline survey in 1987. The reliabilities were 0.71 and 0.70 for neuroticism and extraversion, respectively.

Intelligence

In the WLS data, the Henmon-Nelson (H-N) mental ability test measured the cognitive ability (IQ) in the junior year of high school (1956). The H-N test, consisting of 90 verbal and quantitative items, was administered in all Wisconsin high schools at various grade levels from the 1930s through the 1960s. Evidence suggests that the test is highly reliable (Hauser, Tsai, and Sewell 1983). The MIDUS provides a composite measure that was constructed by computing the mean of *z*-scores for five tests: word recall (immediate and delayed), digits backward, category fluency, number series, and backward counting (Ryff and Lachman 2013). The coefficient of reliability for the composite measure was .712. The ACL administered Lorge-Thorndike (L-T) sentence completion items that asked respondents to put an appropriate word in a blank to complete a sentence (House 2010).[6] The total score for right answers for a series of questions was construed to indicate the verbal intelligence score, which is used as a proxy for IQ.

Although the H-N and L-T tests can reliably measure general mental ability (Strenze 2007; Almlund et al. 2011), age of the respondents at the time that these tests were administered differs across the three data sets. That is, in the WLS, the H-N test was administered when the respondents were in high school whereas mental ability tests were conducted when participants

[6] One example of questions is “Not every cloud gives [blank]” and respondents were given “weather,” “shade,” “sky,” “climate,” and “rain” as appropriate words to complete the sentence.

were in middle age in the other two data sets. In fact, during the 2003-2005 round, the WLS administered six tests of cognitive ability: word recall (immediate and delayed), digit ordering, a Wechsler Adult Intelligence Scale (WAIS-R) similarities test, and letter and category frequency (Yonker, Hauser, and Freese 2007). Feingold (1982) documented that WAIS scores are significantly correlated with a variety of intelligence measures, including verbal IQ, and argued that WAIS can be used as a global measure of an individual's intellectual ability. For better comparability across data sets, the effect of the WAIS in the WLS was also tested.

It should be noted that performance on standardized IQ tests may be affected by an individual's motivation. For instance, some experimental studies have found that offering incentives such as cash or candy is associated with an increase in test scores, particularly among those with low IQ scores (Almlund et al. 2011). High test anxiety may also lead to poor performance on the IQ test. In addition, various IQ tests require factual knowledge from formal schooling; thus, low SES groups with less education are less likely to perform well on standardized IQ tests (Almlund et al. 2011).

Analyses

Analyses consisted of two parts. First, logistic regressions estimated discrete time hazard models of age at first birth. The discrete time event history technique produces results almost identical to those of continuous time hazard models (Singer and Willett 2003; Allison 1982). However, the discrete time event history approach is more straightforward for incorporating time-varying covariates and duration dependence into the model (Jenkins 1995). The dependent variable in the discrete time model is a dichotomous indicator of whether the respondent experienced a live birth in consecutive years, given that no birth occurred by the beginning of the interval. Once a

birth occurs, the individual is no longer exposed to the risk of first birth and is removed from the risk set. Additionally, individuals who did not experience a birth until the most recent interview year were treated as censored at that year. Logistic regressions of the following form were estimated:

$$\log\left(\frac{p_t}{1-p_t}\right) = \alpha + \sum_{i=1}^{5}\beta_i PT_i + \sum_{j=1}^{5}\beta_j PA_j + \beta_k IQ + \sum \beta_n X_n$$

where P_t is the probability of first birth at discrete time period t, conditional on survival in period t-1; PT_i refers to one of the Big Five personality traits; PA_j denotes a dummy variable indicating a quintile of physical attractiveness; IQ is an intelligence score; and X_n denotes a vector of control variables.

Using Poisson regression, the second part of the analyses predicted the total number of children born. Poisson regression assumes that the count for individual i is drawn from the Poisson distribution with a mean of μ_i (Long and Freese 2006). Poisson regression of the following form was estimated:

$$\mu_i = \exp(\alpha + \sum_{i=1}^{k}\beta_i x_i)$$

Note that only the number of children born to respondents who were age 40 and older by the last wave of each survey was computed. In addition, because there was no indication of over-dispersion in the observed number of children, Poisson regressions were estimated rather than the negative binomial regression.

RESULTS

Descriptive statistics for analysis of the WLS sample are presented in Table 1, separated by sex. Note that only white respondents were selected so as to make the sample as comparable to the

MIDUS and ACL as possible.[7] The results suggest significant differences in personality profiles between men and women in the WLS. On average, females in the WLS showed a significantly higher level of extraversion, agreeableness, conscientiousness, and neuroticism than males. However, females had a significantly lower level of openness than males.[8] These significant gender differences in personality traits have been documented in other studies as well (Ackerman and Heggestad 1997). The scores for Henmon-Nelson and WAIS tests indicated that intelligence, either during high school years or older ages, did not significantly differ between sexes in the WLS. Also, the results showed that men and women had similar sociodemographic characteristics and family backgrounds. However, there were a few exceptions. It appears that females, on average, had a significantly higher rank during high school years, but they tended to complete significantly fewer years of schooling than males. In addition, females were less likely to be first-born child in their family, had a greater number of siblings, and had more children at the end of their reproductive career than males.

[Table 1 About Here]

Transition to Parenthood

Results from estimating the discrete time event history model predicting transition to parenthood for males and females in the WLS are presented in Table 2 and Table 3, respectively. The values shown in both tables are odds ratios and values less than 1.0 indicate a decreased risk of first birth in the interval (i.e., two consecutive years), and values greater than 1.0 indicate an

[7] The ACL includes a substantial share of blacks because it oversampled them (House 2010). Respondents in the MIDUS and ACL were also restricted to whites, and descriptive statistics for variables used in the analysis of these two data sets are presented Table A.1.

[8] Two-sample *t*-tests indicated that mean difference in all personality traits by gender is statistically significant at the .01 level.

increased risk of first birth. In both tables, model 1 includes personality traits, physical attractiveness, and H-N scores as well as time and time squared. The second models in both tables added high school rank in addition to family background and religious affiliation variables. The third model added completed years of schooling rather than high school rank, and the final model added the WAIS score instead of the H-N score to model 3.

The results for model 1 in Table 2 indicate significant effects of personality traits, physical attractiveness, and intelligence on men's transition to fatherhood. For males in the WLS, a one-SD increase in extraversion is associated with a 16.4% increase in odds of first birth while a one-SD increase in openness reduces the odds of first birth by 7.6%. The remaining three personality traits, however, did not have significant effects on the odds of men's first birth. Moreover, men in the highest quintile of physical attractiveness (i.e., most attractive) were 37.3% more likely to experience fatherhood than their least attractive counterparts. Also, one additional score on the H-N test reduced the odds of fatherhood in an interval by 0.5%.

The results for model 2 are generally similar to those in model 1. The magnitudes of coefficients for personality traits and physical attractiveness do not differ substantially across the two models. The effect of H-N score, however, loses statistical significance, indicating that the effect of intelligence on fatherhood is mediated by high school rank as well as socioeconomic attainment. The results also show that a one-point increase in the high school rank reduces the odds of first birth by 0.6%. While a father's education reduces the respondent's odds of first birth, somewhat expectedly, parents' income raises it. Furthermore, in accordance with past studies on intergenerational transmission of fertility behaviors (Steenhof and Liefbroer 2008; Barber 2001), a one-year increase in the father's age at the birth of his first child is associated with a 1.7% decrease in the odds of the son's transition to fatherhood. Catholics and Protestants

are 26% and 25%, respectively, more likely to experience fatherhood than those without religion or having another religion.

Model 3 added completed years of schooling rather than high school rank to model 2. The differences in the BICs and AICs from the two models indicate that model 3 is very strongly preferred (Raftery 1995). The results for model 3 are generally similar to those in model 2, with one exception. The coefficient for openness loses statistical significance, meaning that the effect of openness on the odds of first birth is mediated by educational attainment. Results for model 4 indicate that adding WAIS scores instead of H-N scores to model 3 has little effect.

[Table 2 About Here]

The results for females are shown in Table 3. Results for model 1 indicate that personality traits, physical attractiveness, and intelligence are significantly associated with the odds of first birth among WLS females as well. For females in the WLS, a one-SD increase in extraversion is associated with a 12.1% increase in the likelihood of first birth, while a one-SD increase in openness reduces the odds of first birth by 16.7%. In contrast to the results for males, the effect of agreeableness is significant and each SD increment in it raises the odds of first birth by 8.8%. Similar to the results for males, the coefficients indicating quintiles of physical attractiveness show that the most attractive women are 44.1% more likely to experience motherhood than their least attractive counterparts. As found among men, each increment in the H-N score is associated with a 0.6% reduction in the odds of first birth.

Compared with model 1, the coefficients for personality traits, physical attractiveness, and intelligence in model 2 do not differ substantially. Similar to the results for men, each increment in high school rank reduces the odds of first birth by 1.1%. Although a father's education is significantly and negatively associated with the likelihood of motherhood, similar to

the results for males, parents' income is not. In contrast to men, first-born women are 8.2% more likely to experience motherhood relative to higher order women. In line with the socialization literature suggesting that the same-sex dyads (father-son and mother-daughter) show stronger similarity than different-sex dyads (Acock and Bengtson 1978), an additional one-year difference in the mother's age at her first childbirth is associated with a 2.6% decrease in her daughter's odds of first birth. Like males, Catholic and Protestant women are 28% and 27%, respectively, more likely to experience motherhood than those with no or another religion.

Model 3 included completed years of schooling instead of high school rank. Comparing the BIC and AIC between model 2 and model 3 suggested that the latter is very strongly preferred (Raftery 1995). Although the magnitude and signs of coefficients for predictors in model 3 are similar to those in model 2, the effect of the H-N score loses statistical significance, indicating that the effect of intelligence on fatherhood is mediated by educational attainment. Finally, results for model 4 suggest that including the WAIS score instead of H-N has little effect.

[Table 3 About Here]

To better understand the effects of personality traits, physical attractiveness, and intelligence on fertility timing, I estimated additional models using the MIDUS and ACL, and the results are presented in Table 4 and Table 5, respectively. It should be noted that the results from these data sets cannot be directly compared with those from the WLS. Nonetheless, to increase the comparability across the three data sets as much as possible, samples from the MIDUS and ACL were restricted to whites, and independent variables similar to those in the WLS were selected or constructed. Furthermore, in both tables, the first model included personality traits, physical attractiveness, and intelligence as well as time and time squared. The

second model added family background and religion to the first model, and the final model introduced educational attainment to the second model. Among many limitations of these data sets, the principal ones are that the MIDUS does not have a measure for physical attractiveness and that the ACL provides only extraversion and neuroticism among the Big Five traits.

Among males in the MIDUS, the results for model 1 in Table 4 show that a one-SD increase in extraversion is associated with a 15.2% increase in the odds of first birth, whereas a one-SD increase in neuroticism and openness reduces the likelihood of fatherhood by 6.6% and 20.6%, respectively. Also, each SD increment in the composite measure of intelligence is associated with an 11% reduction in the odds of first birth. Adding family background variables in model 2 did not change the results for model 1. The results for model 2 indicate that greater numbers of siblings and being Protestant raise the odds of first birth, whereas the father's education reduces it. Adding educational attainment in model 3 improves model fit significantly (L^2 = 18.11 with 2 *df*), but it did not change coefficients for personality traits. However, the effect of intelligence loses statistical significance, suggesting that the effect of intelligence on fatherhood is mediated by educational attainment. Compared with those having less than high school education, high school graduates are not statistically different while those with more than high school education are 37.6% less likely to experience fatherhood.

Results for females in the MIDUS are generally similar to those for males, with some exceptions. One notable difference is that the effect of intelligence on women's transition to motherhood remains statistically significant across the three models. Unlike males, women with high school education are significantly less likely to experience motherhood than those with less than high school education. Also, contrary to results for males, mothers' and fathers' education is significantly and negatively associated with the odds of first birth among females.

[Table 4 About Here]

Among males in the ACL, the results for model 1 in Table 5 indicate that two personality traits, physical attractiveness and intelligence, are not significantly associated with the odds of first birth. However, when family background variables are introduced, the coefficient for extraversion becomes significant and suggests that a one-SD increase raises the odds of first birth by 12.9%.[9] Also, each year increment in a father's education reduces the likelihood of first birth by 6.6% while being Protestant increases the odds 51.2% compared to those without religion. Including educational attainment in model 3 did not change these patterns.

Results for women in the ACL, in large part, parallel those for males. An important difference between males and females in the ACL is that physical attractiveness is significantly and positively associated with odds of first birth among females. The most attractive women are 5.4 times more likely to experience motherhood than the least attractive women. Among females in the ACL, a one-SD increase in extraversion is associated with an 8.8% increase in the odds of first birth. Somewhat unexpectedly, among the ACL females, neuroticism is also positively associated with the likelihood of transitioning to motherhood.

[Table 5 About Here]

A series of Cox proportional hazards models was fit[10] to explore the effect of personality traits, physical attractiveness, and intelligence on the transition to higher order births. The results are presented in Figure 2.[11] Note that the results for the transition to the second birth include only those who experienced a first birth. Likewise, transition to the third birth is restricted to those

[9] To see what caused the change of significance, I checked for the possibility of multicollinearity using collin routine in the Stata. The values of the variance inflation factor (VIF) were smaller than 10, meaning that multicollinearity is not a major issue here.

[10] Trussell et al. (1985) suggested that the Cox proportional hazard model is more appropriate than the conventional life-table approach for analyzing birth intervals with the presence of covariates. According to Trussell et al. (1985), the reason is that the number of empty cells increases as the number of covariates grows in the life tables.

[11] For the sake of parsimony, hazard ratios for control variables are not presented.

who had experienced a second birth. In addition, the sample is restricted to whites, and models controlled for the covariates in model 3 in Table 2 and Table 3. The bars indicate the estimated hazard ratios and the lines indicate 95% confidence intervals. A hazard ratio whose confidence interval does not include the value of one indicates a significant effect.

[Figure 2 About Here]

The results suggest that among males with one child extraversion was significantly associated with an increase in the odds of having a second child, net of control variables. For women with one child, being in the third and fourth quintile of physical attractiveness significantly increased the likelihood of having a second child. The results for transition to a third birth showed that only extraversion significantly elevated the odds of having a third birth among men with two children. In the case of females, agreeableness was significantly associated with an increase in the likelihood of having a third child while conscientiousness and neuroticism reduced it (about 10% for each SD increase). In addition, women in the third quintile of physical attractiveness were significantly more likely to have a third child than the least attractive women. The results for transition to a fourth child indicate that, among men, the effects of personality traits lose significance while being in the second through fourth quintile of physical attractiveness becomes significant. Among women with three children, only neuroticism marginally reduced the odds of having a fourth child.

Completed Fertility

Results from estimating the Poisson model predicting the total number of biological children ever born for white males and white females in the WLS are presented in Table 6 and Table 7, respectively. The values shown in both tables are incidence-rate ratios, which can be obtained by

exponentiating the Poisson regression coefficient (Long and Freese 2006). In both tables, models 1-4 were estimated in the same manner as in the analyses of fertility timing.

The results for model 1 in Table 6 indicate that a one-SD increase in extraversion is associated with a 6.3% increase in men's predicted number of children while each SD increment in neuroticism reduces men's completed fertility by 3.6%. Moreover, relative to the least attractive, being in the second to fifth quintile of physical attractiveness increased a man's expected number of children. Also, for one additional score on the H-N test, a man's expected number of children decreased by 0.1%.

The results for model 2 indicate that the effect of openness lost statistical significance when high school rank and family background variables were introduced. Also, the coefficient for the H-N score became insignificant. However, the magnitude of the coefficient for extraversion and physical attractiveness did not differ substantially across the two models. In addition, the results indicate that farm background increased the expected number of children by 10.9% among the WLS males. Furthermore, being Catholic or Protestant increased the expected number of children by a factor of 1.29 and 1.09, respectively, holding all other variables constant.

Respondents' completed years of schooling rather than high school rank was introduced to model 3. The differences in the BICs and AICs from models 2 and 3 indicate that the latter model is preferable (Raftery 1995). However, the results for model 3 are similar to those for model 2. The coefficient for education indicates that, for every additional year of completed schooling, a man's predicted number of children decreased by 2.8%. Finally, model 4 added the WAIS score instead of the H-N score, and the results indicate that the effect of the WAIS score was insignificant and did not improve the model fit.

[Table 6 About Here]

Results for females in the WLS are presented in Table 7. Results for model 1 show that all personality traits except conscientiousness were significantly associated with the expected number of children ever born among females in the WLS. A one-SD increase in extraversion and agreeableness raised a woman's expected number of children by 3.2% and 6.0%, respectively. On the other hand, each SD increment in neuroticism and openness decreased a woman's expected number of children by 2.6% and 8.0%, respectively. Similar to the results for males, the coefficients for quintiles of physical attractiveness indicate that women in the third to fifth quintile had a significantly higher expected number of children than the least attractive women. As found among men, each increment in the H-N score was associated with a 0.2% reduction in the completed fertility.

The results presented in model 2 show that including high school and family background variables did not change the coefficients for personality traits and physical attractiveness. However, the coefficient for the H-N score lost statistical significance in model 2. The results indicate that for one additional point in high school rank, a woman's expected number of children decreased by 0.4%. Among control variables, the coefficient for number of siblings was significant and indicated that one additional sibling raised a woman's expected completed fertility by 2.3%, net of other factors. Since number of siblings represents parents' fertility, this result is consistent with previous studies that found a transmission of completed fertility over generations within a family (Murphy 1999; Duncan et al. 1965; Anderton et al. 1987). Furthermore, mothers' age at first birth had a significant and negative effect on women's expected number of children. A one-year year delay, and thus a one-year increase in the mother's age at the birth of her first child, reduced her daughter's completed fertility by 0.8%.

In model 3, respondents' completed years of schooling replaced high school rank. Although model fit was improved significantly, the coefficients were virtually the same as those in model 2. The coefficient for education revealed that a one-year increase in completed schooling lowered the expected number of children by 4.6%. Finally, in model 4, the WAIS score was included instead of the H-N score. There was positive support for preferring model 4 over model 3 (Raftery 1995). Also, for one additional score in the WAIS test, a woman's expected number of children decreased by 0.9%.

[Table 7 About Here]

Additional Poisson models using the MIDUS and ACL were estimated, and the results are presented in Table 8 and Table 9, respectively. Again, the results from these data sets cannot be directly compared with those from the WLS. Furthermore, samples from the MIDUS and ACL were restricted to whites who were at least 40 and older at the time of first interview,[12] and independent variables similar to those in the WLS were selected or constructed.

Among males in the MIDUS, the results for model 1 in Table 8 reveal that a one-SD increase in agreeableness was associated with a 5.4% increase in the expected number of children whereas a one-SD increase in neuroticism and openness reduced it by 4.7% and 9.3%, respectively. Also, each SD increment in the composite measure of intelligence was associated with a 4.4% reduction in the expected completed parity. Adding family background variables to model 2 did not change the results for personality traits in model 1. However, the effect of intelligence lost statistical significance, suggesting that the effect of intelligence on completed fertility is mediated by educational attainment. The results for model 2 further indicate that a larger number of siblings, growing up in an intact family, and being Catholic increased the

[12] A large majority of people completes their childbearing by age 40 (Kohler, Skytthe, and Christensen 2001). Due to this age restriction, the sample size of data is smaller than the sample size used for analysis of fertility timing.

completed fertility by 1.6%, 16.2%, and 18.8%, respectively. Adding educational attainment in model 3 did not improve model fit (L^2 = 1.93 with 2 *df*), and its effect was also insignificant. Nonetheless, the coefficient for agreeableness became insignificant by including educational attainment.

Results for females in the MIDUS were generally similar to those for males, with some exceptions. One notable difference is that the effect of intelligence on women's completed fertility remained statistically significant in the three models. In contrast to males, women who grew up in an intact family did not have significantly more children. Also, women with high school education showed a significantly smaller number of expected children than those with less than high school education. Also, contrary to results for males, mothers' as well as fathers' education was significantly and negatively associated with the completed parity among females.

[Table 8 About Here]

Among males in the ACL, the results for model 1 in Table 9 indicate that extraversion and intelligence were significantly associated with the completed fertility. A one-SD increase in extraversion raised men's expected number of children by 11.2% and, for one increment in verbal intelligence score, a man's fertility increased by 7.7%. Even when family background variables were introduced in model 2, the coefficients for extraversion and intelligence remained significant. Also, each year increment in fathers' education reduced a man's fertility by 3.4%. Inclusion of educational attainment in model 3 did not change these results.

Results for women in Table 9 reveal that extraversion was not significantly associated with the completed fertility. However, physical attractiveness was significantly and positively associated with expected number of children. For instance, being most attractive increased the expected number of children by a factor of 9.9, holding all other variables constant. Furthermore,

contrary to results from males, education was significantly and negatively associated with the completed parity. For example, educational attainment beyond high school reduced a woman's number of children by 16.9%. Furthermore, being Catholic increased the expected number of children by a factor of 1.287, holding all other variables constant.

[Table 9 About Here]

DISCUSSION AND CONCLUSION

The present study explored the effect of Big Five personality traits, physical attractiveness, and intelligence on two important fertility outcomes: time to first childbearing and number of children born over an individual's reproductive career. These factors have often been overlooked in conventional demographic research and treated as unobservable. However, as fertility decisions become increasingly a matter of individual preference and genetic predispositions in low-fertility societies, there is a growing interest in those unconventional determinants among scholars in such various fields as psychology, economics, and sociology. Nonetheless, reliable and population-representative data sets that provide all of those factors are quite rare. Among the scarce data sources, Jokela and his colleagues pioneered in examining the effects of these factors on fertility behaviors using the WLS and MIDUS. Despite their important contributions to this relatively uncharted research area through a series of articles, they tended to emphasize personality traits and not account for physical attractiveness and intelligence simultaneously, which numerous studies from evolutionary psychology and anthropology have reported to have significant implications for human fertility behaviors. To overcome these limitations, the current analysis accounted for attractiveness and intelligence in addition to personality and conventional demographic factors. Moreover, the present study employed another large longitudinal study—

the ACL—in addition to the WLS and MIDUS.

The results of this study provide important evidence about the linkages between personality traits and fertility behaviors. First, among the Big Five traits, extraversion significantly accelerated childbearing among both sexes in the WLS. Moreover, extraversion was found to be positively associated with number of children born during the reproductive career in both sexes of the WLS. Evidence suggests that extraverts tend to mingle in social situations more easily and have a more active sexual life than introverts (Jokela et al. 2011; Berg et al. 2013; Turchik et al. 2010). Given the positive association between sociability and probability of childbearing (Jokela et al. 2009), it appears that outgoing behaviors and a greater number of sexual encounters related to extraversion are responsible for increasing the odds of childbearing. Furthermore, it is well established that age at first childbearing has a significant and negative effect on completed fertility. In other words, the younger the age at first birth, the greater the total number of children (Bumpass and Mburugu 1977; Bumpass, Rindfuss, and Janosik 1978; Freedman, Thornton, and Wallisch 1981). Thus, the current analysis implies that extraversion is associated with earlier childbearing, which in turn increases the total number of births.

Second, openness was found to be strongly associated with decreased probability of transition to parenthood and smaller number of births among men and women in the WLS. The results for both sexes in the MIDUS also indicated that openness was significantly and negatively associated with the two birth outcomes. The observed negative effect of openness on fertility outcomes reflects the association between openness and socioeconomic attainment (Jokela et al. 2011). According to this view, about half of the association between openness and fertility outcomes can be explained by socioeconomic attainment. An alternative explanation is that individuals with higher openness are likely to have less conservative attitudes toward family

life (Lundberg 2011) and be less willing to commit to a long-term relationship (Lundberg 2012); as a result, they are likely to postpone childbearing and have fewer children.

Third, women's agreeableness in the WLS was significantly related to earlier childbearing and higher number of children. Agreeableness reflects cooperation and trust (John and Srivastava 1999), and evidence indicates that individuals high in agreeableness are more likely to seek consensus when conflict arises in a dyadic relationship (Karney and Bradbury 1995). Hence, higher agreeableness may lead to more stable and satisfying romantic relationships, which in turn can affect fertility outcomes (Berg et al. 2013). Moreover, individuals high in agreeableness tend to be friendly, empathic, and caring, and, as a result, they are more likely to find a spouse and to consider parenthood as rewarding than their less agreeable counterparts (Jokela et al. 2011). Although a significant association between agreeableness and fertility outcomes was not found among males in the WLS, the lack of significance for men's agreeableness has been documented in past studies (Jokela et al. 2011; Berg 2013).

Finally, the hypothesized negative effect of neuroticism on fertility outcomes was not supported among men and women in the WLS. On the other hand, a significant and negative effect of neuroticism on the odds of first childbearing and completed fertility was found among both sexes in the MIDUS. Nonetheless, this result should be interpreted with caution since direct comparisons cannot be made between the WLS and MIDUS due to differences in sample compositions and model specifications. Indeed, results from the ACL indicated that neuroticism was positively associated with the odds of first birth among women. Thus, it appears that the effect of neuroticism on fertility outcomes is sensitive to model specifications and sample characteristics.

The present study also provides support for the strong and positive correlation between

physical attractiveness and reproductive success even among contemporary populations. Jokela (2009) found a significant association between physical attractiveness and fertility outcomes, both timing and size of childbearing, using only the WLS. In addition to significant and positive effect of physical attractiveness on the likelihood of transition to parenthood as well as on completed fertility among both sexes in the WLS, the results from the current study suggest that physical attractiveness significantly accelerates childbearing and raises completed parity among females in the ACL. Furthermore, contrary to the curvilinear relationship that Jokela (2009) argued, results from the current study indicate that physical attractiveness is linearly associated with the odds of transition to parenthood as well as with number of children. This conflict may be attributable to the fact that Jokela (2009) controlled for a small number of confounders.

The current investigation also sheds light on the effect of intelligence on fertility outcomes. For both genders in the WLS, intelligence measured by the H-N score was negatively associated with both the odds of transition to parenthood and completed fertility when the model did not include control variables. However, the effect of intelligence quickly lost statistical significance when high school rank or educational attainment was introduced to the model. When all models for the WLS were replicated by replacing the H-N score with the WAIS, immediate and delayed word recall, digit ordering, letter fluency, and category fluency, all of which evaluate cognitive abilities during adulthood (Yonker et al. 2007), the patterns were the same. On the other hand, intelligence in the MIDUS was a composite measure that was calculated using the tests of word list recall (immediate and delayed), digits backward, category fluency, number series, and backward counting. The results for the MIDUS indicated that although the effect of intelligence on men's fertility becomes insignificant when education is included in the model, the effect for women remains significant throughout the models.

Furthermore, results for the ACL sample were inconsistent across two outcomes and between genders. This suggests that the effect of intelligence on fertility behaviors is sensitive to measurements and sample compositions.

Control variables in the models showed signs and magnitude that existing theories of fertility outcomes suggest. In particular, the results from the WLS suggested a significant transmission of age at first birth over generations. That is, children born to a parent who experienced the birth of a first child at a young age tend to give birth at young age and vice versa (Barber 2001). Furthermore, as socialization theory suggests, daughters tend to follow their mothers' age at first birth; sons are affected by their fathers' age at first birth. In addition, the results from the WLS and MIDUS indicated that number of siblings, which represents parent's completed fertility, was significant and positively associated with respondents' number of children ever born, meaning that family size is also transmitted from parents to children. Also, parents' socioeconomic status, particularly fathers' educational attainment, appears to lead to delay in children's childbearing as well as to smaller numbers of offspring.

Despite these novel and important findings, this study has several limitations. First, measurement of key predictors was not identical. For instance, physical attractiveness was rated with high school yearbook pictures in the WLS and by an interviewer at the end of the interview in the ACL. Intelligence was also measured with different indices. However, personality traits, the main predictors under consideration, were measured with relatively similar sets of questions. Thus, the main research goals of a holistic approach to individuality and comparison of different samples were achieved in large part. As more data on personality, physical attractiveness, and intelligence accumulate, more reliable estimates will be obtained. Second, an important assumption of the current study is that personality traits are relatively stable after individuals

reach adulthood. Recently, personality scholars (e.g., Roberts, Walton, and Viechtbauer 2006; Zeng and Hauser 2007) have suggested that some dimensions of personality traits may change even during middle and old age. However, it appears that consensus among personality scholars has not yet been reached (e.g., Costa and McCrae 1994). In any event, changes in personality traits should be less salient during late adulthood than during the "demographically dense" (Rindfuss 1991) young adult years (i.e., between adolescence and age 25) that accompanies multiple life-course transitions, such as completion of schooling, marriage, employment, and fertility. Perhaps a more serious limitation is that personality was measured after the vast majority of participants had virtually completed their first childbearing in the three data sets. This might have resulted in bias of reverse causality. For a more comprehensive understanding of the association between personality and fertility behaviors, future research would benefit from prospective studies that start when participants are in adolescence or early adulthood and that have repeated measurements of personality traits and fertility outcomes.

To conclude, personality traits, particularly extraversion and openness, affect timing of childbearing and size of completed fertility for men and women even after accounting for important individual characteristics. The positive effect of physical attractiveness on fertility outcomes that evolutionary theories have suggested is also supported. The effect of intelligence on fertility outcomes appears to be mediated by education. The current study shows that, as decisions regarding childbearing are increasingly influenced by personal preferences in contemporary low-fertility societies, holistic approaches to individual characteristics that have preeminent implications for demographic behaviors are required and will become even more important in the future.

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Table 1. Summary Statistics for Variables Used in Analysis by Sex: The Wisconsin Longitudinal Study

	Male		Female	
	Mean	S.D.	Mean	S.D.
Personality Traits				
Extraversion	-0.06	0.96	0.07	0.98
Agreeableness	-0.23	0.99	0.19	0.90
Conscientiousness	-0.02	0.96	0.05	0.95
Neuroticism	-0.16	0.91	0.07	0.97
Openness	0.10	0.90	-0.07	0.97
Physical Attractiveness				
1st Quintile	0.18		0.21	
2nd Quintile	0.19		0.20	
3rd Quintile	0.22		0.19	
4th Quintile	0.22		0.19	
5th Quintile	0.20		0.20	
Intelligence				
Henmon-Nelson	102.94	15.17	102.30	14.17
WAIS	8.02	2.78	7.91	2.67
Number of Children Ever Born	2.56	1.53	2.78	1.65
Education of R	14.24	2.59	13.40	2.05
High School Rank	99.13	14.69	105.80	13.97
Parents' Income				
1st Quartile	0.20		0.23	
2nd Quartile	0.26		0.25	
3rd Quartile	0.26		0.26	
4th Quartile	0.28		0.26	
Father's Education	9.98	3.50	9.79	3.32
Mother's Education	10.76	2.77	10.46	2.78
Number of Siblings	2.96	2.30	3.15	2.50
First Born	0.46		0.42	
Intact Family	0.93		0.94	
Farm Background	0.22		0.22	
Mother's Age at First Birth	23.96	5.31	24.04	5.03
Father's Age at First Birth	27.60	5.66	27.71	5.59
Religion				
Catholic	0.36		0.39	
Protestant	0.44		0.46	
Other	0.20		0.15	
N	2,510		2,942	

Table 2. Odds Ratios from the Logistic Regression of Transition to Parenthood among WLS Males (N = 2,510)

	Model 1	Model 2	Model 3	Model 4
Personality Traits				
Extraversion	1.164***	1.163***	1.172***	1.168***
	(0.030)	(0.030)	(0.030)	(0.030)
Agreeableness	1.009	0.994	0.987	0.985
	(0.025)	(0.025)	(0.025)	(0.025)
Conscientiousness	0.987	0.991	0.991	0.990
	(0.025)	(0.026)	(0.025)	(0.025)
Neuroticism	0.995	0.989	0.988	0.987
	(0.027)	(0.027)	(0.027)	(0.027)
Openness	0.924***	0.954*	0.976	0.978
	(0.026)	(0.027)	(0.028)	(0.028)
Physical Attractiveness				
2nd Quintile	1.171**	1.160*	1.132	1.134*
	(0.089)	(0.088)	(0.086)	(0.086)
3rd Quintile	1.177**	1.168**	1.152*	1.152*
	(0.087)	(0.087)	(0.086)	(0.086)
4th Quintile	1.350***	1.319***	1.320***	1.323***
	(0.100)	(0.098)	(0.098)	(0.099)
5th Quintile	1.373***	1.378***	1.356***	1.355***
	(0.104)	(0.105)	(0.103)	(0.103)
Intelligence				
Henmon-Nelson	0.995***	1.001	1.002	
	(0.002)	(0.002)	(0.002)	
WAIS				1.007
				(0.009)
High School Rank		0.994***		
		(0.002)		
Education of R			0.930***	0.933***
			(0.010)	(0.010)
Parents' Income				
2nd Quartile		1.157**	1.165**	1.165**
		(0.079)	(0.080)	(0.080)
3rd Quartile		1.105	1.127*	1.129*
		(0.079)	(0.080)	(0.081)
4th Quartile		1.134*	1.183**	1.187**
		(0.085)	(0.089)	(0.090)
Father's Education		0.978***	0.986*	0.986*
		(0.008)	(0.008)	(0.008)
Mother's Education		0.990	0.992	0.992

		(0.009)	(0.009)	(0.009)
Number of Siblings		0.989	0.988	0.988
		(0.011)	(0.011)	(0.011)
First Born		1.027	1.028	1.028
		(0.051)	(0.051)	(0.051)
Intact Family		1.137	1.135	1.140
		(0.108)	(0.108)	(0.108)
Farm Background		1.138**	1.108*	1.107*
		(0.070)	(0.068)	(0.068)
Mother's Age at First Birth		0.996	0.997	0.997
		(0.006)	(0.006)	(0.006)
Father's Age at First Birth		0.983***	0.984***	0.984***
		(0.005)	(0.005)	(0.005)
Religion				
Catholic		1.259***	1.230***	1.230***
		(0.084)	(0.083)	(0.083)
Protestant		1.245***	1.204***	1.202***
		(0.081)	(0.078)	(0.078)
Time	4.623***	4.667***	4.732***	4.730***
	(0.211)	(0.214)	(0.218)	(0.218)
$Time^2$	0.973***	0.973***	0.973***	0.973***
	(0.001)	(0.001)	(0.001)	(0.001)
Constant	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Number of person-years	78,212	78,212	78,212	78,212
Log-likelihood	-7,080	-7,041	-7,023	-7,023
AIC	14185.93	14135.68	14099.16	14100.29
BIC	14306.40	14385.89	14349.37	14350.50

Note: Standard errors in parentheses. The reference category for physical attractiveness is the first quintile, i.e., the least attractive. The reference category for parents' income is the first quartile, i.e., the lowest income. The reference category for religion is other religion, which includes those with no religious affiliation.

*** p<0.01, ** p<0.05, * p<0.1

Table 3. Odds Ratios from the Logistic Regression of Transition to Parenthood among WLS Females (N = 2,942)

	Model 1	Model 2	Model 3	Model 4
Personality Traits				
Extraversion	1.121***	1.117***	1.110***	1.106***
	(0.026)	(0.027)	(0.027)	(0.026)
Agreeableness	1.088***	1.095***	1.080***	1.078***
	(0.028)	(0.029)	(0.028)	(0.028)
Conscientiousness	1.019	1.038	1.012	1.013
	(0.025)	(0.026)	(0.025)	(0.025)
Neuroticism	1.017	1.012	1.002	0.999
	(0.024)	(0.024)	(0.024)	(0.024)
Openness	0.833***	0.858***	0.925***	0.930***
	(0.021)	(0.022)	(0.025)	(0.025)
Physical Attractiveness				
2nd Quintile	1.193***	1.247***	1.260***	1.262***
	(0.080)	(0.084)	(0.085)	(0.085)
3rd Quintile	1.290***	1.336***	1.341***	1.340***
	(0.087)	(0.091)	(0.091)	(0.091)
4th Quintile	1.459***	1.486***	1.516***	1.521***
	(0.098)	(0.101)	(0.103)	(0.103)
5th Quintile	1.441***	1.495***	1.529***	1.535***
	(0.096)	(0.101)	(0.104)	(0.104)
Intelligence				
Henmon-Nelson	0.994***	1.003*	1.002	
	(0.002)	(0.002)	(0.002)	
WAIS				0.999
				(0.009)
High School Rank		0.989***		
		(0.002)		
Education of R			0.863***	0.866***
			(0.011)	(0.011)
Parents' Income				
2nd Quartile		0.935	0.903	0.906
		(0.059)	(0.057)	(0.057)
3rd Quartile		1.005	0.993	0.996
		(0.066)	(0.065)	(0.065)
4th Quartile		0.897	0.944	0.947
		(0.062)	(0.066)	(0.066)
Father's Education		0.978***	0.986*	0.986*
		(0.008)	(0.008)	(0.008)
Mother's Education		1.010	1.018**	1.019**

		(0.009)	(0.009)	(0.009)
Number of Siblings		1.014	1.007	1.007
		(0.010)	(0.010)	(0.010)
First Born		1.082*	1.035	1.037
		(0.049)	(0.048)	(0.048)
Intact Family		0.901	0.907	0.904
		(0.082)	(0.083)	(0.083)
Farm Background		0.911	0.927	0.924
		(0.052)	(0.053)	(0.053)
Mother's Age at First Birth		0.974***	0.976***	0.976***
		(0.006)	(0.006)	(0.006)
Father's Age at First Birth		0.991*	0.993	0.993
		(0.005)	(0.005)	(0.005)
Religion				
Catholic		1.278***	1.139*	1.138*
		(0.089)	(0.080)	(0.080)
Protestant		1.270***	1.145**	1.144**
		(0.086)	(0.078)	(0.078)
Time	6.389***	6.551***	6.673***	6.676***
	(0.324)	(0.335)	(0.343)	(0.343)
$Time^2$	0.964***	0.964***	0.964***	0.964***
	(0.001)	(0.001)	(0.001)	(0.001)
Constant	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Number of person-years	84,030	84,030	84,030	84,030
Log-likelihood	-7,914	-7,844	-7,788	-7,789
AIC	15854.97	15741.13	15630.28	15631.60
BIC	15976.37	15993.28	15882.43	15883.75

Note: Standard errors in parentheses. The reference category for physical attractiveness is the first quintile, i.e., the least attractive. The reference category for parents' income is the first quartile, i.e., the lowest income. The reference category for religion is other religion, which includes those with no religious affiliation.

*** p<0.01, ** p<0.05, * p<0.1

Table 4. Odds Ratios from the Logistic Regression of Transition to Parenthood by Sex in the MIDUS

	Male			Female		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Personality Traits						
Agreeableness	1.035	1.014	1.003	1.077*	1.034	1.022
	(0.036)	(0.036)	(0.036)	(0.043)	(0.042)	(0.042)
Extraversion	1.152***	1.141***	1.124***	1.115***	1.130***	1.114***
	(0.046)	(0.046)	(0.045)	(0.043)	(0.044)	(0.044)
Neuroticism	0.934**	0.941*	0.931**	0.931**	0.925**	0.925**
	(0.033)	(0.033)	(0.033)	(0.029)	(0.029)	(0.029)
Conscientiousness	1.008	1.005	1.002	0.969	0.955	0.965
	(0.033)	(0.033)	(0.033)	(0.032)	(0.032)	(0.033)
Openness	0.794***	0.821***	0.847***	0.824***	0.856***	0.879***
	(0.032)	(0.035)	(0.036)	(0.030)	(0.032)	(0.033)
Intelligence	0.890***	0.933**	0.965	0.803***	0.871***	0.893***
	(0.027)	(0.030)	(0.032)	(0.025)	(0.029)	(0.030)
Number of Siblings		1.028*	1.024*		1.011	1.006
		(0.015)	(0.015)		(0.014)	(0.014)
First Born		1.033	1.013		1.110	1.118*
		(0.074)	(0.073)		(0.074)	(0.075)
Intact Family		1.044	1.084		0.867*	0.873
		(0.104)	(0.108)		(0.073)	(0.074)
Father's Education		0.974**	0.982		0.967***	0.974**
		(0.013)	(0.013)		(0.011)	(0.011)
Mother's Education		0.991	0.993		0.936***	0.941***
		(0.016)	(0.016)		(0.014)	(0.014)
Religion						
Catholic		0.995	1.005		1.005	1.024
		(0.092)	(0.093)		(0.090)	(0.092)
Protestant		1.219**	1.245***		1.128	1.131
		(0.099)	(0.102)		(0.091)	(0.091)
Education						
High School Grad			0.866			0.521***
			(0.164)			(0.098)
More than High School			0.624**			0.428***
			(0.118)			(0.081)
Time	2.756***	2.771***	2.787***	2.865***	2.910***	2.940***
	(0.115)	(0.116)	(0.117)	(0.114)	(0.117)	(0.119)
$Time^2$	0.983***	0.983***	0.983***	0.981***	0.981***	0.981***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Constant	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***

	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Number of person-years	46,846	46,846	46,846	48,723	48,723	48,723
Log-likelihood	-4,263	-4,252	-4,243	-4,764	-4,730	-4,720

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5. Odds Ratios from the Logistic Regression of Transition to Parenthood by Sex in the ACL

	Male			Female		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Personality Traits						
Neuroticism	0.999	1.022	1.015	1.111***	1.128***	1.095**
	(0.050)	(0.051)	(0.050)	(0.043)	(0.044)	(0.043)
Extraversion	1.078	1.129**	1.125**	1.034	1.064	1.088**
	(0.053)	(0.057)	(0.057)	(0.039)	(0.040)	(0.042)
Physical Attractiveness						
2nd Quintile	1.255	1.431	1.267	3.388**	3.462**	3.779**
	(0.944)	(1.082)	(0.965)	(2.046)	(2.092)	(2.289)
3rd Quintile	2.240	2.306	2.075	3.408**	3.547**	4.137**
	(1.646)	(1.702)	(1.544)	(2.016)	(2.102)	(2.463)
4th Quintile	2.117	2.443	2.225	3.531**	3.674**	4.451**
	(1.556)	(1.805)	(1.658)	(2.086)	(2.175)	(2.650)
5th Quintile	1.857	2.424	2.216	3.925**	4.179**	5.390***
	(1.412)	(1.854)	(1.710)	(2.366)	(2.528)	(3.279)
Intelligence	0.953	1.046	1.056	0.925*	0.957	1.017
	(0.050)	(0.058)	(0.060)	(0.041)	(0.043)	(0.047)
Father's Education		0.934***	0.943***		0.961***	0.978*
		(0.017)	(0.017)		(0.012)	(0.013)
Mother's Education		0.977	0.969		1.012	1.036**
		(0.020)	(0.021)		(0.014)	(0.015)
Intact Family		0.925	0.890		0.995	1.077
		(0.117)	(0.113)		(0.103)	(0.113)
Religion						
Catholic		1.190	1.165		1.247	1.154
		(0.198)	(0.195)		(0.200)	(0.186)
Protestant		1.518***	1.508***		1.519***	1.401**
		(0.217)	(0.216)		(0.226)	(0.209)
Education						
High School Grad			1.319*			0.692***
			(0.196)			(0.077)
More than High School			1.022			0.439***
			(0.154)			(0.055)
Time	2.414***	2.448***	2.445***	2.455***	2.467***	2.512***
	(0.135)	(0.137)	(0.137)	(0.109)	(0.110)	(0.113)
$Time^2$	0.986***	0.986***	0.986***	0.984***	0.984***	0.984***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Constant	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Number of person-years	19,436	19,436	19,436	27,511	27,511	27,511

Log-likelihood	-1,809	-1,783	-1,781	-2,812	-2,800	-2,776

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6. Coefficients from Poisson Regression Models Testing Number of Children Ever Born among Males in the WLS

	Model 1	Model 2	Model 3	Model 4
Personality Traits				
Extraversion	1.063***	1.062***	1.062***	1.062***
	(0.015)	(0.015)	(0.015)	(0.015)
Agreeableness	1.010	1.005	1.004	1.003
	(0.014)	(0.014)	(0.014)	(0.014)
Conscientiousness	0.997	0.997	0.997	0.997
	(0.014)	(0.014)	(0.014)	(0.014)
Neuroticism	1.002	1.002	1.001	1.000
	(0.015)	(0.015)	(0.015)	(0.015)
Openness	0.964**	0.975	0.981	0.981
	(0.015)	(0.015)	(0.016)	(0.016)
Physical Attractiveness				
2nd Quintile	1.122***	1.111**	1.107**	1.106**
	(0.048)	(0.047)	(0.047)	(0.047)
3rd Quintile	1.085*	1.090**	1.088**	1.088**
	(0.045)	(0.046)	(0.046)	(0.046)
4th Quintile	1.201***	1.188***	1.186***	1.185***
	(0.049)	(0.049)	(0.049)	(0.049)
5th Quintile	1.169***	1.171***	1.168***	1.167***
	(0.049)	(0.049)	(0.049)	(0.049)
Intelligence				
Henmon-Nelson	0.999*	1.000	1.001	
	(0.001)	(0.001)	(0.001)	
WAIS				1.005
				(0.005)
High School Rank		0.999		
		(0.001)		
Education of R			0.982***	0.983***
			(0.006)	(0.006)
Parents' Income				
2nd Quartile		1.061	1.062	1.063*
		(0.039)	(0.040)	(0.040)
3rd Quartile		1.035	1.038	1.039
		(0.041)	(0.041)	(0.041)
4th Quartile		1.049	1.057	1.059
		(0.043)	(0.044)	(0.044)
Father's Education		0.993	0.995	0.995
		(0.004)	(0.004)	(0.004)
Mother's Education		0.998	0.999	0.999

		(0.005)	(0.005)	(0.005)
Number of Siblings		1.009	1.008	1.008
		(0.006)	(0.006)	(0.006)
First Born		1.028	1.027	1.028
		(0.028)	(0.028)	(0.028)
Intact Family		1.046	1.047	1.048
		(0.055)	(0.055)	(0.055)
Farm Background		1.109***	1.103***	1.103***
		(0.037)	(0.036)	(0.036)
Mother's Age at First Birth		0.997	0.997	0.997
		(0.003)	(0.003)	(0.003)
Father's Age at First Birth		0.997	0.997	0.997
		(0.003)	(0.003)	(0.003)
Religion				
Catholic		1.292***	1.283***	1.284***
		(0.048)	(0.048)	(0.048)
Protestant		1.091**	1.083**	1.083**
		(0.041)	(0.040)	(0.040)
Constant	2.674***	2.375***	2.540***	2.663***
	(0.249)	(0.341)	(0.361)	(0.344)
N	2,510	2,510	2,510	2,510
Log-likelihood	-4,568	-4,516	-4,511	-4,511
AIC	9157.30	9081.16	9072.72	9072.67
BIC	9221.41	9226.86	9218.42	9218.37

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 7. Coefficients from Poisson Regression Models Testing Number of Children Ever Born among Females in the WLS

	Model 1	Model 2	Model 3	Model 4
Personality Traits				
Extraversion	1.032***	1.026**	1.023*	1.024*
	(0.013)	(0.013)	(0.013)	(0.013)
Agreeableness	1.060***	1.065***	1.058***	1.057***
	(0.015)	(0.015)	(0.015)	(0.015)
Conscientiousness	0.991	0.993	0.985	0.986
	(0.013)	(0.013)	(0.013)	(0.013)
Neuroticism	0.974**	0.974**	0.972**	0.972**
	(0.012)	(0.012)	(0.012)	(0.012)
Openness	0.920***	0.939***	0.962***	0.960***
	(0.012)	(0.012)	(0.013)	(0.013)
Physical Attractiveness				
2nd Quintile	1.046	1.050	1.043	1.043
	(0.037)	(0.037)	(0.037)	(0.037)
3rd Quintile	1.112***	1.117***	1.113***	1.111***
	(0.039)	(0.039)	(0.039)	(0.039)
4th Quintile	1.080**	1.078**	1.082**	1.081**
	(0.038)	(0.038)	(0.038)	(0.038)
5th Quintile	1.099***	1.113***	1.112***	1.111***
	(0.038)	(0.039)	(0.039)	(0.039)
Intelligence				
Henmon-Nelson	0.998***	1.002	1.001	
	(0.001)	(0.001)	(0.001)	
WAIS				1.009**
				(0.005)
High School Rank		0.996***		
		(0.001)		
Education of R			0.954***	0.952***
			(0.007)	(0.007)
Parents' Income				
2nd Quartile		0.974	0.971	0.971
		(0.032)	(0.031)	(0.031)
3rd Quartile		0.993	0.993	0.993
		(0.034)	(0.034)	(0.034)
4th Quartile		0.985	1.003	1.004
		(0.035)	(0.036)	(0.036)
Father's Education		0.992*	0.995	0.995
		(0.004)	(0.004)	(0.004)
Mother's Education		1.000	1.002	1.002

		(0.005)	(0.005)	(0.005)
Number of Siblings		1.023***	1.022***	1.022***
		(0.005)	(0.005)	(0.005)
First Born		1.007	0.997	0.997
		(0.024)	(0.024)	(0.024)
Intact Family		1.019	1.024	1.022
		(0.047)	(0.048)	(0.048)
Farm Background		0.981	0.983	0.983
		(0.029)	(0.029)	(0.029)
Mother's Age at First Birth		0.992***	0.993**	0.993**
		(0.003)	(0.003)	(0.003)
Father's Age at First Birth		0.998	0.998	0.998
		(0.003)	(0.003)	(0.003)
Religion				
Catholic		1.282***	1.243***	1.243***
		(0.048)	(0.047)	(0.047)
Protestant		1.093**	1.063*	1.064*
		(0.040)	(0.039)	(0.040)
Constant	3.286***	3.648***	4.705***	4.839***
	(0.293)	(0.491)	(0.671)	(0.622)
N	2,942	2,942	2,942	2,942
Log-likelihood	-5,537	-5,449	-5,433	-5,431
AIC	11096.36	10947.56	10916.01	10912.36
BIC	11162.22	11097.23	11065.68	11062.03

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 8. Coefficients from Poisson Regression Models Testing Number of Children Ever Born among Both Sexes in the MIDUS

	Male			Female		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Personality Traits						
Agreeableness	1.054**	1.039*	1.038	1.035	1.024	1.023
	(0.024)	(0.024)	(0.024)	(0.026)	(0.026)	(0.026)
Extraversion	1.031	1.017	1.016	1.030	1.028	1.027
	(0.026)	(0.026)	(0.026)	(0.025)	(0.025)	(0.025)
Neuroticism	0.953**	0.947**	0.944**	0.914***	0.910***	0.911***
	(0.021)	(0.021)	(0.021)	(0.018)	(0.018)	(0.018)
Conscientiousness	0.980	0.979	0.980	0.951**	0.941***	0.944***
	(0.021)	(0.021)	(0.021)	(0.020)	(0.020)	(0.020)
Openness	0.907***	0.931***	0.932***	0.929***	0.943***	0.943**
	(0.023)	(0.024)	(0.025)	(0.021)	(0.021)	(0.022)
Intelligence	0.956**	0.975	0.977	0.917***	0.942***	0.943***
	(0.019)	(0.020)	(0.021)	(0.017)	(0.019)	(0.019)
Number of Siblings		1.016**	1.016*		1.017**	1.016**
		(0.008)	(0.008)		(0.008)	(0.008)
First Born		0.977	0.976		1.028	1.028
		(0.044)	(0.044)		(0.042)	(0.042)
Intact Family		1.162**	1.168**		1.028	1.035
		(0.076)	(0.076)		(0.054)	(0.055)
Father's Education		0.990	0.991		0.987*	0.987*
		(0.008)	(0.008)		(0.007)	(0.007)
Mother's Education		0.990	0.991		0.982**	0.982**
		(0.010)	(0.010)		(0.009)	(0.009)
Religion						
Catholic		1.188***	1.184***		1.125**	1.128**
		(0.068)	(0.068)		(0.061)	(0.061)
Protestant		1.057	1.053		0.986	0.986
		(0.055)	(0.055)		(0.049)	(0.049)
Education						
High School Grad			1.113			0.843*
			(0.125)			(0.080)
More than High School			1.050			0.877
			(0.117)			(0.084)
Constant	2.221***	1.867***	1.743***	2.296***	2.380***	2.731***
	(0.046)	(0.174)	(0.241)	(0.044)	(0.204)	(0.328)
N	1,275	1,275	1,275	1,432	1,432	1,432
Log-likelihood	-2,184	-2,168	-2,167	-2,512	-2,493	-2,492

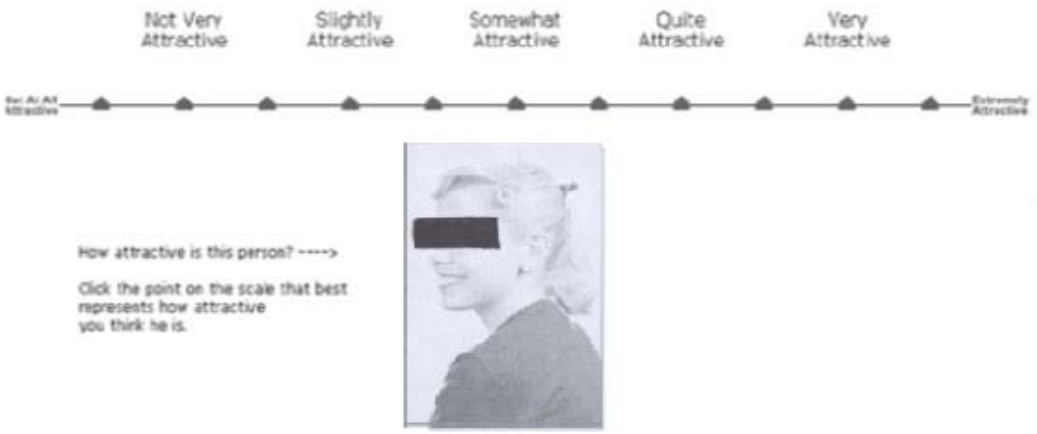
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9. Coefficients from Poisson Regression Models Testing Number of Children Ever Born among Both Sexes in the ACL

	Male			Female		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Personality Traits						
Neuroticism	0.968	0.956	0.957	1.001	1.006	0.997
	(0.033)	(0.033)	(0.033)	(0.025)	(0.026)	(0.025)
Extraversion	1.112***	1.118***	1.119***	0.979	0.980	0.985
	(0.039)	(0.040)	(0.040)	(0.024)	(0.024)	(0.025)
Physical Attractiveness						
2nd Quintile	1.569	1.580	1.630	7.859**	8.287**	8.694**
	(0.925)	(0.935)	(0.970)	(7.890)	(8.323)	(8.733)
3rd Quintile	1.650	1.618	1.666	8.080**	8.229**	8.884**
	(0.960)	(0.945)	(0.977)	(8.088)	(8.240)	(8.899)
4th Quintile	1.531	1.555	1.608	7.589**	7.827**	8.634**
	(0.893)	(0.910)	(0.947)	(7.596)	(7.838)	(8.652)
5th Quintile	1.225	1.208	1.251	8.441**	8.921**	9.879**
	(0.763)	(0.754)	(0.786)	(8.481)	(8.972)	(9.943)
Intelligence	1.077*	1.119***	1.124***	0.961	0.959	0.973
	(0.042)	(0.046)	(0.048)	(0.030)	(0.030)	(0.031)
Father's Education		0.966***	0.966***		0.994	0.997
		(0.012)	(0.012)		(0.008)	(0.009)
Mother's Education		0.985	0.987		1.013	1.018*
		(0.014)	(0.014)		(0.009)	(0.009)
Intact Family		0.883	0.885		1.063	1.079
		(0.077)	(0.078)		(0.075)	(0.076)
Religion						
Catholic		1.035	1.038		1.308**	1.287**
		(0.127)	(0.129)		(0.151)	(0.148)
Protestant		0.992	0.993		1.115	1.099
		(0.108)	(0.109)		(0.119)	(0.118)
Education						
High School Grad			0.960			0.861**
			(0.091)			(0.058)
More than High School			0.956			0.831**
			(0.090)			(0.064)
Constant	1.270	1.920	1.848	0.369	0.281	0.258
	(0.751)	(1.197)	(1.160)	(0.371)	(0.284)	(0.262)
N	349	349	349	652	652	652
Log-likelihood	-664.8	-652.0	-651.9	-1282	-1276	-1273

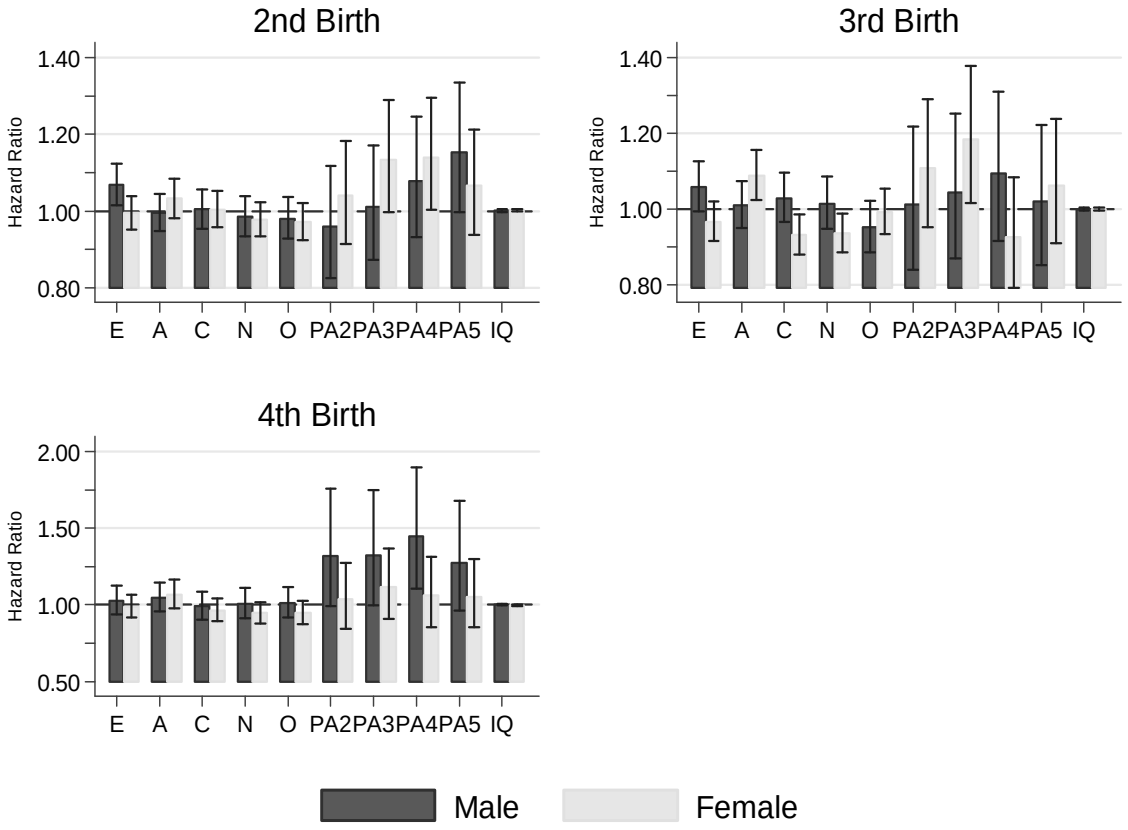
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Figure 1. Example of a Verbally Labeled Rating Scale in the WLS High School Yearbook



Source: Meland (2002)

Figure 2. Results of Cox Regression Models Predicting Transition to Higher Order Births by Sex: The Wisconsin Longitudinal Study



Note: Hazard ratio that the 95% confidence interval does not include 1 indicates a significant effect. E = Extraversion; A = Agreeableness; C = Conscientiousness; N = Neuroticism; O = Openness; PA2-PA5 = Quintiles of Physical Attractiveness; IQ= Henmon-Nelson score. The least attractive (PA1) is the omitted category. Sample is restricted to whites. Each Cox regression controlled for education, parents' income, father's education, mother's education, farm background, number of siblings, first child in the family, growing up in an intact family, mother's age at first birth, father's age at first birth, religion.

Appendices

Table A.1. Summary Statistics for Variables Used in Analysis: The MIDUS and ACL

	MIDUS		ACL	
	Mean	S.D.	Mean	S.D.
Personality Traits				
Extraversion	-0.06	0.98	0.03	1.00
Neuroticism	-0.10	0.94	-0.05	0.99
Agreeableness	-0.05	0.99	---	---
Conscientiousness	0.09	0.95	---	---
Openness	-0.03	0.94	---	---
Physical Attractiveness				
1st Quintile	---	---	0.01	0.08
2nd Quintile	---	---	0.08	0.27
3rd Quintile	---	---	0.38	0.49
4th Quintile	---	---	0.46	0.50
5th Quintile	---	---	0.07	0.26
Intelligence	0.10	0.98	3.24	0.87
Male	0.47	0.50	0.39	0.49
Age at Baseline	46.64	12.08	50.85	16.71
Education				
Less than High School	0.03	0.16	0.20	0.40
High School Grad	0.24	0.43	0.34	0.47
More than High School	0.73	0.44	0.46	0.50
Number of Children	2.23	1.44	2.41	1.74
Number of Siblings	3.42	2.37	---	---
First Born	0.31	0.46	---	---
Intact Family	0.88	0.33	0.83	0.37
Father's Education	5.03	3.04	9.86	3.84
Mother's Education	5.04	2.48	10.01	3.47
Religion				
Catholic	0.27	0.44	0.25	0.43
Protestant	0.53	0.50	0.64	0.48
Other	0.10	0.30	0.11	0.32
N	3,070		1,510	

Note: Samples are restricted to non-Hispanic whites only. Father's and mother's education in the MIDUS are measured with 12 categories rather than years of schooling as in the ACL, and value of 5 in the MIDUS indicates a high school diploma.