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Happiness: Before and After the Kids

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Abstract Understanding how having children influences parents' subjective well-being ("happiness") has great potential to explain fertility behavior. We study parental happiness trajectories before and after the birth of a child, using large British and German longitudinal data sets. We account for unobserved parental characteristics using fixed-effects models and study how sociodemographic factors modify the parental happiness trajectories. Consistent with existing work, we find that happiness increases in the years around the birth of a first child and then decreases to before-child levels. Moreover, happiness increases before birth, suggesting that the trajectories may capture not only the effect of the birth but also the broader process of childbearing, which may include partnership formation and quality. Sociodemographic factors strongly modify this pattern. Those who have children at older ages or who have more education have a particularly positive happiness response to a first birth; and although having the first two children increases happiness, having a third child does not. The results, which are similar in Britain and Germany, suggest that having up to two children increases happiness, and mostly for those who have postponed childbearing. This pattern is consistent with the fertility behavior that emerged during the second demographic transition and provides new insights into low and late fertility.

Keywords Fertility · Happiness · Life course · Parenthood

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Introduction

In the early 1990s, period fertility levels reached a new low in much of the developed world, triggering an intense policy debate about what to do about low fertility and the myriad challenges it causes, such as population aging. Much of low period fertility has been caused by the postponement of births (Myrskylä et al. 2013; Sobotka 2004), but another important aspect is a decrease in quantum driven by stopping at having one or two children. Consequently, policy discussion has focused on the reasons behind postponement and why many people stop at having only one child when most say that they want two (Adema and Whiteford 2007; European Commission 2006).[1]

Research aiming to explain fertility postponement and fertility decline—either period or cohort—focuses on the rise of individualistic values and the incompatibility of family and career desires, particularly for women (Adserà 2004; Feyrer et al. 2008; Gauthier 2007; McDonald 2000; van de Kaa 2003). For example, recent research documenting that women's job satisfaction decreases after a first birth provides some indirect support for the hypothesis that work–family stress contributes to low fertility (Georgellis et al. 2012). The subjective well-being of parents has received considerably less attention than these traditional explanations even though it may be an important driver of fertility behavior (Hobcraft 2006). Fertility is a choice for most people in the developed world. Common sense as well as psychological learning theories predict that people avoid activities that they anticipate will negatively affect their well-being but may want to engage in activities that are expected to have a positive influence (Newman 2008; Rotter 1954). We therefore hypothesize that the experience of the transition to parenthood will inform new parents' decisions about whether to have another child. Earlier demographic research, much of it qualitative, has touched on the potential effect of subjective parenting experiences on further parity progression (Callan 1985; Cartwright 1976; Newman 2008). For example, Presser (2001) predicted that educated working women who become mothers will be surprised by the demands of childbearing, and such feelings may discourage additional births.

Beyond the individual, social learning about the parental well-being trajectories of others may influence the quantum and tempo of fertility. Social learning theory posits that observing the timing and parity of others will inform decisions about one's own fertility (Montgomery and Casterline 1996). We extend this theory by outlining how parental well-being trajectories can influence the fertility behavior of others. First, if we observe that young parents have negative well-being trajectories but that older parents with more resources have easier transitions to parenthood, this may influence postponement of a first birth through social learning. Second, if we observe the transition to parenthood being accompanied by negative rather than positive changes in well-being, this can lead to lower fertility intentions, lower realized fertility, and also postponement if one surmises that less time is needed to have a smaller optimal number of children. Thus, one's own experiences may influence further parity progression after a first birth, and social learning from other people's subjective experiences may influence decisions

[1] Part of the gap between desired and actual fertility is explained by measurement: desired fertility is a cohort concept, but fertility behavior is often measured on a period basis. However, even accounting for this, a gap of 0.34 children remains in the European Union (Sobotka and Lutz 2011).

to postpone childbearing until one has accumulated more resources (e.g., education, income, status) or to adjust fertility intentions downward.

In this article, we analyze how the process of childbearing is associated with parental subjective well-being, using two large longitudinal data sets from Britain and Germany. We use fixed-effects regression techniques, which allow us to control for unobserved heterogeneity and selection into parenthood. We follow the parents up to 18 years after birth, which is markedly longer than previous studies and important because the joys and challenges of parenthood depend on the age of the child. Consistent with prior literature using longitudinal designs (e.g., Clark et al. 2008), our results first document a temporary and transitory gain in happiness around the time of birth. Importantly, we observe that happiness increases before birth, suggesting that the happiness gain around the time of birth may capture not only the effect of the birth but also the complex childbearing process that may involve partnership formation, partnership quality, and increased sexual activity. We then analyze the patterns for different socioeconomic groups and parities and show that the changes in subjective well-being over the transition to parenthood are highly consistent with the low and late fertility behavior that has emerged during the second demographic transition: older parents and those with more socioeconomic resources have the strongest happiness gains around the time of birth, and the temporary happiness gain around the time of birth declines with the number of children that one already has. These results were similar in Britain and Germany. The fact that among older and better-educated parents, well-being increases with childbearing, but that young and less-educated parents have flat or even downward happiness trajectories, may explain why postponing fertility has become so common. Similarly, given that we find no positive gain in subjective well-being for third births, the documented differences by parity may help explain the low quantum of fertility. These results provide a new way of understanding the theories of fertility decline by showing that the fertility behavior that emerged during the second demographic transition would have been largely predicted by parents' subjective well-being response to childbearing.

Trajectories of Parental Well-being by Subgroups

Cross-sectional research has found mixed evidence of the association between having children with happiness (Aassve et al. 2012; Billari 2009; Kohler et al. 2005; McLanahan and Adams 1987; Nelson et al. 2013; Nomaguchi and Brown 2011), giving rise to the question of why one would have children in the twenty-first century (Morgan and King 2001). One key to this paradox is the importance of life stage: young parents show higher levels of distress than do nonparents (Cleary and Mechanic 1983; Lovell-Troy 1983; McLanahan and Adams 1987), but older parents have shown either similar (Koropeckyj-Cox et al. 2007; Rempel 1985; Ross and Huber 1985) or higher levels of well-being than the childless (Margolis and Myrskylä 2011). However, when the question is how children influence parental well-being, it is important to analyze individual changes over time instead of only comparing parents with the childless. Otherwise, the analyses may be biased by genetic factors, personality, or other unobserved or difficult-to-measure fixed characteristics, such as orientation toward career versus family, which may be associated with both fertility behavior and subjective well-being (Alvergne et al. 2010; De Neve 2011; Rogers et al. 2001).

Several recent studies on childbearing and happiness have used longitudinal data to analyze individuals' well-being over time, overcoming much of the selection problems present in cross-sectional work, such as potential selection into parenthood by previous level of subjective well-being (Angeles 2010; Baranowska and Matysiak 2011; Clark and Georgellis 2013; Clark et al. 2008; Frijters et al. 2011). Using the German Socio-Economic Panel, Clark and colleagues (2008) analyzed the pattern in happiness before and after major life events, one of which was the birth of a child. They found that within a 10-year window, with the birth of a child in the middle, the happiness of both men and women tends to increase before and up to time of birth and then decreases to the pre-birth levels. Frijters et al. (2011) analyzed Australian data and also found that although happiness increases around time of birth, it returns to the baseline level in a few years. Clark and Georgellis (2013) and Angeles (2010) used the British Household Panel Survey to analyze whether the happiness of new parents adapts to their new circumstances. Each study focused on short-term adaptation but did not consider long-run trajectories or differences by birth order or socioeconomic status (SES). We build on these existing studies by examining how the happiness trajectory of parents varies by age at parenthood, SES measured by education, gender, parity, marital status, and context.

Age at First Birth and Education

Our hypotheses about age are based on quantitative and qualitative studies, which suggest that women with more socioeconomic resources have less steep post-birth dips in life satisfaction than those with fewer resources. For example, parents with less education and income have higher rates of post-birth depression (Avison and Davies 2005; O'Hara 2009). Increasing educational and job opportunities for women have, in part, led to the postponement of childbirth. Research on older mothers suggests that women who postpone childbearing are more "ready" and less stressed by having children (Gregory 2007), possibly because older mothers have more social capital and higher status at work, thus allowing greater financial flexibility and options for childcare, which can help ease the transition to parenthood. Because it is not clear whether being "ready" is captured by chronological age or socioeconomic resources (education), we analyze both.

However, not all literature points to an association between higher socioeconomic resources and more positive well-being trajectories for parents. The stress about "perfect" mothering may have negative effects on high-SES mothers' well-being (Macdonald 2011). Moreover, those with low SES may have different expectations for how childbearing affects the lives of parents (Edin and Kefalas 2005; Nomaguchi and Brown 2011) or may have larger kin networks, even though these factors do not necessarily turn into more instrumental support (Harknett and Knab 2007). Higher pre-birth education and income may also imply higher opportunity costs to childbearing.

Gender

Some evidence suggests that post-birth dips in life satisfaction will be stronger for women than men (Clark et al. 2008). This accords with much research in sociology, which documents that women are more socially isolated after childbirth because they more often take leave from the labor force and act as the primary caregiver, particularly

when the child is young (Della Giusta et al. 2011; Simon 1992). Part of the stronger dip may also be due to a larger anticipation effect.

Parity

Much prior research averages the happiness response of parents to the birth of a child over all parities, or alternatively focuses only on first births (Clark and Georgellis 2013; Clark et al. 2008; Frijters et al. 2011). Kohler et al. (2005) is an exception: they found that first births have a positive effect on parental happiness, but higher order births do not. Although parity may be an important determinant of the effect of a birth on happiness, it is ambiguous how it changes with parity. If a birth is a positive life event, the happiness response to having a child may be strongest when the event is first experienced. Moreover, higher-parity births might increase happiness less than the first birth because of resource dilution. However, parents who already have children may be more confident in their skills and may be better able to cope with children, which would predict that parents' happiness response is more positive for higher-order births.

Marital Status and Context

Parenthood may be more stressful for unmarried than married persons because they may not have anyone sharing childcare duties (Davies et al. 1997). These differences may be moderated by the welfare state. To analyze how parental well-being depends on the level of support for single parents, we compare Britain and Germany, countries that have a high mean age at birth (age 30 in 2008 (OECD 2011)) and which both offer support for single parents but exhibit differences in the overall context of childbearing. Britain is characterized by higher rates of nonmarital childbearing, a more dynamic labor market, limited support for parents with children, a predominantly private childcare system, and higher rates of working mothers.[2] Although direct public support for parents was relatively low in Germany until 2007, total public spending has been higher and the tax code has been more favorable for parents in Germany than in Britain (Thévenon 2011). The differences in out-of-wedlock childbearing and public support to parents may result in greater differences in parental well-being by marital status in Britain than in Germany.

Mediators of Parental Happiness

When people have children, many aspects of their lives change. Before having children, people are finding a partner, making commitments and plans, and anticipating a future together. After having children, couples are excited by the joys of the baby but also experience changes in labor force participation, income, health, leisure time, and marital quality. All these consequences are all linked to parental well-being. Cross-sectional research cannot capture the effects of these mediating factors of fertility on happiness. Longitudinal research has not considered these factors, or has presented results based

[2] Perelli-Harris et al. (2009) reported that 18 % of first births in the United Kingdom in 1995–2005 were to single women; in West Germany and among women born in 1971–1973, who were in their prime childbearing years at ages 22–34 in 1995–2005, 11 % of first births were to single women. In 2008, 32 % of German mothers with children younger than age 3 were working; in the United Kingdom, the corresponding proportion was 52 % (OECD 2012).

only on models that control for these factors (Clark et al. 2008), making it impossible to analyze their mediating role. We use longitudinal data to analyze the extent to which such mediators explain the impact of childbearing on parental happiness.

Data

We use the German Socio-Economic Panel (SOEP) and the British Household Panel Survey (BHPS). The SOEP is a representative longitudinal study of households including Germans living in the Old (West) and New (East) German states, foreigners, and recent immigrants to Germany (Wagner et al. 2007). The SOEP started in 1984, with the New German states added in 1991. The BHPS is an annual survey that started in 1991, consisting of a nationally representative sample of households. These data sets have three key advantages for this research. First, the SOEP and the BHPS are the world's longest panel data sets, which allow examining life satisfaction before and after births. Second, the samples are large, allowing for stratified analyses. Third, the data include information on potentially important mediators such as health, marital status, income, and labor force participation.

We focus on those who became parents during the observation window (SOEP, 1984–2009; BHPS, 1991–2008), excluding those who had children before entering the surveys and those who were childless at the end of our follow-up. The resulting sample sizes are 4,903 (SOEP) and 3,225 (BHPS). After exclusions resulting from missing data, our German sample comprises 4,513 people who had in total 7,602 births over an average follow-up of 12.2 years. The British sample comprises 2,689 people who experienced 4,520 births over an average follow-up of 10.2 years (Table 1).

Key Measures

Our key outcome is the subjective well-being of parents. In the German sample, respondents were asked annually, "How satisfied are you with your life, all things considered?" Responses range from 0 (completely dissatisfied) to 10 (completely satisfied). In the British sample, parental well-being is measured with two questions. The first measures general happiness with the question, "Have you recently been feeling reasonably happy, all things considered?"; the response range is from 1 (much less happy than usual) to 4 (more happy than usual). The other question is, "How dissatisfied or satisfied are you with your life overall?", with answers ranging from 1 (not satisfied at all) to 7 (completely satisfied). The latter life satisfaction question is closer to the one used in SOEP but was asked only in the 1996–2000 and 2002–2008 waves. The general happiness question was included in all the BHPS waves. We experimented with both measures, and like Clark and Georgellis (2013), we found that our results were very similar independent of the measure, the key difference being the loss in statistical power for the sporadically measured life satisfaction. Therefore, we use the general happiness measure in the BHPS.[3] We rescale this variable to range from

[3] The differences in the questions provide external validity. Research on happiness has been criticized for being sensitive to measurement, but we find our results to be robust to the way the life satisfaction question is framed.

0 to 10—the same range as in the SOEP well-being measure—to allow comparison of the magnitude across the two data sets.[4]

Other Variables

We coded variables in the same manner to facilitate parallel analysis for both data sets. In both surveys, age (years) is recorded at each wave. In the SOEP, information on births comes from the birth biography data, which records the sum, birth year, and sex of the biological children of the respondents. From the changes in the number of children, we infer whether the child was born before or after a given interview. Stepchildren or adopted children are not observed. In BHPS, we obtain the corresponding information on biological children from questions recording the births of biological children. Marital status is time-varying and categorized to married/living with a spouse, divorced/separated, single, or other. Income is measured at the household level and is pretax income in inflation-corrected euros or pounds. In the German data, education is measured in years. In the British data, education is measured with six categories: university, some college, other training establishment, polytechnic education, nursing school or similar, or other. Health is measured by self-rated health with five categories. Labor force status is measured with five categories: working, unemployed, maternity leave or similar, in school, or other. Each of these variables is time-varying, with the exception of education, which is fixed in the BHPS data.

Empirical Approach

We use longitudinal fixed-effects (FE) linear regression models to examine changes in life satisfaction over the transition to parenthood. We assume the cardinality of life satisfaction because treating life satisfaction as ordinal versus cardinal makes little difference (Ferrer-i-Carbonell and Frijters 2004). Our modeling approach, which follows Clark et al. (2008) with some modifications,[5] allows observing anticipation, short-term (1 to 4 years) changes, and long-term (5 to 18 years) changes in happiness over the transition to parenthood while controlling for time-invariant unobserved characteristics, such as personality or genetic endowments. Life satisfaction is modeled as a function of time to or after a birth with the regression equation

$$H_{it} = \alpha_i + B_{it}^{2-3} + B_{it}^{1} + C_{it} + A_{it}^{1-2} + A_{it}^{3-4} + A_{it}^{5-9} + A_{it}^{10-18} + \boldsymbol{\beta}'\mathbf{age}_{it} + T_t + \boldsymbol{\theta}'\mathbf{x}_{it} + \varepsilon_{it},$$

where H_{it} is life satisfaction for individual i at time t; α_i is the individual fixed effect; B^{2-3} and B^{1} are indicators capturing the deviation in happiness from the baseline 2–3 and one year (B) before a child is born; C and A^{k} capture the corresponding deviation in happiness in the interview following the birth of the (C) child and k years (A) after the

[4] After this transformation, the distributional characteristics are similar. The median, mean, and standard deviation of well-being are 7.3 , 7.1, and 1.7, respectively, in the SOEP; these values for the BHPS are 6.7, 6.8, and 1.9, respectively.

[5] Clark et al. (2008) estimated two equations: one for the happiness trajectory before the event, and another for after the event. A resulting problem is two baselines. We circumvent this problem by combining the equations.

birth[6]; age is controlled with single-age dummy variables[7]; T captures year-specific effects (for example, unification of Germany)[8]; and $\mathbf{x}_{it}$ is a vector for other time-varying covariates (health, education, income, marital status, labor force status, and birth of additional children). We include respondents in the regressions five years before birth, so the baseline to which the coefficients B, C, A are compared is happiness four to five years before the birth of a child.

We apply the preceding model to full SOEP and BHPS data sets without the time-varying covariates $\mathbf{x}_{it}$ in order to establish the general pattern of happiness before and after the first child is born and compare the model with an ordinary least squares (OLS) model to analyze the importance of unobserved factors; the OLS specification controls for gender, marital and labor force status, health, age at first birth, income, and education at the time of birth (results for this regression are shown in Table 2). We estimate the model for subpopulations stratified by sex (Fig. 1), age at first birth (Fig. 2), marital status (Fig. 3), education (Fig. 4), and parity (Fig. 5). We estimate the model with time-varying controls to shed light on the mediating mechanisms (Fig. 6). We test whether the coefficients differ by subgroups by estimating full sample models that include full interactions for the subgroup variables.

An important feature of our analysis is that we focus on the happiness trajectories among those who experienced a first birth during the observation period. This approach is limited in that we do not compare happiness of parents with those who never had a child. Such comparisons, which are plentiful in the literature, suffer from the potential bias caused by unobserved confounders.[9]

Results

Respondents were born between 1934 and 1990 in the German data, and between 1945 and 1991 in the British data (Table 1). Average age at entry is 25.2 in Germany and 26.1 in Britain, with average follow-ups 12.2 and 10.2 years, respectively. On average, respondents had 1.7 children during the data collection period. The total number of observed births is 7,602 in Germany: 4,513 first births; 2,268 second births; and 536 third births. The British data hold 4,520 births: 2,689 first births, 1,377 second births, and 295 third births. In the German sample, three-quarters of new parents were married/living with a spouse; in Britain, the figure is 90 %.[10] Most new fathers were employed in the

[6] In BHPS, post-birth follow-up ends in 15 years. Thus, in the BHPS analysis, we replace $A^{10–18}$ with $A^{10–15}$.
[7] We also considered linear, quadratic, and cubic age specifications. The results did not change.
[8] We avoid the age-period-cohort identification problem by combining three time periods for which descriptive statistics suggested no differences. Alternative ways to identify the model (e.g., using quadratic age) did not influence the results.
[9] Kohler et al. (2005) analyzed fertility and happiness among twins to get at the causal relationship. This avoids many problems present in standard OLS approaches, although even here unobserved life events may have shaped the twins so that they differ from each other in ways that influence both fertility and subjective well-being; this could bias the results.
[10] Excluding cohabiters would decrease the proportion in the British data below that observed in the German data. However, the regression results for partnership status (Fig. 4) are not sensitive to whether cohabiters are combined with the married.

Table 1 Sample characteristics of persons who experienced a first birth during the observation period

	SOEP			BHPS		
	Total	Men	Women	Total	Men	Women
Number of Respondents (%)	4,513	1,927 (43)	2,586 (57)	2,689	1,310 (49)	1,379 (51)
Year of Birth, Mean (SD)	1969 (7.7)	1967 (8.0)	1970 (7.4)	1971 (7.5)	1969 (7.3)	1972 (7.5)
Range (min, max)	1934, 1990	1934, 1990	1936, 1989	1945, 1991	1945, 1990	1950, 1991
Age at Entry, Mean (SD)	25.2 (5.4)	27.0 (5.6)	23.8 (4.9)	26.1 (5.8)	27.5 (5.7)	24.7 (5.5)
Range (min, max)	15, 55	16, 55	15, 47	15, 52	16, 52	15, 41
Age at First Birth (%)						
<23	14.4	6.4	20.9	14.3	8.7	19.5
23–34	74.3	75.3	73.6	68.1	68.4	67.8
35–49	11.2	18.3	5.5	17.6	22.9	12.7
Years of Follow-up						
Mean (SD)	12.2 (6.1)	12.8 (6.1)	11.7 (6.0)	10.2 (5.0)	10.0 (4.9)	10.3(5.0)
Range (min, max)	4, 24	4, 24	4, 24	4, 18	4, 18	4, 18
Number of Children, Mean (SD)	1.68 (0.70)	1.69 (0.70)	1.67 (0.70)	1.70 (0.69)	1.68 (0.68)	1.71 (0.69)
Births Observed						
Total	7,602	3,268	4,334	4,520	2,177	2,343
First	4,513	1,927	2,586	2,689	1,310	1,379
Second	2,268	991	1,277	1,377	659	718
Third births	536	230	306	295	134	161
Fourth and higher order	285	120	165	159	74	85
Characteristics at the Birth of First Child						
Married or living with a spouse (%)	75.4	77.9	73.5	91.9	96.5	87.6
Health, mean (SD)[a]	2.09 (0.79)	2.11 (0.80)	2.08 (0.78)	2.00 (0.86)	1.93 (0.83)	2.07(0.88)
Income/1,000; mean (SD)[b]	38.8 (28.4)	40.6 (26.9)	37.5 (29.4)	30.3 (19.8)	30.3 (19.6)	30.2 (20.0)
Labor Force Status (%)						
Employed	48	90	17	62	88	37
Unemployed	4	5	3	7	9	5
Maternity leave	30	1	51	28	1	55
Other outside labor force	18	3	28	3	3	3
Education: (SOEP: years; BHPS: proportion with some college or university)	12.1	12.2	12.0	57	54	60
Happiness, Mean (SD)[c]						
First interview	7.47 (1.70)	7.44 (1.64)	7.50 (1.75)	6.99 (1.88)	7.08 (1.72)	6.91 (2.02)
At birth of first child	7.56 (1.60)	7.47 (1.57)	7.62 (1.63)	7.21 (2.09)	7.19 (1.91)	7.24 (2.26)
Last interview	6.95 (1.70)	6.90 (1.69)	7.00 (1.72)	6.60 (1.91)	6.67 (1.73)	6.54 (2.06)

Notes: SOEP = German Socio-Economic Panel 1984–2009; BHPS = British Household Panel Survey 1991–2008.

[a] Measured on a scale from 1 (excellent) to 5 (poor).

[b] SOEP income is measured at the household level and refers to pretax income in inflation-corrected euro. BHPS income is measured at the household level and refers to pretax income in inflation-corrected pounds.

[c] Life satisfaction in SOEP, general happiness in BHPS; the scale for both ranges from 0 (poor) to 10 (excellent).

interview following the first birth (90 % in Germany, 88 % in Britain), but the majority of mothers were on a maternity or comparable leave (51 % in Germany, 55 % in Britain). At first interview, parents' levels of life satisfaction (on a scale of 0 to 10) were 7.5 in the German data and 7.0 in the British data. At first birth, life satisfaction was marginally higher, decreasing again by the last interview.

The Happiness Trajectory of Parents

Overall Trajectories

Table 2 shows the results of the FE regression model without time-varying controls except for age and period, and also the results from a comparable OLS model that also controls for gender, marital and labor force status, health, age at first birth, income, and education observed at the time of birth. Modeling these as time-varying would not change the results. We also estimate the FE model for the British data using two happiness measures: general happiness and life satisfaction.

The OLS specification suggests that happiness increases significantly one year before the birth, stays at an elevated level in the year of birth, and then quickly returns to pre-birth levels. Happiness stays at this level from when the first child is young through when the child reaches adult ages. The coefficients for the control variables are in the expected direction: good health, working, high income, and education are associated with increased happiness. Age at first birth also shows a positive gradient with happiness. The FE results are qualitatively consistent with those obtained with the OLS model and similar in Germany and Britain as well as across the two happiness measures available in the BHPS. The main difference between the OLS and the FE models is that the happiness increase in the years preceding birth and in the year of birth is somewhat stronger in the FE specification, and the decrease in post-birth decline is not quite as strong in the FE specification. In the FE model for the German data, we also observe an increase in happiness two to three years before the birth. Such anticipation effects are not surprising because the process of childbearing from planning to birth may take years. For example, only about 50 % of couples who are trying to conceive become pregnant within three months, but many wait much longer (Jensen et al. 2005).

Although the overall FE versus OLS differences are not large, they still suggest that the FE model captures unobserved confounders that are not included in the OLS model. Therefore, in the following subsections, we report only FE results.

Sex Differences

Figure 1 shows two differences in happiness trajectories for women and men. In both Britain and Germany, women gain more in happiness in expectation (differences statistically significant in both data sets with $p < .10$) and right after the birth of a child ($p < .05$ in both data sets). Women also have steeper drops between the year of the birth

Table 2 Happiness trajectory of parents before and after the birth of the first child: Ordinary least squares (OLS) and fixed-effects (FE) regressions

	SOEP		BHPS		
	OLS	FE	OLS, General Happiness[a]	FE, General Happiness[a]	FE, Life Satisfaction[b]
Time Before/After the Birth (ref. = 4–5 years before)					
2–3 years before	0.07	0.08*	–0.03	0.01	0.05
1 year before	0.26***	0.30***	0.33**	0.40***	0.42***
First child born	0.27***	0.32***	0.38**	0.47***	0.39***
1–2 years after	0.00	0.05	–0.08	0.01	0.07
3–4 years after	–0.04	0.03	–0.05	0.04	0.06
5–9 years after	–0.05	0.02	–0.03	0.15	0.13
10–15/18 years after[d]	–0.07†	0.02	–0.07	0.13	0.21
Female	0.11**		0.03		
Marital Status (ref. = married)					
Single	–0.06†		0.01		
Divorced/separated	–0.14		0.05		
Other (e.g., widowed, unknown)	–0.42		–0.48*		
Labor Force Status (ref. = working)					
Unemployed	–0.26**		–0.19***		
Maternity leave or similar	–0.18**		–0.09*		
In education	0.00		–0.13*		
Other (e.g., housewife, retired)	–0.15*		0.08		
Health (ref. = very good/excellent)					
Good	–0.29***		–0.13***		
Satisfactory	–0.82***		–0.36***		
Poor	–1.16***		–0.78***		
Bad	–1.22***		–1.15***		
Log of Household Income	0.07***		0.02		
Age at First Birth (ref. <20)					
20–24	0.11		0.16*		
25–29	0.19†		0.29**		
30–34	0.36*		0.33**		
35–39	0.30†		0.34*		
40–44	0.61**		0.44*		
45+	0.67*		0.71*		
Number of Years of Education[c]	0.05***				
Education (ref. = some college)[c]					
University			0.17		
Other training establishment			0.07		
Polytechnic			–0.01		
Nursing school or similar			–0.05		
Other			0.05		
Age Controls (single-year dummy variables)	Yes	Yes	Yes	Yes	Yes

Table 2 (continued)

	SOEP		BHPS		
	OLS	FE	OLS, General Happiness[a]	FE, General Happiness[a]	FE, Life Satisfaction[b]
Year Controls (single-year dummy variables)	Yes	Yes	Yes	Yes	Yes
Constant	3.58***	6.29***	6.86***	11.02***	8.10***
Observations	54,976	54,976	27,307	27,307	21,395
R^2	.070	.455	.029	.261	.532
Number of Persons	4,513	4,513	2,689	2,689	2,672

Notes: SOEP = German Socio-Economic Panel, N = 4,513 and 54,976 person-years. BHPS = British Household Panel Survey, N = 2,689 and 27,307 person-years.

[a] General happiness as the dependent variable; see the Data section for more details.

[b] Life satisfaction as the dependent variable; see the Data section for more details.

[c] Education measured differently in the two data sets; see the Data section for more details.

[d] 10–18 years in the SOEP; 10–15 years in the BHPS.

$^{\dagger}p < .10$; $*p < .05$; $**p < .01$; $***p < .001$

and the year afterward, possibly because of a larger initial gain. In the long-run, there are no differences between men and women.

Age at First Birth

Figure 2 shows the happiness trajectories for young (ages 18–22), adult (ages 23–34), and mature (ages 35 and older) parents.[11] The youngest category includes those at the cusp of adulthood. The adult category includes ages at which people have often completed their education and are starting careers. The mature parent group includes ages at which people typically have stabilized their socioeconomic position, but also ages at which risks to healthy childbearing start to increase, particularly for women (Heffner 2004).

Young parents have a predominantly declining pattern of happiness that does not increase above the baseline even during the year of birth. Those who become parents at ages 23–34 have increasing happiness before a first birth and in the year of birth; however, one to two years after the birth, happiness decreases to baseline or below. Mature parents (ages 35–49) have increasing happiness before and during the birth year; then, after a small drop, happiness remains at or above baseline. A test for whether the coefficients for 3–4, 5–9, and 10–18 years after birth are all 0 suggests increased long-run happiness ($p < .05$) in Germany and a borderline significant result ($p < .10$) in Britain.

Marital Status

Figure 3 charts parental happiness trajectories by marital status at birth. Among both the partnered and unpartnered, happiness increases around the birth and then decreases

[11] Parents aged 17 or younger are excluded because (1) teenage childbearing is a different process than having children at young adult ages; (2) our samples include very few people who had children before turning age 18; and (3) it is difficult to construct a meaningful pre-birth baseline happiness for teen parents.

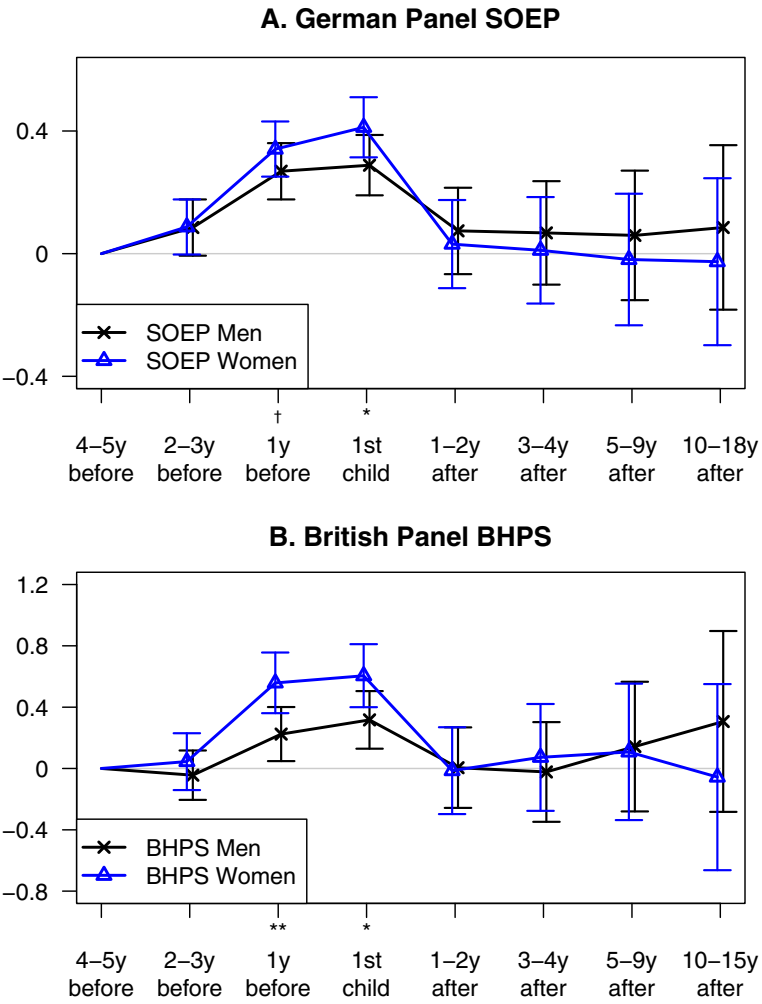

Fig. 1 Happiness trajectory of parents before and after the birth of the first child, by country and gender. Fixed-effects linear regressions. SOEP = German Socio-Economic Panel, with a sample size of 1,927 men and 2,586 women; BHPS = British Household Panel Survey, with a sample size of 1,310 men and 1,379 women. The model includes as control variables age and period dummy variables, and fixed effects for individuals. Standard errors are estimated using robust methods that account for the clustering of data within individuals. Tests for overall male-female difference are significant at $p < .05$ (SOEP) and $p < .01$ (BHPS). Significance markers under the x-axis are for the test between men and women and are as follows: $^{\dagger}p < .10$; $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$

to pre-birth levels. The differences by partnership status are small in Germany, where the only difference is that those partnered are happier than those unpartnered in the year before the birth ($p < .01$). In Britain, partnered parents have larger increases in happiness in the year the child is born and have upward happiness trajectories as their children mature. Unpartnered British experience smaller increases in happiness around the birth and do not experience long-run increases in happiness post-birth. The differences are not significant ($p > .05$) for any single time point but are significant

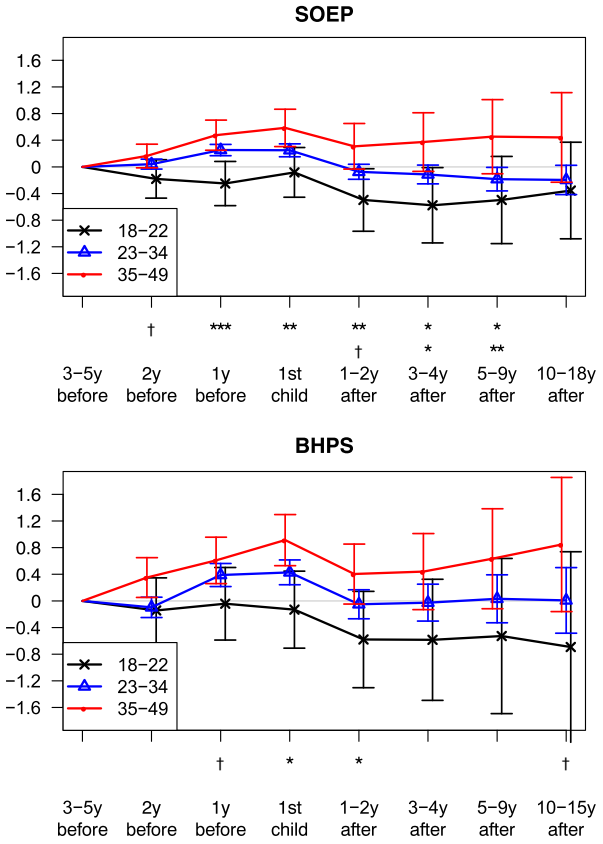

Fig. 2 Happiness trajectory before and after the birth of the first child by age of becoming a parent (ages 15–22, 23–34, 35–49). Fixed-effects linear regressions. SOEP = German Socio-Economic Panel, with sample sizes of 691 for ages 15–22; 3,258 for ages 23–34; and 564 for ages 35–49. BHPS = British Household Panel Survey, with sample sizes of 455 for ages 15–22; 1,768 for ages 23–34; and 466 for ages 35–49. The model includes as control variables age and period dummy variables, and fixed effects for individuals. Standard errors are estimated using robust methods that account for the clustering of data within individuals. To obtain stable estimates for the young parents, these age-stratified analyses use 3–5 years before birth as the baseline. The test for the overall difference between ages 18–22 and 23–34 is significant at $p < .001$ (SOEP) and $p < .10$ (BHPS); the test for the difference between ages 23–34 and 35–49 is significant at $p < .001$ (SOEP) and $p > .10$ (BHPS). The first row of significance markers under the *x*-axis is for the test between ages 18–22 and 23–34; the second row of significance markers under the *x*-axis tests differences between ages 23–34 and 35–49. Significance levels are indicated as follows: $^{\dagger}p < .10$; $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$

over the course of parenthood (joint test for the difference in coefficients from 1–2 years to 10–15 years after birth, $p < .05$).

Next we analyze parental happiness trajectories by education and parity and consider the role of mediating factors. The results are very similar between the German and British data; therefore, we present the results only for the larger, German data set.

Educational Attainment

Figure 4 plots the trajectory by educational attainment, with "high education" measured by 12 or more years of schooling. Men with high education gain more happiness from a

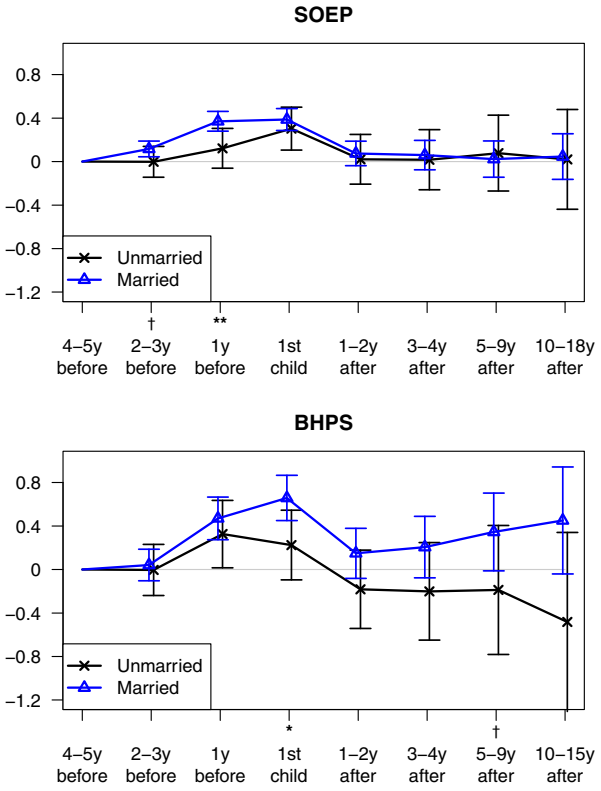

Fig. 3 Happiness trajectory before and after the birth of the first child by marital status. Fixed-effects linear regressions. SOEP = German Socio-Economic Panel, with sample sizes of 3,402 (married) and 1,111 (not married). BHPS = British Household Panel Survey, with sample sizes of 1,623 (married) and 1,066 (not married). The model includes as control variables age and period dummy variables, and fixed effects for individuals. Standard errors are estimated using robust methods that account for the clustering of data within individuals. The test for the difference between partnered and nonpartnered is significant at $p < .001$ (SOEP) and $p < .05$ (BHPS). Significance markers under the x-axis are for the test between married and not married and are as follows: $^{\dagger}p < .10$; $*p < .05$; $**p < .01$; $***p < .001$

first birth than their less-educated peers in expectation, after birth, and in the long run. These education differences are significant ($p < .05$) or marginally significant ($p < .10$) at every measurement point until nine years after birth. For women, there are no differences by education.

Parity

To this point, we have focused on a first birth. Figure 5 plots the parental well-being trajectories with respect to the first, second, and third births with the German data. The regressions are stratified by parity so that parents are in multiple regression equations if they had more than one birth. We control for the influence of previous births; without these, the baseline level estimated as four to five years before the birth (separately for each parity) would be influenced by the previous births.

For first births, parents' happiness trajectories increase sharply before and around the birth and then settle close to pre-birth levels, which is the same result shown earlier in

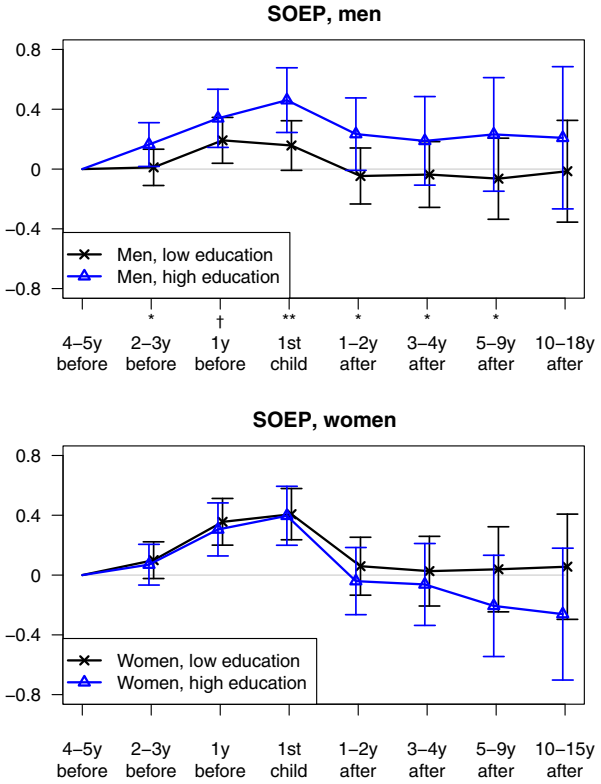

Fig. 4 Happiness trajectory before and after the birth of the first child by educational attainment (high = at least 12 years; low = less than 12 years). Fixed-effects linear regressions. Data are from the German Socio-Economic Panel, $N = 4{,}513$ with 54,976 person years. The model includes as control variables age and period dummy variables, and fixed effects for individuals. Standard errors are estimated using robust methods that account for the clustering of data within individuals. The results are similar for the British BHPS. The test for the difference between high- and low-educated is significant at $p < .05$ for men and $p > .10$ for women. Significance markers under the x-axis are for the test between high and low educated and are as follows: $^{\dagger}p < .10$; $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$

Table 2. For second births, the overall trajectory is similar, but the increase in happiness before and around the birth is lower than for first births ($p < .05$). For third births, the pattern is qualitatively different: there are no positive effects around the birth, and the long-term trajectory is declining; however, the differences compared with second or first births are not significant.

Mediating Factors

Figure 6 plots the happiness trajectories estimated with no time-varying controls other than age and period (Controls I); with controls for time-varying health, income, labor force status, and marital status (Controls II); and with additional controls for the births of second and third births using indicators for the year before and the year of birth (Controls III). For both men and women, the happiness trajectories surrounding a first birth are very similar, and the differences are statistically not significant across these models. The period when the controls make the most difference is the time just before

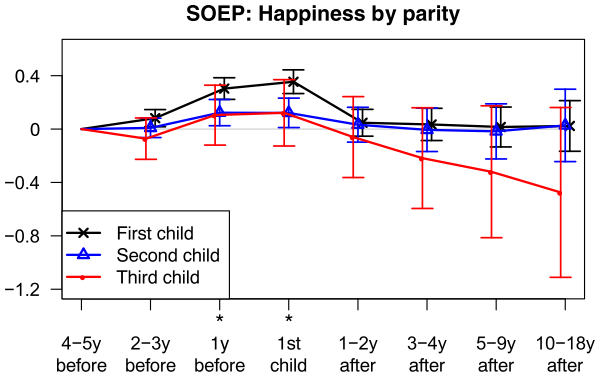

Fig. 5 Happiness trajectory before and after the birth of a child by birth order. Fixed-effects linear regressions. SOEP = German Socio-Economic Panel. The sample size is 4,443 for first births, 2,268 for second births, and 536 for third births. The model controls for the previous children's birth and its anticipation, age, and period dummy variables, and fixed effects. Standard errors are estimated using robust methods that account for the clustering of data within individuals. The results are similar for the British BHPS. Significance markers under the *x*-axis are for the test between the first and the second child and are as follows: $^{\dagger}p < .10$; $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$. All comparisons with the third child are statistically insignificant

and after the birth, possibly because the changes in marital status are picking up the happiness of partnering, planning a future together, and the anticipation of childbearing. These results suggest that the influence of childbearing on happiness is not strongly mediated by changes in income, health, marital, or labor force status.

Sensitivity Analysis

First, we estimate the key results using a conditional FE logit (instead of linear) model with various alternative categorizations to check whether our results were influenced by the cardinality assumption of the happiness measures. Second, we stratify the analysis by final parity (one, two, or three or more children) at age 40, excluding those for whom the follow-up ended earlier. Third, we study whether the happiness trajectories with respect to the second and third children depend on birth spacing by stratifying by the length of the birth interval. Fourth, we test whether including those who do not have children during the observation window would influence our results. Fifth, we reestimate all the German results excluding the former East Germany. Sixth, we test whether our results for subgroups would change if time-varying health, income, labor force status, and marital status were controlled for. Finally, we allow the error term to be autocorrelated (AR(1)), which corrects for biased confidence intervals if there is autocorrelation net of the covariates. The results of each sensitivity check are similar to those presented herein.

Discussion

In a context where fertility is a choice for most people, trajectories of subjective well-being around the transition to parenthood may be an important driver of low fertility. In this article, we replicate the overall happiness trajectory surrounding the birth of a child,

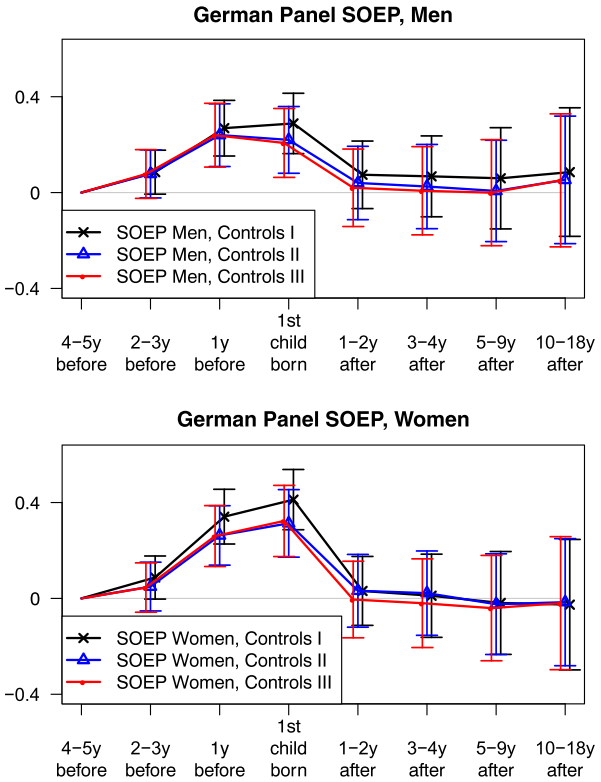

Fig. 6 Happiness trajectory before and after the birth of the first child without time-varying controls (controls I); with controls for time-varying health, income, marital, and labor force status (controls II); and with controls II plus controls for the subsequent births (controls III). Fixed-effects regressions. SOEP = German Socio-Economic Panel, with data for 1,927 men and 2,586 women. The model includes as control variables age and period dummy variables, and fixed effects for individuals. Standard errors are estimated using robust methods that account for the clustering of data within individuals. The coefficients shown for models with controls II and III are not statistically significantly different from the main model with controls I in any of the models or for men or women. The results are similar for BHPS

which has been highlighted by others (Angeles 2010; Clark and Georgellis 2013; Clark et al. 2008; Frijters et al. 2011), and make several innovations that are important for explaining why subjective well-being is central to understanding low and late fertility. First, we document how the happiness trajectory of parents differs greatly by age at parenthood, socioeconomic status, gender, parity, marital status, and context. Second, we examine long-run changes in happiness following a birth up to 18 years, which is important because the joys and challenges of parenthood depend on the age of the child. Last, we find that the happiness trajectory over the transition to parenthood is not explained by observed factors that are also changing over the period when a first child is born (getting married, leaving the labor force, and so on).

The experience of having a first child may affect new parents' decisions about whether to have another child. This is basic learning theory in psychology: people will avoid activities that will harm their well-being (Rotter 1954). This theoretical framework is useful for demographers in understanding how the subjective experience of the transition to parenthood can affect parity progression (Callan 1985; Cartwright 1976;

Newman 2008; Presser 2001). We find that the happiness gain around the time of childbirth attenuates with parity, being strongest for the first, lower for the second, and nonpositive for the third child. Perhaps the positive response to a birth is strongest when the experience is new, or perhaps higher-order births have a weaker impact because they are less likely to be planned (Hayford and Guzzo 2010). Independent of the mechanism, these results accord with qualitative work suggesting that the balance of negative and positive experiences is important when deciding to have an additional child (Newman 2008), and help explain why most people have one or two children, even when the net economic costs to parents are substantial. That parents experience increases in well-being for the first two children but not the third may explain why so few go on to have a third child. Decreasing gains in subjective well-being at higher birth orders may inhibit people from moving to parity three.

Not only one's own experience of the transition to parenthood, but also perceiving the well-being of others before and after having children, may affect the tempo and quantum of fertility. In addition to the type of social learning about the optimal timing and number of children to have (Montgomery and Casterline 1996), fertility decisions may be affected by observing the subjective experiences of others. We find divergent parental well-being trajectories by age at first birth and socioeconomic status. Those who become parents at young ages have a downward happiness trajectory, but those who become parents at older ages and men with more resources have more positive short- and long-term responses to a birth. Older parents may be more "ready" for parenthood or may have been anticipating it more intently (Gregory 2007). Socioeconomic resources may be particularly important for men because they take more responsibility of the economic and financial well-being of the household than women. If people see young parents with few resources having a difficult time and others with many resources having an easier time, this may send a message to postpone childbearing. Even if intentions are high, postponement may contribute to lower quantum because of declining fecundity. Thus, perceptions of new parents' experiences can influence others to postpone childbearing until they have accumulated more resources (education, income, status) or to adjust fertility intentions downward.

The divergent trends in the happiness response to a birth by age at first birth and socioeconomic status shed new light on the set point theory of happiness, which posits that after short-term fluctuations resulting from life events, happiness converges back to the initial level (Brickman and Campbell 1971; Larsen 2000; Lykken and Tellegen 1996). When averaged over the whole population, parental happiness trajectories return to pre-birth levels, consistent with set point theory. However, we find that not all subgroups converge back to their baseline levels. The birth of a child has long-term negative consequences for young parents but positive consequences for older parents. Although set point theory might hold on average, there is important heterogeneity in the long-term happiness response to having a child. The consistent rise in age at first birth in the latter half of the twentieth century may be the result of high-status people serving as a vanguard group. This behavior may point to future postponement among all social groups. However, although postponement may increase the payoff from childbearing, it also increases the risk of involuntary childlessness. The positive well-being trajectory estimated here is conditional on having a child. We do not observe the trajectories of those who postponed childbearing too long.

Our results on the association between age at first birth and subjective well-being cover the period 1984–2009, which largely corresponds to the era of fertility postponement in the industrialized world. However, our results should not be interpreted as showing that subjective well-being is the driving force of fertility postponement. It is possible that before fertility postponement became common, older-age parenthood was associated with a different happiness response. In addition, we do not argue that subjective well-being was the main driver of fertility decline because subjective experience likely became an important determinant of fertility during or after the second demographic transition with the rise of individualistic values. Moreover, throughout the period we study (1984–2009 in Germany and 1991–2008 in England), fertility has been relatively low and stable, making it difficult to analyze the contribution of subjective well-being to fertility behavior relative to other factors. Rather, our results provide a new way of understanding theories of fertility decline by showing that the fertility behavior that emerged during the second demographic transition would have been largely predicted by the subjective well-being response of parents to childbearing.

Our results are quite similar in Britain and Germany. The main difference is that German parents have similar happiness trajectories, whether partnered or unpartnered; in Britain, however, partnered parents experience larger increases in happiness in response to a birth than the unpartnered. These differences may reflect differences in the social stigma related to out-of-wedlock childbearing and single parenthood. Both carry a stigma in western parts of Germany, but out-of-wedlock childbearing is also relatively rare in these regions. In contrast, out-of-wedlock childbearing is relatively common and more socially acceptable in eastern parts of Germany (Konietzka and Kreyenfeld 2002). This may diminish the differences in the well-being trajectories in Germany between the partnered and unpartnered when compared with the difference in Britain. Differences in the tax and family policies available for lone parents may also contribute to the country differences. In Britain, there is a clear dichotomy between means-tested out-of-work benefits and in-work support provided through tax credits, but Germany relies more on the traditional means-tested social assistance (Blundell et al. 2009). The resulting differences in poverty are not small: 40 % to 46 % of lone mothers in Britain are poor, compared with only 27 % to 30 % in Germany (Ruspini 1999). Social norms and social policy may play some role in shaping parental well-being trajectories, but overall, the individual sociodemographic characteristics are more important than context.

The happiness trajectories of parents were quite similar in the pooled cross-sectional OLS regressions and the fixed-effects regressions. This suggests that in the populations analyzed, there is relatively little selection that is not accounted for by our control variables. It is possible that unobserved confounding is a relatively small problem also in other cross-sectional research on subjective well-being and fertility. However, the extent of bias resulting from cross-sectional analysis likely depends on the set of control variables that are available and used, and also the context. One cannot infer from our results that the set of control variables used in our regressions would effectively control for selection in some other context.

Our findings open new research questions. First, the mechanisms through which children influence well-being are not well understood and could include both biological and social responses. These might explain why women anticipate a first birth more than

men, with stronger happiness increases prior to and around the birth and a larger drop afterward. A potentially important physiological factor may be the increased levels of the hormone oxytocin during pregnancy and after birth (Ryan and Deci 2001). Among the possible social mechanisms is the fact that women's typical role as the primary caregiver exposes them to higher risk of sleep deprivation and social isolation (Della Giusta et al. 2011; Simon 1992). Qualitative information on work–family conflict, planning status of births, and instrumental support would be useful to further our understanding of the social mechanisms. Second, social norms about childbearing have relaxed markedly over the study period, and when and how many children to have may be more of a decision than before. Future research could consider whether this has changed the well-being implications of having children. Third, we mapped happiness trajectories for those who become parents; the remaining question is how these trajectories compare with those who are voluntarily or involuntarily childless. Last, how changes in parental well-being affect children's well-being is an open question.

Our study has limitations. First, although our fixed-effects approach is robust to attrition that varies only across individuals but not within, time-varying attrition risk that is correlated with childbearing could influence our results. We compare the three-year stay-in-sample probability following a birth (four consecutive waves) with the same probability among those who do not experience a birth within the observation window. The probabilities are not dramatically different from each other (87.8 % vs. 90.7 %), suggesting that time-varying attrition is not a large source of bias. Other individual-level factors that vary over time and influence both the likelihood of becoming a parent and happiness could also influence our results: for example, relationship quality. We control for all the relevant time-varying factors for which we have data—for example, for partnership status, which is not relationship quality but includes whether there is any cohabiting or marital relationship. Nevertheless, it is possible that unobservables, such as better measures of partnership quality, could influence both fertility and subjective well-being. Future work, possibly using instrumental variables, could potentially circumvent the problem of such unobservables.[12]

Second, we do not have information on miscarriages or stillbirths. An unknown fraction of the live births that we observe are preceded by miscarriages and stillbirths, and this fraction is likely to increase with age. Because miscarriages or stillbirths are also likely to be associated with decreased well-being at baseline, the fact that we do not observe these may explain part of the strong happiness response that we observe for older parents.

Third, we do not have information on adoptions. The process of becoming a parent biologically versus through adoption is very different, and the first years of parenthood may be different for biological and adoptive parents because adopted children often are

[12] As a reviewer recommended, we considered instrumental variables regressions. We first used the birth of twins as an instrument for having two children. Results for twins were not statistically different from 0. The 95 % confidence intervals overlapped also with the happiness trajectories observed for the first and second birth. We then used sex distribution of children as an instrument for having additional children. Having a boy versus girl did not predict parity progression, but having the first two children of the same sex increased the likelihood of having a third child. Regressions in which the birth of a third child was instrumented with the sex distribution of the first two children were also statistically indistinguishable from 0 and from the noninstrumented happiness trajectory for the third child. In our data, the commonly used instruments of sex distribution and multiple births had too little statistical power to establish any results. Data on miscarriages, another possible instrument, were not available.

not babies. Future work could analyze whether this results in different parental well-being trajectories.

In today's developed countries, where having a child is often a conscious choice, trajectories of subjective well-being around the transition to parenthood may be an important driver of low and late fertility. The way in which the process of having a child influences parental happiness depends on the individual characteristics of parents and number of previous children. Our results suggest that those who gain from childbearing most are those who have one or two children at an older age after acquiring educational and financial resources. This is consistent with the fertility behavior that emerged during the second demographic transition in developed countries. If social learning about the higher well-being trajectories of older and higher status parents affects the timing and quantum behavior, then we can expect that subjective well-being will continue to be a driver of the timing and level of fertility in modern societies.

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