**Transition to Parenthood, Gender and Well-Being: A Longitudinal Study of the
United Kingdom**

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Abstract

Previous studies have omitted a dynamic analysis of how the transition into parenthood shapes gendered mental health trajectories. This study adopts a life-course approach to examine how transitioning into parenthood affects mothers' and fathers' different mental health outcomes over time, using high-quality panel data from the 'UK Household Longitudinal Study' (2009-2021). Results from fixed effects models with discrete-time trends show that: (1) mothers' mental health is more largely affected by the transition to parenthood –both positively and negatively– than fathers'; (2) mothers' overall mental health shows a distinctive positive anticipation and adaptation around childbirth, while fathers show insignificant changes; (3) role and social functioning are improved only among mothers following childbirth; (4) becoming a parent decreases the risks of depressive feelings for both genders, with longer lasting effects for women, while stress and energy levels show a deterioration during care-intensive years, particularly among mothers; (5) mothers working full-time and from higher socioeconomic backgrounds experience reduced mental health benefits from the transition to parenthood compared to mothers with lower paid work constraints and in less privileged socioeconomic positions. Overall, transitioning to parenthood leads to distinct changes in mental health outcomes in heterogenous ways across genders and socioeconomic groups.

Keywords: Parenthood; Subjective well-being; Mental health; Gender; Longitudinal analysis

1 Introduction

Gender inequalities persist strongly across multiple outcomes such as paid work, household labour or leisure (Bianchi et al., 2000; Budig & England, 2001; Hook, 2010; Kamp Dush et al., 2018). The effect of parenthood on gender inequalities in income and labour market outcomes has been well documented (Musick et al., 2020). Yet, how the transition to parenthood affects individuals' mental health trajectories, and particularly whether men and women are differently impacted by this life-course transition, remains to be precisely investigated. The present study contributes to the health, gender, and life-course literatures by providing new dynamic evidence of how the transition to parenthood shapes men's and women's mental health outcomes over time.

Understanding how parenthood impacts gender gaps in mental health has important scientific and societal implications. Women tend to experience higher mental health problems (e.g., depression, anxiety, and fatigue) than men (Otten et al., 2021). Studies suggest that parents, and especially mothers, are at higher risks of suffering mental health adversities (e.g., Giesselmann et al., 2018). Scholars have argued that gendered disparities in parental mental health may reflect inequalities in parenting demands and responsibilities, which may lead mothers to experience larger strains, stress, and time pressures (Ruppanner et al., 2019). This in turn may bring women to suffer higher mental health challenges than men over parenthood transitions (Nomaguchi et al., 2005).

Previous research has provided inconclusive evidence on how becoming a parent affects men's and women's subjective and mental well-being due to the dynamic and complex nature of the parenthood experience (Nelson et al., 2014; Nomaguchi & Milkie, 2020). Longitudinal studies examining life satisfaction or happiness generally find only short-term effects of childbirth, with an eventual return to pre-birth levels over time

(Clark et al., 2008; Clark & Georgellis, 2013; Myrskylä & Margolis, 2014), with some differing trends across countries (e.g., Mikucka, 2016). Studies on specific emotional well-being outcomes (i.e., strain, feelings of joy, fulfilment) suggest that parenthood may have counteracting positive and negative effects which unequally affect mothers and fathers (Negraia & Augustine, 2020; Nomaguchi & Milkie, 2003; Roeters & Gracia, 2016). However, this research often relies on cross-sectional data, missing a long-term dynamic view, or has focused on general evaluative measures of well-being such as life satisfaction. In line with recent studies seeking to move from unidimensional to multidimensional approaches to capture parental well-being over the life course (Aassve et al., 2021; Bernardi et al., 2017; Krämer & Rodgers, 2020), our study addresses these gaps by examining gendered parental mental health outcomes with a longitudinal domain-based approach using a multi-item mental health score.

This study makes two key contributions. First, we adopt a longitudinal framework to investigate mental health trajectories of first-time parents examining the gendered differences of parenthood transitions on mental health trajectories. Second, our study not only focuses on mental health as an overall score (i.e., using the SF-12 measure), but also adopts a multidimensional approach to mental health trajectories following the transition to parenthood. We focus on specific dimensions of mental health having distinct implications for mothers' and fathers' well-being. By making novel use of multiple mental health subscales (e.g., functioning, affect), we can identify the possible counteracting effects of parenthood otherwise not detectable through a computed global score (e.g., becoming a parent may increase joy, but also fatigue or conflict with social life). Our multidimensional approach allows us to compare longer term processes in adjacent but distinct areas of individuals' mental health following childbirth, with a

particular focus on gendered differences within and across domains as well as on socioeconomic heterogeneity.

Our study benefits from large-scale longitudinal panel data from the British *Understanding Society* survey (UKHLS). The UKHLS provides high-quality repeated observations on both mental health and life satisfaction, but also on specific items of mental health collected between 2009 and 2021 from a sample of over 40,000 households. Using this rich dataset, our study provides unique evidence on how parents' mental health evolves during the transition to parenthood, how specific mental health areas are affected by parenthood transitions, and whether patterns differ between men and women.

2 Analytical framework

2.1 Well-being in the transition to parenthood: A mental health approach

Previous studies have looked at subjective well-being by examining global evaluative indicators such as 1-to-10 scales of life satisfaction or happiness. These measures are reliable to examine how individuals subjectively judge their lives and reflect global assessments of life quality (Clark et al., 2019). These types of measures however do not allow to describe the complex and multi-layered mental and emotional processes that take place following childbirth. Recent studies using multidimensional approaches to subjective well-being indicate that parenthood has positive or negative effects depending on the examined satisfaction indicator (i.e., leisure quality, sleep deprivation, marital satisfaction) driving overall life satisfaction judgements with heterogeneous effects among mothers and fathers (Aassve et al., 2021; Bernardi et al., 2017; Krämer & Rodgers, 2020). Yet how mental health evolves around childbearing among men and women still needs to be carefully investigated.

Scholars have argued that single-item assessments such as life and domain satisfaction alone may not account for specific well-being outcomes (Deci & Ryan, 2008). For example, reporting good life satisfaction or overall happiness does not necessarily equate to having good mental health or emotional and psychological functioning. While domains of life satisfaction account for individuals' subjective perception of the different aspects relevant to their lives, multi-item mental health scores allow for an assessment of mental strains and benefits (Henderson et al., 2016). Multi-item mental health instruments can simultaneously record good psychological functioning (i.e., performing necessary tasks) and emotional distress levels (i.e., stress, feeling down or happy), which may change following the experience of parenthood (Oyarzún-Farías et al., 2021). This multidimensional approach provides in-depth evidence of parental mental health, complementing previous research on life satisfaction and happiness.

Previous studies on mental illness –defined as a medical condition– have found parenthood to be linked to emotional disorders for both men and women, such as postpartum depression (Escribà-Agüir & Artazcoz, 2011). Studies on self-reported mental health find mixed evidence on the effect of parenthood. Some results suggest positive effects and mental health improvements (Mckenzie & Carter, 2013), particularly for mothers (Kalucza et al., 2015). Others point out higher levels of distress and depressive moods (Evenson & Simon, 2005; Giallo et al., 2012), dependent on social and marital context, as well as age at birth and parenting stage (Mirowsky & Ross, 2002; Simon & Caputo, 2019). Only few studies have adopted a dynamic approach, yielding contrasting results. Examining Australian longitudinal household data, Ruppanner et al. (2019) found positive effects of a first birth on maternal mental health, supporting an older study by Clark and Georgellis (2013) finding temporary positive effects of

parenthood on well-being in the UK. Conversely, Giesselmann et al. (2018) found a significant negative evolution for German mothers following the transition into parenthood, while Tosi and Goisis (2021) find that effects vary depending on whether parents had to go through medically assisted reproduction.

Our paper contributes to the growing literature on parenthood transitions and mental health trajectories by (1) adopting a novel and nuanced multidimensional approach using relevant subscales of mental health, (2) examining gender differences across this life-course process, and (3) addressing socioeconomic heterogeneity in these effects.

2.2 Conceptual and theoretical approaches

Mental health is conceptualised as a state which includes functioning, psychological well-being, and vitality i.e., having good mental health translates into having the ability to carry out daily work and social activities, and contribute to one's community without experiencing persistent strain and being able to manage emotional distress (World Health Organization, 2022).

All mental health domains may be affected by parenthood. First, role and social functioning (i.e., the ability to perform well usual daily and social activities) may be negatively affected by parenthood, as the new parenting roles and responsibilities may induce performing less well due to role overload or strain, particularly for mothers (Goode, 1960; Simon, 1992), which may negatively impact parents' resilience to distress (Galderisi et al., 2015). Second, negative affect, such as feeling stressed, may increase due to feeling more pressured for time (Ruppanner et al., 2019), while positive affect, such as feeling joyful, hopeful or happy, may improve with a fulfilling family life, particularly for women. Lastly, vitality (i.e., having energy and endurance) may deteriorate after childbirth, due to the increase in strain and fatigue linked to the lack of

sleep and having to provide intensive care in the first years, which may affect mothers more than fathers (Venn et al., 2008).

The predominant approach to study subjective well-being within the life-course framework is the *set-point* theory. According to *set-point* theory, every individual has a stable, baseline well-being level determined by genes, personality, and early environment (Diener et al., 2009). Important life events only temporarily increase or decrease –rather than redefine– existing well-being levels, having a short-term effect before individuals revert to their baseline (or set-point) by adapting to their new circumstances over time. Additionally, in the case of expected life changes such as becoming a parent, an anticipation process is likely to be observed, raising well-being levels a few years prior the actual occurrence of the event (Frijters et al., 2011).

Multiple studies have found evidence in support of *set-point* theory in relation to how parenthood transitions affect selected well-being outcomes. Longitudinal studies find that the rewards from parenthood on happiness and life satisfaction have a temporary effect, with an increase of life satisfaction or happiness right before (anticipative phase) and right after childbirth, followed by a decline, eventually dropping back to pre-birth levels (adaptative phase) (Clark et al., 2008). This finding of momentary increases in life satisfaction has been documented for German and British data (Clark & Georgellis, 2013; Myrskylä & Margolis, 2014) as well as for Swiss data (Anusic et al., 2014; Mikucka & Rizzi, 2019). Although *set-point* theory does not make explicit distinctions between men and women, some gendered differences can be observed in magnitude of reaction to event or adaptation periods following childbirth for life satisfaction (Frijters et al., 2011; Mikucka & Rizzi, 2019), indicating a possibly gendered component of this critical life-course event.

Further, the *costs-rewards* approach puts forward that parenthood simultaneously brings positive and negative aspects to parents' lives (Nomaguchi & Milkie, 2003). Being a parent is associated with feelings of fulfilment and joy, as it brings psychological and emotional benefits. However, parenthood also generates increased feelings of stress and fatigue, due to financial and time-consuming commitments, as well as greater domestic responsibilities (Nomaguchi & Milkie, 2020). Depending on the stressors experienced by parents (e.g., work-family conflict, perception of unfairness in domestic chores, financial burdens), those may offset the enjoyments of parenting (Pollmann-Schult, 2014; Stanca, 2012). The *cost-rewards* approach acknowledges the mixed and sometimes contradictory experiences of parenthood, suggesting that transitioning into parenthood may combine both positive and negative mental health elements.

To date, however, the *set-point* and *costs-rewards* theories have not been combined with regards to gendered mental health dynamics over multiple years following childbirth. The *costs-rewards* theory justifies a domain-based approach to parental mental health. *Set-point* theory justifies a yearly and long-term approach to examining mental health outcomes as trends evolve rapidly around birth. We test whether the expectations drawn from *set-point* theory also apply to mental health and its specific domains (functioning, affect, vitality) and examine whether parenthood's costs and rewards are reflected in mental health outcomes. Following *set-point* theory, anticipation and adaptation patterns are expected for mental health, but with the possibility of more apparent strains during the most demanding early years temporarily lowering mental health levels before reaching adaptation. While *set-point* theory does not posit major differences in reaction and adaptation to childbirth between men and women, gendered mechanisms in the transition to parenthood may yield differentiated mental health trajectories.

2.3 Gender, parenthood, and mental health

Men and women face different demands when becoming parents (Scott & Alwin, 1989). With the arrival of a child, new tasks and responsibilities need to be carried out, adding to existing obligations. As mothers and fathers are not subjected to the same societal expectations, the transition to parenthood prompts different normative, behavioural, and well-being responses from men and women.

Research on couples shows that gendered behaviours increasingly emerge following childbirth. Mothers often shoulder a larger amount of housework and childcare, which results from a shift to more traditional gender behaviours and division of labour after entering parenthood (Baxter et al., 2015; Yavorsky et al., 2015). Mothers continually take on a greater parenting role than fathers as the primary caretaker, which involves higher time commitments and constraints, more demanding tasks, leading to increased time-pressures and multitasking (Buddelmeyer et al., 2018; Craig & Mullan, 2011; Offer & Schneider, 2011; Ruppanner et al., 2019). This has been accentuated by the recent emergence of intensive parenting ideologies which led to an increase in childrearing involvement, in particular for mothers (Craig et al., 2014). This greater role burden has been linked to a deterioration in mothers' mental health (Rizzo et al., 2013), particularly when the mothering role conflicts with work responsibilities (Matysiak et al., 2016). Mothers also feel less happy, more stressed and more fatigued than fathers when spending time with their children (McDonnell et al., 2019; Musick et al., 2016; Nelson-Coffey et al., 2019; Roeters & Gracia, 2016).

Longitudinal studies on life satisfaction and happiness levels find mostly moderate, short-term differences between mothers and fathers (Clark et al., 2008; Clark & Georgellis, 2013; Myrskylä & Margolis, 2014). Other studies find that mothers of young

children are happier (Baranowska & Matysiak, 2011; Radó, 2020), while some indicate that fathers are happier (Nelson-Coffey et al., 2019). We expand on these studies by examining mental health multidimensionally and assessing the presence of gendered differences across mental health domains over time.

2.4 Socioeconomic characteristics as moderators of parental mental health

Socioeconomic factors are important markers of parental well-being. The experience of parenthood can differ significantly depending on the socioeconomic characteristics of parents (Pollmann-Schult, 2014). We consider the role of socioeconomic status (SES) – considering education, occupational class, and income– and paid work time constraints on mothers’ and fathers’ mental health.

Having children is costly, both financially and timewise. On the one hand, high-SES individuals have a higher level of education and more often work in higher paid managerial or professional occupations. Higher income provides an easier access to childcare resources or to outsourcing housework, which may help relieve parental stress and time pressure, especially for mothers. Moreover, higher SES is often associated with more egalitarian family ideologies and arrangements, which has been found to be positively linked to mothers’ well-being (Kulik, 2020). High-SES is also associated with better overall health outcomes (Smith, 2007).

On the other hand, high-SES individuals may also experience greater work-family conflict linked to career-oriented occupations, as well as demanding work responsibilities. Work-life conflict has been found to reduce well-being outcomes during the transition to parenthood (Matysiak et al., 2016). Moreover, high-SES parents may adhere particularly to “intensive parenting” ideologies (Dotti Sani & Treas, 2016), which increases societal pressure on parents (particularly mothers) to be very actively involved in childcare, even

when work demands are high. As a result, it could be argued that the mental health of high-SES individuals, particularly mothers, is harmed disproportionately by the transition to parenthood. A study by Nomaguchi & Brown (2011) finds evidence of the duality of the role of education for parenting, which provides resources for childrearing, but also increases competing parenting and career demands. This scenario may lead to expect that high-SES parents, and particularly high-SES mothers, see greater changes in their mental health than lower-status parents.

Additionally, individuals who combine high work constraints with the arrival of a first child may experience more negative feelings following parenthood than those with lower work constraints, as the former have less leeway to organise and complete housework and childcare, leading to increased stress (Chandola et al., 2019). The effects of work constraints may be particularly salient for women as previous studies show that high work constraints particularly disadvantage the well-being of mothers on full-time schedules (Hewitt et al., 2006).

2.5 Hypotheses

We formulate the following hypotheses, based on our adaptation of previous scholarship. First, we expect parenthood to have a positive effect on mental health in the short-term for both men and women, consistent with *set-point* theory (*H1a*). However, consistent with the *costs-rewards* approach, parental mental health may display a negative trend during care-intensive years, due to larger strain, fatigue, and pressure associated with the high demands of early childrearing (*H1b*). Due to mothers' higher role conflict and parental involvement leading to greater strains than fathers', we expect any negative trend to be more apparent for women (*H1c*).

Second, we expect parenthood to have positive effects on mental health items that account for fulfilment, but negative effects on mental health items that account for strain, consistent with the *costs-rewards* approach predicting counteracting effects, for both men and women (*H2a*). Yet, drawing on the gender roles literature and previous empirical evidence, we expect the effects of becoming a new parent on both negative and positive mental health items to be larger among women than among men (*H2b*).

Third, we anticipate socioeconomic factors to moderate the gendered effects of the transition to parenthood on mental health. We expect larger fluctuations in mental health among high-SES individuals due to higher parental involvement (*H3a*), with most pronounced effects among high-SES mothers compared to low-SES mothers (*H3b*). Similarly, we expect larger negative outcomes for mothers with high work constraints (i.e., working full-time) than for mothers having lower paid work constraints (*H3c*).

3 Data and methods

3.1 Data and sample

We use the first 11 waves of the UK Longitudinal Household Survey (UKHLS, *Understanding Society*), spanning every year between 2009 (wave 1) and 2021 (wave 11). The survey consists of over 40,000 British households interviewed yearly, with every household member over 15 years old being interviewed separately, providing complementary data on family configurations. Questionnaires include rich modules on individual well-being and health, socioeconomic characteristics, and demographics.

We select partnered individuals to keep a homogeneous sample in terms of couple and family context, as single parenthood has been shown to have more distinctively negative consequences on parental mental health (Evenson & Simon, 2005). Considering

that there is evidence for positive self-selection into parenthood (Cetre et al., 2016), we restrict the sample to individuals who will become or are first-time parents during the observation period. We further restrict our observations to women aged between 18 to 50 years and men aged 18 to 60 years to constrain the sample to individuals in the typical age range for having younger children. Of the initial 26,855 parents selected, 20,591 (76.7%) have complete row information on all included dependent, independent, and control variables. This final sample consists of parents transitioning into parenthood for the first time or experiencing aging of their first child aged 8 or younger during the survey (8,862 respondents), and parents whose first child is 9 years or older (control group, 10,710 respondents). It includes 9,361 women observed on average for 4.3 waves (40,149 total observations) and 10,211 men observed 4.6 times (46,695 total observations). Table 1 describes sample characteristics.

[INSERT TABLE 1 ABOUT HERE]

3.2 Dependent variables

We measure mental health using the SF-12 health questionnaire. We use the Mental Component Summary (MCS) score of the SF-12, a validated and reliable measure of mental health (Gill et al., 2007; Ware et al., 1996). The SF-12 MCS is computed from six items of the total twelve questions assessing the respondent's mental well-being in the following domains: limitations in role functioning due to emotional problems ('accomplishing less than usual'; 'being less careful than usual'), social functioning ('health or emotional problems interfering with social activities'), psychological distress and affect ('feeling calm and peaceful'; 'feeling downhearted and depressed'), and

vitality ('having a lot of energy'). The items are assessed on a scale from 1 to 5 (expressed as 'all of the time' to 'none of the time') and computed into a global score. The final score ranges continuously from 0 (very poor mental health) to 100 (very good mental health), with 50 set as a general median score and a standard deviation fixed at 10. We use both the overall SF-12 MCS score and the six items from each subscale of mental well-being¹. All dependent variables are treated as continuous variables. Table 2 describes and summarises the distribution and meaning of all dependent variables used.

[INSERT TABLE 2 ABOUT HERE]

3.3 Independent, moderation, and control variables

The independent variable throughout this study is the first transition to parenthood. To model the dynamic nature of this process on individual well-being, the variable is constructed to take into account discrete-time trends surrounding the birth event (e.g., used in Myrskylä & Margolis, 2014). The time trend variable is coded into a categorical variable ranging from -3 years before birth to 8 years after birth. This observation window is defined to capture average baseline effects at -3 years before birth (when estimated

¹ The SF-12 is a shortened version of the original SF-36 measure but retains the same dimensions and subscales (Ware et al., 1998). The SF-36 MCS is a multidimensional measure which evaluates all main domains of mental well-being, i.e., role and social functioning, mental health, and vitality. Each subscale was adapted from former validated and reliable instruments, permitting the use of each subscale separately as a valid measure of a specific domain (e.g., using only the social functioning subscale) (Ware Jr & Sherbourne, 1992). The high correlation between the SF-12 and the SF-36 has been established, in particular for its UK adaptation (Jenkinson et al., 1997; Ware et al., 1998). Thus, this paper makes use of both the global SF-12 MCS score and its subscales to explore each domain in detail.

outcomes are considered unrelated to the parenthood transition, i.e., before any anticipation effects) and up to 8 years to capture all early parenthood stages.

For individuals becoming parents during the observation period, the variable takes the value of the number of years around the birth of the first child. For individuals already entering the panel as parents whose first child is 8 years or younger (i.e., left-censored observations), the time trend variable takes on the value of the first child's age. All other older parents used as a control group are coded to -3 as a default value, following a similar strategy than in previous related studies (Perales, 2019; Ruppanner et al., 2019). See Online Supplements (Table S1) for a fictional illustration of the data file structure.

For moderation analyses we define four time-invariant dummy variables: obtained a degree in higher education; held a managerial or professional position during most years of the observed period; average personal monthly income over the observed period exceeded the average income of the sample; average working hours exceeded 30 weekly hours during care-intensive years (i.e., in years 0 to 4 post-birth) for young parents or over the whole period for older parents (i.e., in years 5+ post-birth).

We control for age, age squared, employment status (full-time, part-time or no employment), household monthly total net income, and long-term health impairment.

3.4 Empirical strategy

We apply fixed effects models to study the trajectories around the birth of a first child, which exploit within-individual variations of time dependent variables for more consistent estimations. Fixed effects models eliminate unobserved time-constant individual effects, producing unbiased estimations that require few assumptions (Allison, 2009) and eliminate self-selection issues (i.e., selection into parenthood). The estimated parameters capture the average effect of change in the variable of interest, i.e., the arrival

and aging of the first child, on the outcome. Following Perales (2019) and Ruppanner et al. (2019), parents with children aged 9 or older are included as a control group, which contributes to a robust estimation of control variables while not contributing to the estimation of the independent variable.

We stratify our analyses by gender and use separate models for men and women, as processes surrounding well-being and parenthood are very gender specific. We overlay graphically the separately estimated trajectories of men and women to compare magnitude, scope, and level of the each examined well-being outcome around the event, having controlled separately for confounders. Additionally, we estimate fully interacted models for each outcome to include significance tests of gender differences in the parenthood transition variable (see Leopold, 2018 for a similar strategy). The fixed effects framework allows for interactions of time-varying variables with a time-constant variable, although the time-constant variable will not be included in the model outside of the interaction terms.

The fixed effects regression model is specified in the following way for men and women, with clustered (robust) standard errors:

$$Y_{it} = \beta_0 + \beta' \cdot TP_{it} + \gamma' \cdot X_{it} + \alpha_i + \varepsilon_{it} \quad (1)$$

Where TP is the categorical discrete-time variable for first-time parenthood, X contains all time-dependent individual control variables and α_i is the individual fixed effect.

The fully interacted model is specified similarly, with gender interactions on all variables:

$$Y_{it} = \beta_1' \cdot TP_{it} + \beta_2' \cdot TP_{it} \times female_i + \gamma_1' \cdot X_{it} + \gamma_2' \cdot X_{it} \times female_i + \alpha_i + \varepsilon_{it} \quad (2)$$

Lastly, moderation analyses are carried out by adding an interaction term between the independent variable and the time-invariant moderator M for men and women separately:

$$Y_{it} = \beta' \cdot TP_{it} + \beta' \cdot TP_{it} \cdot M_i + \gamma' \cdot X_{it} + \alpha_i + \varepsilon_{it} \quad (3)$$

4 Results

4.1 Parents' mental health trajectories: SF-12 MCS

Figure 1 presents the results of the fixed effects models for men's and women's individual mental health trajectories measured by the SF-12 MCS. Appendix Table A1 presents the coefficients of the fixed effects linear regression models of changes in mental health for men and women separately.

[INSERT FIGURE 1 ABOUT HERE]

Figure 1 shows that, at baseline, women becoming mothers score lower on mental health on average than men becoming fathers. Women's mental health trajectory globally stays at a lower average level than men's during the complete observation frame, despite a reduction of the gap over time. For mothers, we observe an anticipation effect, with a statistically significant positive improvement of mental health during the year of pregnancy ($\beta_{TP=-1} = 1.52, p < .001$). The trajectory reaches a peak during the year of birth ($\beta_{TP=0} = 1.77, p < .001$), followed by a complete adaptation in the second year after birth. For fathers, the trajectory shows a small, but not statistically significant, downwards trend following childbirth, without displaying an anticipation nor a positive effect of a first childbirth on mental health. Appendix Table A1 compares the results for mental health

with those for life satisfaction to contrast both measures. Table A1 shows similar patterns for women, with trends for men being slightly different than for mental health, as life satisfaction improves at birth for new fathers ($\beta_{TP=0} = 0.12, p < .05$), before reaching complete adaptation in the following year.

Overall, results from Figure 1 partly find support for the *set-point theory*. Women show a distinct anticipation and adaptation pattern during the transition to parenthood, but we cannot conclude the same for men, which validates *H1a* for women but not for men. Further, we find no evidence of a significant negative pattern linked to the care-demanding years of raising a very young child after the initial positive effect of the arrival, as opposed to our predictions on *H1b*. Lastly, contrary to *H1c*, no larger negative effect of parenthood is found for mothers' overall mental health in the years following birth, compared to fathers. In short, women are more positively impacted by parenthood than men starting in the pregnancy year and across most early parenthood years, while fathers' mental health score levels are not significantly affected by parenthood (see Appendix Table A4 for results of the fully interacted model)

4.2 Parenthood transitions and specific domains of mental health

Figure 2 shows results from the fixed effects models using all SF-12 MCS items. In Appendix Table A2 (for women) and Appendix Table A3 (for men) we present the complete models with regression coefficients and SE. Appendix Table A4 presents the fully interacted model for the same measures. We observe again lower average initial levels on all items for mothers than for fathers.

[INSERT FIGURE 2 ABOUT HERE]

The main results emerging from Figure 2 (supported by Appendix Tables A2, A3 and A4) can be summarised as follows. First, mothers are more likely to have accomplished their usual tasks relatively to baseline, starting in the birthyear ($\beta_{TP=0} = 0.19, p<.001$) and carrying on during all care-intensive years (i.e., until year 4 post-birth). By contrast, men's changes in this item relative to the baseline response level are not statistically significant. Similarly, women are consistently more likely to indicate being more careful than usual from pregnancy onwards ($\beta_{TP=0} = 0.20, p<.001$), with stable and statistically significant effects over the entire observation period, while fathers are again unaffected. This may be directly linked to mothers' greater parenting load as it requires being very attentive.

Second, difficulties in participating in social activities due to emotional or physical problems are reduced post-birth on average for mothers only ($\beta_{TP=0} = 0.18, p<.001$), while fathers are unaffected. The significant improvement in mothers' social functioning endures throughout the observation period, without showing any adaptation pattern ($\beta_{TP=8} = 0.34, p<.001$).

Third, for feeling calm we observe a statistically significant increase among mothers in the year before birth compared to baseline levels ($\beta_{TP=-1} = 0.11, p<.01$), followed by an ongoing decrease after birth ($\beta_{TP=8} = -0.18, p<.01$), which is steepest in the care-intensive years which are linked to higher demand and stress. Fathers' trajectory also displays a statistically significant drop in feeling calm which stabilises at this level throughout the entire observation period ($\beta_{TP=8} = -0.14, p<.001$). Although mothers' trajectory shows a more clearly defined decline in feeling calm during early childrearing than men, the predicted change in this outcome is similar between men and women (Appendix Table A4).

Fourth, mothers' depressive emotions decrease sharply after the transition to parenthood, which translates into being more likely to feel happy ($\beta_{TP=0} = 0.30, p < .001$). This process starts from the pregnancy year, with a positive anticipation effect ($\beta_{TP=-1} = 0.25, p < .001$) and long-lasting improvements over the entire observation period ($\beta_{TP=8} = 0.15, p < .05$). For men, an increase in feeling happy is also observed before and at birth, however –unlike mothers– adaptation occurs already one year after childbirth. Hence, we find evidence of an improvement in positive feelings following childbirth, which is statistically significantly larger for mothers than fathers (Appendix Table A4).

Lastly, energy levels display a statistically significant decrease for both men and women, but with a more pronounced decline pattern for women during care-intensive years ($\beta_{TP=2} = -0.14, p < .01$) before they adapt to average pre-birth levels, while men maintain a stable lower level compared to their baseline across the post-birth period ($\beta_{TP=8} = -0.12, p < .05$). However, the predicted change in energy is significantly larger for women than for men across most post-birth years (Appendix Table A4). A substantial and significant dip in energy levels relative to the baseline level is also observed for women only in the year preceding birth ($\beta_{TP=-1} = -0.26, p < .001$), which may be explained by the physical discomforts of pregnancy.

Overall, results on specific mental health items are in line with expectations for *H2a*. We can observe that strains (i.e., lack of energy and feeling calm) are negatively impacted but are countered by positive and fulfilling emotions (i.e., improvements in feeling one accomplishes tasks or feeling happy). Subscales show a gendered process: women display stronger trends in stress, nervousness, and strain (steeper downwards trend in feeling calm and lower energy levels) but improve their role and social functioning compared to men, in line with *H2b*. However, gender gaps in mental health emerging from the transition to

parenthood are generally not very strong. Gender inequalities in mental health seem to be partly linked to pre-childbirth gender gaps in mental health, but mothers react more strongly to parenthood in terms of both satisfactory and adverse mental health changes.

4.3 The moderating role of socioeconomic characteristics

Table 3 presents moderation analyses to estimate the impact of socioeconomic markers on mental health trajectories during the transition to parenthood, with analyses presented separately for men and women.

[INSERT TABLE 3 ABOUT HERE]

Table 3 shows a consistent pattern over all four moderation analyses for women. Higher socioeconomic status displays overall lower mental health outcomes following the first child's birth. During the pregnancy year, an anticipation effect is not significantly different across the groups, but trends start to diverge notably from the year of birth ($\beta_{TP \cdot M=0} = -2.34, p < .01$). Highly educated mothers experience a statistically significantly lower positive birth effect than less educated women. However, the difference in effect does not translate into the parenthood transition being negative, rather highly educated mothers mostly miss out on the positive impact of having a first child. For mothers in high-SES positions, parenthood similarly translates into lower mental health levels across most years of childrearing ($\beta_{TP \cdot M=8} = -2.35, p < .01$). While higher income could be associated with better outcomes due to disposing of more resources to ease the strains of parenthood, mothers with higher-than-average incomes also experience a diminishment in their mental health, compared to lower earning mothers, even if the negative difference is only statistically significant at birth ($\beta_{TP \cdot M=0} = -1.86, p < .05$). Lastly, working full time

(i.e., working over 30 hours per week) was equally associated with significantly lower well-being across the post-birth observation period.

Table 3 also reveals that, for men, differences across socioeconomic groups are small, except when comparing high-SES to low-SES occupational groups. However, the effect of being in a high-SES position is reversed for men, compared to women: fathers in professions with lower socioeconomic status experience declines in mental health which are offset for fathers in managerial and professional positions.

Overall, mothers are found to have more heterogeneous experiences of parenthood than fathers depending on their socioeconomic characteristics. Mothers from higher social backgrounds and working longer hours experience a reduced positive experience gained by other groups following the arrival of the first, as expected following *H3a*. By contrast, differences among fathers are not significant, which is consistent with *H3b*. Lastly, we find that mothers with high work-constraints experience lower mental health outcomes, in line with *H3c*.

Finally, additional analyses show that socioeconomic differences in mothers' mental health are greatly reduced when we analyse full-time working mothers only (analyses available upon request). These additional analyses imply that the reduction of mental health outcomes among socioeconomically privileged mothers when transitioning to parenthood is largely reflecting the higher work constraints experienced by these mothers, compared to mothers from socioeconomically more disadvantaged backgrounds.

5 Discussion

This study has investigated women's and men's mental health trajectories around the first transition into parenthood in the UK between 2009 and 2021. To widen the scope of

previous parental well-being research, this paper has innovated by examining trajectories in specific mental health areas over a long period of time. This allowed us to document the extent of the presence of both positive and negative gendered counteracting effects in parental mental health trajectories.

The main findings of our study can be summarised as follows. First, analyses of mental health scores reveal that parenthood has significant short-term positive effects for women but not for men. Outside of observing that average SF-12 score levels are consistently lower for women than for men, we find no obvious mental health disadvantage for women after the transition into parenthood, as could have been expected due to higher societal constraints and expectations surrounding young mothers (e.g., Giesselmann et al., 2018). For comparison purposes, we show similar results for life satisfaction compared to mental health, particularly for women, adding to previous literature on parenthood transitions and well-being trajectories (Aassve et al., 2021; Clark & Georgellis, 2013; McKenzie & Carter, 2013; Mikucka & Rizzi, 2019; Myrskylä & Margolis, 2014; Tosi & Goisis, 2021). Our specific focus on mental health and its domains allows to capture additional key components of individuals' well-being, adding new evidence to previous research on parenthood transitions.

Second, when examining subscales of mental well-being, we confirm that mothers are on average more affected than men by the first parenthood transition. However, we find no clear pattern divergences that suggest an unequal evolution of mental health in early parenting years. Rather, we find clear evidence for counteracting effects associated to parenthood: calmness and having energy show a downwards trend with respect to baseline following childbirth for both mothers and fathers, while feeling depressed is significantly reduced. This indicates the presence of both positive (i.e., better outlook on

life and fulfilment) and negative (i.e., strains and fatigue) aspects of parenthood. These results are consistent with the *costs-rewards* theory stating that parenthood brings differentiated and gendered mental health outcomes across different indicators.

Third, and contrary to initial expectations, we find an improvement in role and social functioning for mothers, both in the short term and in the long term, while fathers are entirely unaffected in these areas. We anticipated increases in role dysfunction due to the multiplication of responsibilities (predicted to be greater for mothers due to gender norm expectations) in ways that negatively affect individuals' abilities to complete daily tasks as well as usual. These findings may indicate that role accumulation not only brings burdens and overload, but also involves benefits (Sieber, 1974). Cumulating roles may have positive consequences due to the stimulating effects and additional buffers it offers. Recent empirical evidence suggests that multiple roles in early adulthood may be linked to decreased depressive risks for older individuals and well-being premiums (Comolli et al., 2021; Engels et al., 2021). Role accumulation when becoming a parent may thus not necessarily be detrimental for good functioning, but it does not exclude experiencing strain (increase of stress, decrease in energy) during childrearing years.

Fourth, analyses show the presence of socioeconomic heterogeneity among women following the transition to parenthood. Mothers from higher socioeconomic groups experience lower positive effects from parenthood suggesting that women from lower socioeconomic backgrounds are comparatively more positively affected by the transition into motherhood. This may indicate the presence of conflicting responsibilities (e.g., higher paid work constraints with childcare obligations) and/or larger parenting involvement among more privileged women potentially reducing the enjoyment of parenthood, consistent with previous findings (Gimenez-Nadal & Sevilla, 2016).

Overall, our results show that mothers experience better mental health outcomes across the first transition to parenthood, and generally show that women psychologically react to parenthood more than men (in positive and negative terms). Besides the physical processes involving pregnancy and childbirth, these results indicate women's higher involvement, both emotionally and functionally, as opposed to men's lesser involvement during this strongly gendered life-course transition. Globally, by using a novel multidimensional approach with rich empirical evidence our study offers a better understanding of how parenthood affects gendered well-being.

Our study connects with existing demography and policy debates on parental well-being, gender, and the life course. Previous studies find that parents whose well-being levels drop after the birth of their first child are less likely to have another child (Margolis & Myrskylä, 2015). This is particularly true in contexts with a stronger unequal division of labour within couples in which women experience heavier strain (Aassve et al., 2015; Mills et al., 2008) or have difficulties with reconciling work and family-life (Luppi, 2016; Luppi & Mencarini, 2018). Therefore, by understanding long-term gender differences in parental mental health, this study is contributing to key population debates around fertility intentions, childbirth patterns and its consequences in society.

We must acknowledge some shortcomings of our study. First, our study does not include objective medical measures of mental health, such as cortisol levels or allostatic load. Future research could combine a life-course approach using long-term longitudinal yearly measures with medical data to provide a more precise and objective assessment of individuals' well-being and health. Second, while the SF-12 is an effective assessor of mental health, it may not always capture explicit parenting-related strains and mental health issues experienced by new parents, such as feeling tired or parenting-specific

difficulties. Thus, our conclusions on the lack of longer lasting negative effects should be completed by future studies addressing these dimensions. Third, our study could be expanded to subsequent parenthood transitions, as effects and processes may be more clearly visible with increased parity (Mikucka & Rizzi, 2019). We hope future studies will benefit from our multidimensional life-course approach on how parenthood transitions shape gender differences in mental health by filling these shortcomings.

To conclude, our study has used unique high-quality panel data from the UK to bring a new multidimensional approach to the literature on gender disparities in mental health over the life course. We have shown that, despite differences in average mental health levels between men and women, it is crucial to address specific items with different implications for the present and future health of mothers and fathers.

References

- Aassve, A., Fuochi, G., Mencarini, L., & Mendola, D. (2015). What is your couple type? Gender ideology, housework sharing, and babies. *Demographic Research*, 32, 835–858. <https://doi.org/10.4054/DemRes.2015.32.30>
- Aassve, A., Luppi, F., & Mencarini, L. (2021). A first glance into the black box of life satisfaction surrounding childbearing. *Journal of Population Research*. <https://doi.org/10.1007/s12546-021-09267-z>
- Allison, P. D. (2009). *Fixed Effects Regression Models*. SAGE Publications, Inc. <https://doi.org/10.4135/9781412993869>
- Anusic, I., Yap, S. C. Y., & Lucas, R. E. (2014). Testing Set-Point Theory in a Swiss National Sample: Reaction and Adaptation to Major Life Events. *Social Indicators Research*, 119(3), 1265–1288. <https://doi.org/10.1007/s11205-013-0541-2>
- Baranowska, A., & Matysiak, A. (2011). Does parenthood increase happiness? Evidence for Poland. *Vienna Yearbook of Population Research*, 9, 307–325.
- Baxter, J., Buchler, S., Perales, F., & Western, M. (2015). A Life-Changing Event: First Births and Men's and Women's Attitudes to Mothering and Gender Divisions of Labor. *Social Forces*, 93(3), 989–1014. <https://doi.org/10.1093/sf/sou103>
- Bernardi, L., Bollmann, G., Potarca, G., & Rossier, J. (2017). Multidimensionality of Well-Being and Spillover Effects Across Life Domains: How Do Parenthood and Personality Affect Changes in Domain-Specific Satisfaction? *Research in Human Development*, 14(1), 26–51. <https://doi.org/10.1080/15427609.2016.1268893>
- Bianchi, S. M., Milkie, M. A., Sayer, L. C., & Robinson, J. P. (2000). Is Anyone Doing the Housework? Trends in the Gender Division of Household Labor. *Social Forces*, 79(1), 191–228. <https://doi.org/10.2307/2675569>
- Buddelmeyer, H., Hamermesh, D. S., & Wooden, M. (2018). The stress cost of children on moms and dads. *European Economic Review*, 109, 148–161.
- Budig, M. J., & England, P. (2001). The Wage Penalty for Motherhood. *American Sociological Review*, 66(2), 204. <https://doi.org/10.2307/2657415>
- Cetre, S., Clark, A. E., & Senik, C. (2016). Happy People Have Children: Choice and Self-Selection into Parenthood. *European Journal of Population*, 32(3), 445–473. <https://doi.org/10.1007/s10680-016-9389-x>
- Chandola, T., Booker, C. L., Kumari, M., & Benzeval, M. (2019). Are Flexible Work Arrangements Associated with Lower Levels of Chronic Stress-Related Biomarkers? A Study of 6025 Employees in the UK Household Longitudinal Study. *Sociology*, 53(4), 779–799. <https://doi.org/10.1177/0038038519826014>
- Clark, A. E., Diener, E., Georgellis, Y., & Lucas, R. E. (2008). Lags and Leads in Life Satisfaction: A Test of the Baseline Hypothesis. *The Economic Journal*, 118(529), F222–F243. <https://doi.org/10.1111/j.1468-0297.2008.02150.x>
- Clark, A. E., Flèche, S., Layard, R., Powdthavee, N., & Ward, G. (2019). *The origins of happiness: The science of well-being over the life course*. <https://doi.org/10.1515/9780691196954>
- Clark, A. E., & Georgellis, Y. (2013). Back to Baseline in Britain: Adaptation in the British Household Panel Survey. *Economica*, 80(319), 496–512. <https://doi.org/10.1111/ecca.12007>
- Comolli, C. L., Bernardi, L., & Voorpostel, M. (2021). Joint Family and Work Trajectories and Multidimensional Wellbeing. *European Journal of Population*, 37(3), 643–696. <https://doi.org/10.1007/s10680-021-09583-3>
- Craig, L., & Mullan, K. (2011). How Mothers and Fathers Share Childcare: A Cross-National Time-Use Comparison. *American Sociological Review*, 76(6), 834–861. <https://doi.org/10.1177/0003122411427673>
- Craig, L., Powell, A., & Smyth, C. (2014). Towards intensive parenting? Changes in the composition and determinants of mothers' and fathers' time with children 1992–2006. *The British Journal of Sociology*, 65(3), 555–579. <https://doi.org/10.1111/1468-4446.12035>
- Deci, E. L., & Ryan, R. M. (2008). Hedonia, eudaimonia, and well-being: An introduction. *Journal of Happiness Studies*, 9(1), 1–11. <https://doi.org/10.1007/s10902-006-9018-1>
- Diener, E., Lucas, R. E., & Scollon, C. N. (2009). Beyond the Hedonic Treadmill: Revising the Adaptation Theory of Well-Being. In E. Diener (Ed.), *The Science of Well-Being: The Collected Works of Ed Diener* (pp. 103–118). Springer Netherlands. https://doi.org/10.1007/978-90-481-2350-6_5

- Dotti Sani, G. M., & Treas, J. (2016). Educational gradients in parents' child-care time across countries, 1965–2012. *Journal of Marriage and Family*, 78(4), 1083–1096.
- Engels, M., Wahrendorf, M., Dragano, N., McMunn, A., & Deindl, C. (2021). Multiple social roles in early adulthood and later mental health in different labour market contexts. *Advances in Life Course Research*, 100432. <https://doi.org/10.1016/j.alcr.2021.100432>
- Escribà-Agüir, V., & Artazcoz, L. (2011). Gender differences in postpartum depression: A longitudinal cohort study. *Journal of Epidemiology & Community Health*, 65(4), 320–326. <https://doi.org/10.1136/jech.2008.085894>
- Evenson, R. J., & Simon, R. W. (2005). Clarifying the Relationship Between Parenthood and Depression. *Journal of Health and Social Behavior*, 46(4), 341–358. <https://doi.org/10.1177/002214650504600403>
- Frijters, P., Johnston, D. W., & Shields, M. A. (2011). Life Satisfaction Dynamics with Quarterly Life Event Data*. *The Scandinavian Journal of Economics*, 113(1), 190–211. <https://doi.org/10.1111/j.1467-9442.2010.01638.x>
- Galderisi, S., Heinz, A., Kastrup, M., Beezhold, J., & Sartorius, N. (2015). Toward a new definition of mental health. *World Psychiatry*, 14(2), 231–233. <https://doi.org/10.1002/wps.20231>
- Giallo, R., D'Esposito, F., Christensen, D., Mensah, F., Cooklin, A., Wade, C., Lucas, N., Canterford, L., & Nicholson, J. M. (2012). Father mental health during the early parenting period: Results of an Australian population based longitudinal study. *Social Psychiatry and Psychiatric Epidemiology*, 47(12), 1907–1916. <https://doi.org/10.1007/s00127-012-0510-0>
- Giesselmann, M., Hagen, M., & Schunck, R. (2018). Motherhood and mental well-being in Germany: Linking a longitudinal life course design and the gender perspective on motherhood. *Advances in Life Course Research*, 37, 31–41. <https://doi.org/10.1016/j.alcr.2018.06.002>
- Gill, S. C., Butterworth, P., Rodgers, B., & Mackinnon, A. (2007). Validity of the mental health component scale of the 12-item Short-Form Health Survey (MCS-12) as measure of common mental disorders in the general population. *Psychiatry Research*, 152(1), 63–71. <https://doi.org/10.1016/j.psychres.2006.11.005>
- Gimenez-Nadal, J. I., & Sevilla, A. (2016). *Intensive Mothering and Well-being: The Role of Education and Child Care Activity* (Working Paper No. 10023). IZA Discussion Papers. <https://www.econstor.eu/handle/10419/145157>
- Goode, W. J. (1960). A theory of role strain. *American Sociological Review*, 483–496.
- Henderson, A., Harmon, S., & Newman, H. (2016). The Price Mothers Pay, Even When They Are Not Buying It: Mental Health Consequences of Idealized Motherhood. *Sex Roles*, 74(11–12), 512–526. <https://doi.org/10.1007/s11199-015-0534-5>
- Hewitt, B., Baxter, J., & Western, M. (2006). Family, work and health: The impact of marriage, parenthood and employment on self-reported health of Australian men and women. *Journal of Sociology*, 42(1), 61–78. <https://doi.org/10.1177/1440783306061353>
- Hook, J. L. (2010). Gender Inequality in the Welfare State: Sex Segregation in Housework, 1965–2003. *American Journal of Sociology*, 115(5), 1480–1523. <https://doi.org/10.1086/651384>
- Jenkinson, C., Layte, R., Jenkinson, D., Lawrence, K., Petersen, S., Paice, C., & Stradling, J. (1997). A shorter form health survey: Can the SF-12 replicate results from the SF-36 in longitudinal studies? *Journal of Public Health*, 19(2), 179–186. <https://doi.org/10.1093/oxfordjournals.pubmed.a024606>
- Kalucza, S., Hammarström, A., & Nilsson, K. (2015). Mental health and parenthood – A longitudinal study of the relationship between self-reported mental health and parenthood. *Health Sociology Review*, 24(3), 283–296. <https://doi.org/10.1080/14461242.2015.1051079>
- Kamp Dush, C. M., Yavorsky, J. E., & Schoppe-Sullivan, S. J. (2018). What Are Men Doing while Women Perform Extra Unpaid Labor? Leisure and Specialization at the Transitions to Parenthood. *Sex Roles*, 78(11), 715–730. <https://doi.org/10.1007/s11199-017-0841-0>
- Krämer, M. D., & Rodgers, J. L. (2020). The impact of having children on domain-specific life satisfaction: A quasi-experimental longitudinal investigation using the Socio-Economic Panel (SOEP) data. *Journal of Personality and Social Psychology*, 119(6), 1497.
- Kulik, L. (2020). Contribution of gender role ideology to explaining emotional wellbeing among working parents. *Community, Work & Family*, 23(3), 305–323. <https://doi.org/10.1080/13668803.2018.1540402>
- Leopold, T. (2018). Gender Differences in the Consequences of Divorce: A Study of Multiple Outcomes. *Demography*, 55(3), 769–797. <https://doi.org/10.1007/s13524-018-0667-6>

- Luppi, F. (2016). When is the Second One Coming? The Effect of Couple's Subjective Well-Being Following the Onset of Parenthood. *European Journal of Population*, 32(3), 421–444. <https://doi.org/10.1007/s10680-016-9388-y>
- Luppi, F., & Mencarini, L. (2018). Parents' subjective well-being after their first child and declining fertility expectations. *Demographic Research*, 39, 285–314.
- Margolis, R., & Myrskylä, M. (2015). Parental Well-being Surrounding First Birth as a Determinant of Further Parity Progression. *Demography*, 52(4), 1147–1166. <https://doi.org/10.1007/s13524-015-0413-2>
- Matysiak, A., Mencarini, L., & Vignoli, D. (2016). Work–Family Conflict Moderates the Relationship Between Childbearing and Subjective Well-Being. *European Journal of Population*, 32(3), 355–379. <https://doi.org/10.1007/s10680-016-9390-4>
- McDonnell, C., Luke, N., & Short, S. E. (2019). Happy Moms, Happier Dads: Gendered Caregiving and Parents' Affect. *Journal of Family Issues*, 40(17), 2553–2581. <https://doi.org/10.1177/0192513X19860179>
- Mckenzie, S. K., & Carter, K. (2013). Does transition into parenthood lead to changes in mental health? Findings from three waves of a population based panel study. *Journal of Epidemiology and Community Health*, 67(4), 339–345. <https://doi.org/10.1136/jech-2012-201765>
- Mikucka, M. (2016). How does parenthood affect life satisfaction in Russia? *Advances in Life Course Research*, 30, 16–29. <https://doi.org/10.1016/j.alcr.2016.03.004>
- Mikucka, M., & Rizzi, E. (2019). The Parenthood and Happiness Link: Testing Predictions from Five Theories. *European Journal of Population*, 36(2), 337–361. <https://doi.org/10.1007/s10680-019-09532-1>
- Mills, M., Mencarini, L., Tanturri, M. L., & Begall, K. (2008). Gender equity and fertility intentions in Italy and the Netherlands. *Demographic Research*, 18, 1–26. <https://doi.org/10.4054/DemRes.2008.18.1>
- Mirowsky, J., & Ross, C. E. (2002). Depression, parenthood, and age at first birth. *Social Science & Medicine*, 54(8), 1281–1298. [https://doi.org/10.1016/S0277-9536\(01\)00096-X](https://doi.org/10.1016/S0277-9536(01)00096-X)
- Musick, K., Bea, M. D., & Gonalons-Pons, P. (2020). His and Her Earnings Following Parenthood in the United States, Germany, and the United Kingdom. *American Sociological Review*, 85(4), 639–674. <https://doi.org/10.1177/0003122420934430>
- Musick, K., Meier, A., & Flood, S. (2016). How Parents Fare: Mothers' and Fathers' Subjective Well-Being in Time with Children. *American Sociological Review*, 81(5), 1069–1095. <https://doi.org/10.1177/0003122416663917>
- Myrskylä, M., & Margolis, R. (2014). Happiness: Before and After the Kids. *Demography*, 51(5), 1843–1866. <https://doi.org/10.1007/s13524-014-0321-x>
- Negraia, D. V., & Augustine, J. M. (2020). Unpacking the Parenting Well-Being Gap: The Role of Dynamic Features of Daily Life across Broader Social Contexts. *Social Psychology Quarterly*, 83(3), 207–228. <https://doi.org/10.1177/0190272520902453>
- Nelson, S. K., Kushlev, K., & Lyubomirsky, S. (2014). The pains and pleasures of parenting: When, why, and how is parenthood associated with more or less well-being? *Psychological Bulletin*, 140(3), 846–895. <https://doi.org/10.1037/a0035444>
- Nelson-Coffey, S. K., Killingsworth, M., Layous, K., Cole, S. W., & Lyubomirsky, S. (2019). Parenthood Is Associated With Greater Well-Being for Fathers Than Mothers. *Personality and Social Psychology Bulletin*, 45(9), 1378–1390. <https://doi.org/10.1177/0146167219829174>
- Nomaguchi, K. M., & Brown, S. L. (2011). Parental Strains and Rewards Among Mothers: The Role of Education. *Journal of Marriage and Family*, 73(3), 621–636. <https://doi.org/10.1111/j.1741-3737.2011.00835.x>
- Nomaguchi, K. M., & Milkie, M. A. (2003). Costs and Rewards of Children: The Effects of Becoming a Parent on Adults' Lives. *Journal of Marriage and Family*, 65(2), 356–374. <https://doi.org/10.1111/j.1741-3737.2003.00356.x>
- Nomaguchi, K. M., & Milkie, M. A. (2020). Parenthood and Well-Being: A Decade in Review. *Journal of Marriage and Family*, 82(1), 198–223. <https://doi.org/10.1111/jomf.12646>
- Nomaguchi, K. M., Milkie, M. A., & Bianchi, S. M. (2005). Time strains and psychological well-being: Do dual-earner mothers and fathers differ? *Journal of Family Issues*, 26(6), 756–792.
- Offer, S., & Schneider, B. (2011). Revisiting the Gender Gap in Time-Use Patterns: Multitasking and Well-Being among Mothers and Fathers in Dual-Earner Families. *American Sociological Review*, 76(6), 809–833. <https://doi.org/10.1177/0003122411425170>

- Otten, D., Tibubos, A. N., Schomerus, G., Brähler, E., Binder, H., Kruse, J., Ladwig, K.-H., Wild, P. S., Grabe, H. J., & Beutel, M. E. (2021). Similarities and Differences of Mental Health in Women and Men: A Systematic Review of Findings in Three Large German Cohorts. *Frontiers in Public Health*, 9, 40. <https://doi.org/10.3389/fpubh.2021.553071>
- Oyarzún-Farías, M. de los A., Cova, F., & Bustos Navarrete, C. (2021). Parental Stress and Satisfaction in Parents With Pre-school and School Age Children. *Frontiers in Psychology*, 12, 683117. <https://doi.org/10.3389/fpsyg.2021.683117>
- Perales, F. (2019). Modeling the consequences of the transition to parenthood: Applications of panel regression methods. *Journal of Social and Personal Relationships*, 36(11–12), 4005–4026. <https://doi.org/10.1177/0265407519847528>
- Pollmann-Schult, M. (2014). Parenthood and Life Satisfaction: Why Don't Children Make People Happy? *Journal of Marriage and Family*, 76(2), 319–336. <https://doi.org/10.1111/jomf.12095>
- Radó, M. K. (2020). Tracking the Effects of Parenthood on Subjective Well-Being: Evidence from Hungary. *Journal of Happiness Studies*, 21(6), 2069–2094. <https://doi.org/10.1007/s10902-019-00166-y>
- Rizzo, K. M., Schiffrin, H. H., & Liss, M. (2013). Insight into the Parenthood Paradox: Mental Health Outcomes of Intensive Mothering. *Journal of Child and Family Studies*, 22(5), 614–620. <https://doi.org/10.1007/s10826-012-9615-z>
- Roeters, A., & Gracia, P. (2016). Child Care Time, Parents' Well-Being, and Gender: Evidence from the American Time Use Survey. *Journal of Child and Family Studies*, 25(8), 2469–2479. <https://doi.org/10.1007/s10826-016-0416-7>
- Ruppanner, L., Perales, F., & Baxter, J. (2019). Harried and Unhealthy? Parenthood, Time Pressure, and Mental Health: Parenthood, Time Pressure, and Mental Health. *Journal of Marriage and Family*, 81(2), 308–326. <https://doi.org/10.1111/jomf.12531>
- Scott, J., & Alwin, D. F. (1989). Gender differences in parental strain: Parental role or gender role? *Journal of Family Issues*, 10(4), 482–503.
- Sieber, S. D. (1974). Toward a Theory of Role Accumulation. *American Sociological Review*, 39(4), 567. <https://doi.org/10.2307/2094422>
- Simon, R. W. (1992). Parental Role Strains, Salience of Parental Identity and Gender Differences in Psychological Distress. *Journal of Health and Social Behavior*, 33(1), 25–35. <https://doi.org/10.2307/2136855>
- Simon, R. W., & Caputo, J. (2019). The Costs and Benefits of Parenthood for Mental and Physical Health in the United States: The Importance of Parenting Stage. *Society and Mental Health*, 9(3), 296–315. <https://doi.org/10.1177/2156869318786760>
- Smith, J. P. (2007). The Impact of Socioeconomic Status on Health over the Life-Course. *The Journal of Human Resources*, 42(4), 739–764.
- Stanca, L. (2012). Suffer the little children: Measuring the effects of parenthood on well-being worldwide. *Journal of Economic Behavior & Organization*, 81(3), 742–750. <https://doi.org/10.1016/j.jebo.2010.12.019>
- Tosi, M., & Goisis, A. (2021). Mental Health Around the Transition to First Birth: Does Medically Assisted Reproduction Matter? *Demography*, 9335177. <https://doi.org/10.1215/00703370-9335177>
- Venn, S., Arber, S., Meadows, R., & Hislop, J. (2008). The fourth shift: Exploring the gendered nature of sleep disruption among couples with children. *The British Journal of Sociology*, 59(1), 79–97. <https://doi.org/10.1111/j.1468-4446.2007.00183.x>
- Ware, J., Kosinski, M., & Keller, S. (1998). *SF-12: How to Score the SF-12 Physical and Mental Health Summary Scales*.
- Ware, J., Kosinski, M., & Keller, S. D. (1996). A 12-Item Short-Form Health Survey: Construction of scales and preliminary tests of reliability and validity. *Medical Care*, 34(3), 220–233. <https://doi.org/10.1097/00005650-199603000-00003>
- Ware Jr, J. E., & Sherbourne, C. D. (1992). The MOS 36-item short-form health survey (SF-36): I. Conceptual framework and item selection. *Medical Care*, 473–483.
- World Health Organization. (2022). *World mental health report: Transforming mental health for all*. World Health Organization. <https://apps.who.int/iris/handle/10665/356119>
- Yavorsky, J. E., Kamp Dush, C. M., & Schoppe-Sullivan, S. J. (2015). The Production of Inequality: The Gender Division of Labor Across the Transition to Parenthood. *Journal of Marriage and Family*, 77(3), 662–679. <https://doi.org/10.1111/jomf.12189>

TABLES

Table 1 Sample description

	Young parents		Older parents (control)		Total	
	Mothers (N=4,404)	Fathers (N=4,458)	Mothers (N=4,957)	Fathers (N=5,753)	Mothers (N=9,361)	Fathers (N=10,211)
Age at first observation	31.2	33.7	42.2	47.3	37.0	41.4
Nb. of waves observed	4.3	4.2	4.2	4.9	4.3	4.6
Higher education degree	0.44	0.37	0.24	0.26	0.33	0.31
Managerial/professional position	0.46	0.48	0.37	0.43	0.42	0.45
High household income	0.42	0.41	0.52	0.52	0.47	0.47
Weekly work hours	25.54	40.80	27.5	38.61	26.6	39.5
SF-12 MCS	48.30	49.97	48.82	51.05	48.57	50.62

Note: ‘Young parents’ refers to the group of parents having a first child aged 8 or younger, ‘Older parents’ refers to the included control group of parents with a first child aged 9 or older. *Source:* UKHLS data, waves 1-11.

Table 2 Description of dependent variables

		Women		Men		Range	Description/Item question ¹	Meaning ²
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
SF-12 Mental Component Score (MCS)		48.57	9.43	50.62	8.58	0-100	Computed global score	Higher global scores indicate better overall mental well-being and functioning
SF-12 MCS subscales and items								
Role functioning	<i>Accomplishing tasks</i>	4.44	0.89	4.55	0.82	1-5	<i>During the past 4 weeks, how much of the time have you accomplished less than you would like as a result of any emotional problems?</i>	Lower scores indicate issues with performing work and/or other usual daily activities resulting from emotional problems; Higher scores indicate no such problems occurring in the past 4 weeks.
	<i>Carrying out tasks carefully</i>	4.52	0.81	4.60	0.76	1-5	<i>During the past 4 weeks, how much of the time did you work or other regular daily activities less carefully than usual as a result of any emotional problems?</i>	
Social functioning	<i>Doing social activities</i>	4.43	0.92	4.55	0.84	1-5	<i>During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities?</i>	Lower scores indicate issues with usual social activities due to physical or emotional problems; Higher scores indicate no such problems occurring in the past 4 weeks.
Affect	<i>Feeling calm*</i>	3.33	0.89	3.51	0.88	1-5	<i>How much of the time during the past 4 weeks have you felt calm and peaceful?</i>	Lower scores indicate nervousness and depressive moods; Higher scores indicate feeling peaceful, calm, cheerful, and happy in the past 4 weeks.
	<i>Feeling happy and cheerful*</i>	4.06	0.93	4.19	0.90	1-5	<i>How much of the time during the past 4 weeks have you felt downhearted and depressed?</i>	
Vitality	<i>Having energy*</i>	3.23	0.90	3.44	0.87	1-5	<i>How much of the time during the past 4 weeks did you have a lot of energy?</i>	Lower scores indicate feeling low in energy (tired, worn out); Higher scores indicate feeling energetic in the past 4 weeks.

Note: Pooled total sample. Source: UKHLS data, waves 1-11.

¹Items range from 1 = “all of the time” to 5 = “none of the time”.

²The interpretation of the SF-12 subscales included in this table is adapted from Ware Jr & Sherbourne (1992).

*Negatively coded (worded) items were reverse coded (rephrased) so that higher scores indicate better outcomes across all items.

Table 3 Fixed effects linear regression models predicting changes in mental health (SF-12 MCS) around first birth, with socioeconomic characteristics moderation. Separate models for men and women

	Mental health * Socioeconomic characteristics (SEC)															
	SEC = Higher education				SEC = Managerial/professional				SEC = High personal income				SEC = over 30h work per week			
	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)	
	Women		Men		Women		Men		Women		Men		Women		Men	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
Time around birth																
-3 years to birth	Ref.		Ref.		Ref.		Ref.		Ref.		Ref.		Ref.		Ref.	
-2 years to birth	0.24	0.65	-0.09	0.47	0.17	0.65	0.12	0.57	0.12	0.43	0.36	0.46	0.30	0.50	0.06	0.96
-1 year to birth	2.04**	0.66	-0.19	0.50	2.03**	0.66	-0.68	0.60	1.53**	0.47	-0.02	0.48	1.59**	0.54	-0.79	1.02
Birth	3.20***	0.62	-0.13	0.50	3.35***	0.66	-0.48	0.57	2.25***	0.46	0.35	0.48	2.61***	0.53	1.20	0.88
1 year after birth	2.25***	0.67	-0.63	0.54	2.10**	0.74	-1.32*	0.63	1.43**	0.51	-0.23	0.53	1.94***	0.56	0.64	1.01
2 years after birth	2.18**	0.69	-0.89	0.58	2.42***	0.71	-1.24	0.65	1.29*	0.54	-0.48	0.56	1.78**	0.59	-0.73	1.02
3 years after birth	1.50*	0.74	-0.91	0.61	1.93*	0.79	-1.27	0.69	0.71	0.58	-0.38	0.60	1.19	0.62	-0.17	1.07
4 years after birth	1.63*	0.74	-0.70	0.64	2.57**	0.80	-1.21	0.71	1.06	0.61	-0.42	0.63	1.45*	0.65	0.16	1.10
5 years after birth	1.63*	0.79	-0.77	0.67	2.34**	0.85	-1.36	0.74	0.61	0.65	-0.71	0.68	1.12	0.68	-0.27	1.18
6 years after birth	1.46	0.81	-0.96	0.70	1.61	0.88	-1.40	0.77	1.02	0.68	-0.58	0.71	1.61*	0.71	0.13	1.18
7 years after birth	1.21	0.85	-1.49*	0.74	1.65	0.93	-1.99*	0.81	0.71	0.71	-1.47	0.75	1.12	0.75	-1.98	1.23
8 years after birth	1.29	0.89	-1.01	0.76	1.93*	0.97	-1.98*	0.83	0.91	0.75	-1.01	0.78	1.27	0.78	-0.94	1.28
Time around birth * SEC																
-2 years to birth * SEC	-0.26	0.73	0.19	0.60	-0.01	0.76	-0.51	0.66	-0.08	0.75	-0.67	0.60	-0.48	0.69	-0.04	1.01
-1 years to birth * SEC	-0.74	0.74	0.57	0.63	-0.77	0.78	1.05	0.69	0.08	0.82	0.30	0.62	-0.12	0.74	1.05	1.07
Birth * SEC	-2.34**	0.74	0.11	0.60	-2.58***	0.77	0.02	0.65	-1.86*	0.83	-0.86	0.59	-1.86**	0.70	-1.44	0.93
1 year after birth * SEC	-1.76*	0.77	0.14	0.63	-1.65*	0.81	0.70	0.68	-1.06	0.81	-0.63	0.63	-1.85*	0.73	-1.33	1.05
2 years after birth * SEC	-2.05**	0.76	0.59	0.65	-2.60***	0.78	0.61	0.71	-1.35	0.84	-0.25	0.65	-2.02**	0.74	0.18	1.06
3 years after birth * SEC	-1.76*	0.78	0.57	0.68	-2.65**	0.83	0.37	0.72	-1.11	0.83	-0.53	0.67	-1.85*	0.75	-0.51	1.11
4 years after birth * SEC	-1.37	0.79	0.50	0.68	-2.78***	0.81	0.62	0.73	-1.17	0.87	-0.07	0.68	-1.60*	0.76	-0.70	1.13
5 years after birth * SEC	-2.19**	0.81	-0.20	0.70	-3.19***	0.84	0.16	0.74	-0.83	0.87	-0.23	0.70	-1.78*	0.78	-0.60	1.20
6 years after birth * SEC	-1.05	0.82	0.40	0.72	-1.58	0.86	0.21	0.77	-1.01	0.87	-0.37	0.72	-2.15**	0.78	-1.01	1.19
7 years after birth * SEC	-1.42	0.83	0.92	0.74	-2.27**	0.88	0.64	0.78	-1.52	0.91	0.70	0.74	-1.89*	0.81	1.08	1.24
8 years after birth * SEC	-1.04	0.86	0.01	0.76	-2.35**	0.91	0.76	0.80	-1.24	0.93	0.04	0.76	-1.54	0.83	-0.01	1.28
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Person-year observations	40,149		46,695		34,074		43,121		40,149		46,695		40,149		46,695	
Number of individuals	9,361		10,211		8,753		9,897		9,361		10,211		9,361		10,211	

Note: Robust standard errors. *** p<0.001, ** p<0.01, * p<0.05. Source: UKHLS data, waves 1-11.

FIGURES

Fig. 1 Predicted changes in mental health (SF-12 MCS) around first birth from fixed effects linear models. Separate models for men and women

Note: Fixed effects models estimates with 95% confidence intervals with reference category at -3 years.
Source: UKHLS data, waves 1-11.

Fig. 2 Predicted changes in mental health domains (SF-12 MCS items) around first birth from fixed effects linear models. Separate models for men and women

Note: Fixed effects models estimates with 95% confidence intervals with reference category at -3 years. Negatively coded (worded) items were reverse coded (rephrased) so that higher scores indicate better outcomes across all items. *Source:* UKHLS data, waves 1-11.

APPENDIX

Table A1 Fixed effects linear regression models predicting changes in mental health and life satisfaction around first birth. Separate models for men and women

	Women				Men			
	(1)		(2)		(3)		(4)	
	Mental health Coef.	SE	Life Satisfaction Coef.	SE	Mental health Coef.	SE	Life Satisfaction Coef.	SE
Time around birth								
-3 years to birth	<i>Ref.</i>		<i>Ref.</i>		<i>Ref.</i>		<i>Ref.</i>	
-2 years to birth	0.07	0.37	0.01	0.05	0.02	0.32	-0.07	0.06
-1 year to birth	1.52***	0.41	0.21***	0.05	0.11	0.34	0.07	0.05
Birth	1.77***	0.41	0.32***	0.06	-0.05	0.35	0.12*	0.06
1 year after birth	1.11*	0.45	0.16*	0.06	-0.53	0.39	-0.01	0.06
2 years after birth	0.90	0.48	0.10	0.07	-0.60	0.43	0.01	0.06
3 years after birth	0.36	0.52	0.02	0.07	-0.63	0.46	-0.05	0.07
4 years after birth	0.69	0.55	0.05	0.08	-0.45	0.50	-0.02	0.08
5 years after birth	0.30	0.59	0.04	0.08	-0.81	0.53	-0.04	0.08
6 years after birth	0.68	0.62	0.04	0.09	-0.75	0.56	-0.03	0.08
7 years after birth	0.26	0.65	-0.01	0.09	-1.06	0.59	-0.01	0.09
8 years after birth	0.51	0.69	0.06	0.10	-0.96	0.63	-0.04	0.09
Age	-0.70***	0.18	-0.01	0.03	-0.82***	0.13	-0.07***	0.02
Age squared	0.01**	0.00	-0.00	0.00	0.01***	0.00	0.00***	0.00
Employment status								
Full-time	<i>Ref.</i>		<i>Ref.</i>		<i>Ref.</i>		<i>Ref.</i>	
Not employed	-1.18***	0.22	-0.05	0.03	-1.60***	0.23	-0.28***	0.03
Part-time	-0.08	0.14	-0.02	0.02	0.52*	0.21	-0.01	0.04
Log household income	-0.05	0.10	0.06**	0.02	0.07	0.10	0.04*	0.02
Health status								
No illness	<i>Ref.</i>		<i>Ref.</i>		<i>Ref.</i>		<i>Ref.</i>	
Long-term illness	-1.19***	0.15	-0.17***	0.02	-0.86***	0.13	-0.11***	0.02
<i>Person-year observations</i>			40,149				46,695	
<i>Number of individuals</i>			9,361				10,211	

Note: Robust standard errors. *** p<0.001, ** p<0.01, * p<0.05. Source: UKHLS data, waves 1-11.

Table A2 Fixed effects linear regression models predicting changes in mental health areas (SF-12 MCS items) around first birth (for women)

	(1) Accomplishing tasks		(2) Being careful		(3) Social activities		(4) Feeling calm		(5) Feeling happy		(6) Having energy	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
Time around birth												
-3 years to birth	Ref.		Ref.		Ref.		Ref.		Ref.		Ref.	
-2 years to birth	0.00	0.04	0.00	0.03	0.06	0.04	-0.01	0.04	0.04	0.04	0.01	0.03
-1 year to birth	0.07	0.04	0.05	0.04	-0.03	0.04	0.11**	0.04	0.25***	0.04	-0.26***	0.04
Birth	0.19***	0.04	0.20***	0.04	0.18***	0.04	0.02	0.04	0.30***	0.04	-0.15***	0.04
1 year after birth	0.15***	0.04	0.16***	0.04	0.21***	0.04	-0.07	0.04	0.22***	0.05	-0.10*	0.04
2 years after birth	0.13**	0.05	0.16***	0.04	0.23***	0.05	-0.12**	0.05	0.22***	0.05	-0.14**	0.04
3 years after birth	0.12*	0.05	0.15**	0.04	0.20***	0.05	-0.17***	0.05	0.16**	0.05	-0.13**	0.05
4 years after birth	0.13*	0.05	0.16***	0.05	0.29***	0.05	-0.14**	0.05	0.16**	0.06	-0.04	0.05
5 years after birth	0.07	0.06	0.16**	0.05	0.26***	0.06	-0.17**	0.06	0.12*	0.06	-0.04	0.05
6 years after birth	0.11	0.06	0.16**	0.05	0.29***	0.06	-0.13*	0.06	0.16**	0.06	-0.00	0.06
7 years after birth	0.09	0.06	0.16**	0.06	0.28***	0.07	-0.18**	0.06	0.11	0.07	0.01	0.06
8 years after birth	0.11	0.07	0.16**	0.06	0.34***	0.07	-0.18**	0.07	0.15*	0.07	0.01	0.06
Age	-0.06**	0.02	-0.07***	0.02	-0.08***	0.02	-0.02	0.02	-0.05**	0.02	-0.04**	0.02
Age squared	0.00	0.00	0.00**	0.00	0.00*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Employment status												
Full-time	Ref.		Ref.		Ref.		Ref.		Ref.		Ref.	
Unemployed	-0.13***	0.02	-0.13***	0.02	-0.14***	0.02	-0.04*	0.02	-0.11***	0.02	-0.03	0.02
Part-time	-0.00	0.01	-0.01	0.01	-0.03*	0.01	0.01	0.01	-0.02	0.01	0.02	0.01
Log household income	0.00	0.01	0.01	0.01	-0.00	0.01	-0.03**	0.01	0.02*	0.01	-0.01	0.01
Health status												
No illness	Ref.		Ref.		Ref.		Ref.		Ref.		Ref.	
Long-term illness	-0.17***	0.02	-0.12***	0.01	-0.22***	0.02	-0.11***	0.01	-0.14***	0.02	-0.17***	0.01
<i>Person-year observations</i>						40,149						
<i>Number of individuals</i>						9,361						

Note: Robust standard errors. *** p<0.001, ** p<0.01, * p<0.05. Source: UKHLS data, waves 1-11.

Table A3 Fixed effects linear regression models predicting changes in mental health areas (SF-12 MCS items) around first birth (for men)

	(1) Accomplishing tasks		(2) Being careful		(3) Social activities		(4) Feeling calm		(5) Feeling happy		(6) Having energy	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
Time around birth												
-3 years to birth	<i>Ref.</i>		<i>Ref.</i>		<i>Ref.</i>		<i>Ref.</i>		<i>Ref.</i>		<i>Ref.</i>	
-2 years to birth	-0.02	0.03	-0.01	0.03	-0.02	0.03	-0.00	0.03	0.05	0.04	-0.00	0.03
-1 year to birth	-0.03	0.03	-0.01	0.03	0.02	0.03	-0.01	0.04	0.08*	0.04	-0.01	0.03
Birth	0.03	0.03	0.03	0.03	0.04	0.03	-0.07	0.04	0.12**	0.04	-0.16***	0.03
1 year after birth	-0.01	0.04	0.02	0.04	-0.00	0.04	-0.10*	0.04	0.05	0.04	-0.14***	0.04
2 years after birth	-0.04	0.04	-0.03	0.04	0.03	0.04	-0.12**	0.04	0.06	0.05	-0.15***	0.04
3 years after birth	-0.04	0.04	0.00	0.04	0.06	0.04	-0.14**	0.05	0.03	0.05	-0.13**	0.04
4 years after birth	-0.02	0.05	0.01	0.04	0.06	0.05	-0.13**	0.05	0.02	0.05	-0.12**	0.05
5 years after birth	-0.06	0.05	-0.02	0.05	0.04	0.05	-0.14*	0.05	0.00	0.06	-0.11*	0.05
6 years after birth	-0.05	0.05	-0.00	0.05	0.04	0.05	-0.12*	0.06	-0.01	0.06	-0.09	0.05
7 years after birth	-0.07	0.06	-0.02	0.05	0.01	0.06	-0.12*	0.06	-0.04	0.06	-0.11*	0.06
8 years after birth	-0.06	0.06	-0.03	0.06	0.04	0.06	-0.14*	0.06	-0.02	0.07	-0.12*	0.06
Age	-0.04***	0.01	-0.04**	0.01	-0.06***	0.01	-0.05***	0.01	-0.07***	0.01	-0.05***	0.01
Age squared	0.00	0.00	0.00*	0.00	0.00**	0.00	0.00***	0.00	0.00***	0.00	0.00**	0.00
Employment status												
Full-time	<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>
Unemployed	-0.24***	0.02	-0.18***	0.02	-0.21***	0.02	-0.03	0.02	-0.19***	0.02	-0.03	0.02
Part-time	0.02	0.02	0.03	0.02	0.03	0.02	0.04	0.02	0.05*	0.02	-0.02	0.02
Log household income	0.01	0.01	0.01	0.01	-0.00	0.01	0.00	0.01	0.02	0.01	-0.00	0.01
Health status												
No illness	<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>
Long-term illness	-0.12***	0.01	-0.11***	0.01	-0.17***	0.01	-0.08***	0.01	-0.10***	0.01	-0.13***	0.01
<i>Person-year observations</i>							46,695					
<i>Number of individuals</i>							10,211					

Note: Robust standard errors. *** p<0.001, ** p<0.01, * p<0.05. Source: UKHLS data, waves 1-11.

Table A4 Fixed effects linear regression models predicting changes in mental health and all mental health domains (SF-12 MCS items) around first birth. Fully interacted models for men and women

	Mental health domains													
	(1)		(2)		(3)		(4)		(5)		(6)		(7)	
	Mental health		Accomplishing tasks		Being careful		Social activities		Feeling calm		Feeling happy		Having energy	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
Time around birth														
-3 years to birth	<i>Ref.</i>		<i>Ref.</i>		<i>Ref.</i>		<i>Ref.</i>		<i>Ref.</i>		<i>Ref.</i>		<i>Ref.</i>	
-2 years to birth	0.02	0.32	-0.02	0.03	-0.01	0.03	-0.02	0.03	-0.00	0.03	0.05	0.04	-0.00	0.03
-1 year to birth	0.11	0.34	-0.03	0.03	-0.01	0.03	0.02	0.03	-0.01	0.04	0.08*	0.04	-0.01	0.03
Birth	-0.05	0.35	0.03	0.03	0.03	0.03	0.04	0.03	-0.07	0.04	0.12**	0.04	-0.16***	0.03
1 year after birth	-0.53	0.39	-0.01	0.04	0.02	0.04	-0.00	0.04	-0.10*	0.04	0.05	0.04	-0.14***	0.04
2 years after birth	-0.60	0.43	-0.04	0.04	-0.03	0.04	0.03	0.04	-0.12**	0.04	0.06	0.05	-0.15***	0.04
3 years after birth	-0.63	0.46	-0.04	0.04	0.00	0.04	0.06	0.04	-0.14**	0.05	0.03	0.05	-0.13**	0.04
4 years after birth	-0.45	0.50	-0.02	0.05	0.01	0.04	0.06	0.05	-0.13**	0.05	0.02	0.05	-0.12**	0.05
5 years after birth	-0.81	0.53	-0.06	0.05	-0.02	0.05	0.04	0.05	-0.14*	0.05	0.00	0.06	-0.11*	0.05
6 years after birth	-0.75	0.56	-0.05	0.05	-0.00	0.05	0.04	0.05	-0.12*	0.06	-0.01	0.06	-0.09	0.05
7 years after birth	-1.06	0.59	-0.07	0.06	-0.02	0.05	0.01	0.06	-0.12*	0.06	-0.04	0.06	-0.11*	0.06
8 years after birth	-0.96	0.63	-0.06	0.06	-0.03	0.06	0.04	0.06	-0.14*	0.06	-0.02	0.07	-0.12*	0.06
Time around birth * Female														
-2 years * Female	0.05	0.48	0.02	0.05	0.01	0.04	0.07	0.05	-0.01	0.05	-0.01	0.05	0.01	0.05
-1 years * Female	1.41**	0.53	0.09	0.05	0.07	0.05	-0.05	0.05	0.12*	0.05	0.17**	0.06	-0.25***	0.05
Birth * Female	1.82***	0.54	0.16**	0.05	0.18***	0.05	0.14**	0.05	0.09	0.05	0.18**	0.06	0.00	0.05
1 year * Female	1.64**	0.60	0.16**	0.06	0.15**	0.05	0.21***	0.06	0.02	0.06	0.17**	0.06	0.04	0.06
2 years * Female	1.50*	0.65	0.17**	0.06	0.18**	0.06	0.20**	0.06	0.00	0.06	0.16*	0.07	0.01	0.06
3 years * Female	0.99	0.69	0.16*	0.07	0.14*	0.06	0.14*	0.07	-0.03	0.07	0.13	0.07	0.00	0.06
4 years * Female	1.14	0.74	0.14*	0.07	0.16*	0.07	0.23**	0.07	-0.01	0.07	0.14	0.08	0.08	0.07
5 years * Female	1.12	0.79	0.13	0.08	0.18**	0.07	0.22**	0.08	-0.03	0.08	0.11	0.08	0.08	0.07
6 years * Female	1.43	0.83	0.16*	0.08	0.17*	0.07	0.25**	0.08	-0.00	0.08	0.17*	0.09	0.09	0.08
7 years * Female	1.32	0.88	0.16	0.09	0.18*	0.08	0.27**	0.09	-0.06	0.09	0.15	0.09	0.12	0.08
8 years * Female	1.47	0.93	0.17	0.09	0.19*	0.08	0.30**	0.09	-0.04	0.09	0.17	0.10	0.14	0.09
Controls (with Female interaction)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
<i>Person-year observations</i>								86,844						
<i>Number of individuals</i>								19,572						

Note: Robust standard errors. *** p<0.001, ** p<0.01, * p<0.05. *Source:* UKHLS data, waves 1-11.

ONLINE SUPPLEMENTS

Table S1 Fictitious illustration of data file structure

id	Wave	Sample status	Age	Sex	Education	Work hours	Work hours*	Parent indicator	Number of children	1 st birth	Time around first birth	Age of oldest child
1001	1	Original	22	Female	Bachelor	0	25	0	0	0	-2	.
1001	2	Original	23	Female	Master	40	25	0	0	0	-1	.
1001	3	Original	24	Female	Master	20	25	1	1	1	0	0
1001	4	Original	25	Female	Master	30	25	1	1	0	1	1
1002	2	Temporary	24	Male	GCSE	40	45	0	0	0	-2	.
1002	3	Temporary	25	Male	GCSE	40	45	0	0	0	-1	.
1002	4	Permanent	26	Male	GCSE	45	45	1	1	1	0	0
1003	1	Original	33	Female	Master	35	35	1	1	0	3	3
1003	2	Original	34	Female	Master	35	35	1	1	0	4	4
1003	3	Original	35	Female	Master	35	35	1	1	0	5	5
1003	4	Original	36	Female	Master	40	35	1	1	0	6	6
1003	5	Original	37	Female	Master	20	35	1	2	0	7	7
1003	6	Original	38	Female	Master	20	35	1	2	0	8	8
1003	7	Original	39	Female	Master	20	35	1	2	0	.	9
1003	8	Original	40	Female	Master	20	35	1	2	0	.	10
1004	1	Original	46	Female	Master	40	39	1	1	0	-3	10
1004	3	Original	47	Female	Master	39	39	1	1	0	-3	11
1004	4	Original	48	Female	Master	35	39	1	1	0	-3	12
1004	5	Original	49	Female	Master	35	39	1	1	0	-3	13
1004	6	Original	50	Female	Master	40	39	1	1	0	-3	14

*Average work hours over the observed *post-birth* period, for moderation analyses