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## Maternal life satisfaction and child development from toddlerhood to adolescence

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Nabanita Datta Gupta, Jonas Jessen, C. Katharina Spiess

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# Maternal life satisfaction and child development from toddlerhood to adolescence \*

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May 17, 2023

## Abstract

In this paper we analyse the association between maternal well-being and child development at different ages. We use data from the German Socio-Economic Panel (SOEP) which captures maternal life satisfaction and numerous cognitive and non-cognitive child development outcomes. We identify a strong positive association between mothers' life satisfaction and their children's development when these are toddlers (2-3 years, VAB scores), of primary school age (5-10 years, SEB scores and Big 5) and in adolescence (11-14 years, life satisfaction, school grades and self-reported Big 5). This relationship holds when we control for a wide range of potentially confounding factors, including maternal education, employment, household income and maternal personality traits. We confirm our main findings with an IV estimation where we instrument contemporaneous maternal life satisfaction with that measured pre-birth and with a value-added model as some child outcomes are observed twice at different ages. Our findings suggest that mothers' life satisfaction is beneficial for their children's development at all ages and that it is fruitful for policy makers to identify measures through which maternal well-being can be raised.

*JEL: J13, I22*

*Keywords: life satisfaction, subjective well-being, mothers, child development, skill formation*

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## 1 Introduction

The impact of well-being on various population outcomes, including fertility, migration, and longevity, has been extensively studied and is well-established (e.g., Deaton, 2008; Diener et al., 2018; Myrskylä and Margolis, 2014; Proto and Rustichini, 2015; St. John et al., 2015). Thus, it is clear that well-being matters in the quantitative dimension of demography. However, there is much less evidence on how well-being affects the quality dimension of the population, namely, its human capital formation and progress in educational outcomes. This aspect is especially important for ageing societies with a declining labour force. While some research shows that individual well-being affects individual's educational outcomes from primary school to tertiary education (Amholt et al., 2020), it has also been shown that education influences individual well-being (Cuñado and De Gracia, 2012). Nevertheless, little evidence exists on the intergenerational link of the association between the well-being of the educating generation and child outcomes.

This is remarkable, as it is well-documented that parent-child interactions are of particular importance for child development (Del Bono et al., 2016; Fiorini and Keane, 2014). Higher levels of parental well-being may not only impact the *quantity*, but, perhaps more importantly, also the *quality* of these interactions. Besides directly affecting child development through the interactions, higher parental well-being can also have beneficial effects through reducing children's socio-emotional problems from creating a more positive environment in the home. Given these insights, this paper investigates how maternal well-being, as measured by maternal life satisfaction, affects child development from toddlerhood to adolescence. We focus on maternal well-being as mothers are commonly still the primary caretaker and therefore the adult whom young children spend most time with during the day. In fact, parental daily childcare time has been increasing strongly since the 1960s.<sup>1</sup> Given that small children spend increasingly more time with their mothers, a natural question to ask is how this affects child outcomes measured both contemporaneously and at later ages.

When it comes to maternal well-being, the psychological literature primarily focuses on negative and extreme measures, such as maternal depression, and how they affect child development. Large meta-analyses found that a mother's antenatal and postnatal mental problems can have negative effects on her child's cognitive, socio-emotional, language, motor and adaptive behaviour development, spanning from infancy to adolescence (Goodman et al., 2011; Rogers et al., 2020). However, these studies only identify correlational associations and may reflect the effect of confounding variables.

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<sup>1</sup>A study of 10 OECD countries showed a threefold increase in daily childcare time of both parents between 1965 and 2012, despite the rise of single parenthood and changes in female labour force participation over the last 50 years. Childcare time in the study included time spent supervising and playing with the child, washing, feeding and preparing food for the child and putting the child to bed. One exception however was France, where maternal childcare time decreased over time, see Dotti Sani and Treas (2016).

Similarly, maternal psychopathology such as maternal distress has been found to be a source of systematic misreporting of child functioning. Mothers with depression rate their children's behavioural outcome more harshly, thereby increasing parental discrepancies in ratings of the development of their child. Thus, the presence of mothers' mental disorders is a distorting factor in their reports on child behaviour and may affect their investments in the child (Datta Gupta et al., 2018). For example, they may be less engaged in the cognitive stimulation of the child and give lower levels of emotional support to their child as well.

In contrast to previous studies, we adopt a broader and more positive measure of maternal well-being: subjective well-being as measured by life satisfaction. This approach differs from the previous literature as much less is known about positive maternal well-being and how it affects child development. The relationship between maternal well-being and child development may not run equivalently in both directions; i.e., the effect of maternal distress or depression on child development is not necessarily the opposite of the effect of maternal life satisfaction. There is far less evidence on this positive measure of well-being aside from a few correlational studies, see e.g. (Augustijn, 2022; Brajša-Žganec and Hanzec, 2014; Phua et al., 2017).

The objective of this paper is to investigate the impact of maternal well-being, as measured by mothers' life satisfaction, on various psychometric measures of child development, both contemporaneously and at later stages. Perception of well-being or life satisfaction is of course intimately tied to maternal personality traits. Indeed, it may be the case that there is a genetic component in happiness passed down to their children. However, even studies comparing monozygotic and dizygotic twins find heritabilities for well-being and life satisfaction in the 30-40% range, far less than what is found for IQ, see for instance Røysamb et al. (2018). Still, in our analysis we control for maternal personality in our preferred specification by using the widely used Big 5-personality concept when identifying the effect of life satisfaction on child outcomes.

If a positive association is found between maternal life satisfaction and children's cognitive and socio-emotional development, particularly up to middle childhood, where decisions regarding educational tracks are made, it would suggest a more effective and potentially less costly policy initiative for improving child development. By promoting mother's satisfaction levels during the early years of a child's life, this may help reduce public expenditures related to child development issues, such as the need for external educators or special needs teachers. Ultimately, such policies can have far-reaching effects on labour market outcomes, health, and social outcomes in later life. As is the case for other early childhood interventions, these policies may pay for themselves (Hendren and Sprung-Keyser, 2020).

Life satisfaction is a widely used and accepted concept for measuring well-being in various discip-

lines, both in micro and macro studies. The research on subjective well-being is rapidly expanding, with an average of 14,000 publications a year (Diener et al., 2017). The consensus in the psychology literature is that well-being or happiness levels are relatively stable and tend to fluctuate around a fairly stable set-point, but that major life events do indeed shift happiness levels (Diener et al., 2009). Empirical evidence shows that life-events such as marriage, childbirth, unemployment, divorce, widowhood and disability are all associated with marked changes in happiness levels (Anusic et al., 2014). According to this evidence, it may not be expected that the small initial boost that occurs in maternal well-being around childbirth is sustainable in the long-run for mothers. However, a shift in the level may nonetheless have a permanent effect on their children, including on their human capital formation. If this association can be identified, we can also learn more about potential channels of other shocks during early childhood affecting child outcomes and child development, such as maternal unemployment (Kalil and Wightman, 2011) or family instability (Fomby and Cherlin, 2007). If such events affect maternal well-being, and if maternal well-being is found to be associated with child development, then this paper contributes to other literatures as well.

It is a well-documented finding that the early years are crucial for child development. Many studies for various countries have shown that early investments are particularly effective; James Heckman and co-authors point out that this is particular true due to the double complementarity of early skill investments (Cunha et al., 2006). This is relevant for cognitive and non-cognitive skills (Heckman, 2006). The empirical literature on this mainly focuses on early childhood investments, those from caretakers and educators in the family and those outside the family.<sup>2</sup>

Studies on the effects of input of caretakers and educators outside the family mainly focus on the effects of formal day care (e.g. Cornelissen et al., 2018; Datta Gupta and Simonsen, 2010; Havnes and Mogstad, 2011, 2015) or on the effects of informal care provided by grandparents living outside the child's household (Barschkett et al., 2021). Complementary to this, the literature on the input from caretakers and educators in the family focuses on issues, such as the effects of maternal time investments (Del Bono et al., 2016; Nicoletti and Tonei, 2020), parental leave expansions (Danzer et al., 2022; Huebener et al., 2019), maternal activities (Kalb and Van Ours, 2014; Price and Kalil, 2019) or maternal employment (Bastian and Lochner, 2022; Hsin and Felfe, 2014). Overall, the literature highlights the importance of early investments in cognitive and non-cognitive skills for child development, particularly those made by caretakers and educators during the early years of a child's life.

The few studies trying to establish a causal link between maternal life satisfaction and child outcomes in a more causal direction are those by Berger and Spiess (2011), McNamara et al. (2019)

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<sup>2</sup>A few studies explicitly focus on both (e.g. Jessen et al., 2022; Kuger et al., 2019).

and Richter et al. (2018). Based on the same data set as we use in our study but only considering children up to age six, Berger and Spiess (2011) show that maternal well-being around birth affects child development. The results indicate that the more satisfied the mother, the better her child's verbal skills and the lower their socio-emotional problems. The relationship is found to be more pronounced for boys and results are robust to accounting for mothers' personality and controlling for mothers' cognitive skills. However, there is no evidence up to now on whether the association is long lasting or whether it fades out over time (Headey et al., 2014).<sup>3</sup>

In this study, we adopt a longer-term perspective and examine the link between maternal well-being and their children's development up to age 14. At this stage, mothers tend to spend considerably less time with their children. Moreover, we extend the analysis beyond socio-emotional skills, and assess the influence on a range of outcomes, including cognitive skills, socio-emotional behaviour, children's personality traits, their self-reported own well-being and test scores. We are thus able to provide the first insights on the intergenerational effects of well-being from one generation to the other covering many years and a comprehensive set of outcomes.

In our analysis, we include a range of variables that may confound the relationship between maternal life satisfaction and child outcomes, such as household income, maternal education, time spent in formal day care and family structure. While these factors are predictive of child outcomes, they have little impact on our estimates of maternal life satisfaction. In our preferred specification, we additionally account for mothers' personality traits. This slightly depresses the coefficients, but point estimates are qualitatively similar. As mothers' life satisfaction may be endogenous and the relationship to child development could run in the other direction, we also present instrumental variable (IV) estimates following the approach by Berger and Spiess (2011). Specifically, we instrument contemporaneous life satisfaction of mothers with their life satisfaction measured two years *prior* to her first childbirth. Through this, the potential reverse causality of the well-being measure vanishes and the issue of measurement error due to short-run fluctuations is mitigated. IV estimates are noisier, as is common, but consistent with our main findings.

To provide a glimpse of our findings, a one-point higher maternal life satisfaction on a scale from 0-10 is associated with a 0.03 standard deviations (SD) improvement in toddlers (aged 2-3) skill attainment measured by VAB scores across four domains. For school-aged children (5-9 years), we identify positive effects on the total difficulties score measuring socio-emotional behaviour and pro-social behaviour as well as on all mother-reported Big 5 personality traits of children. The coefficient for the total difficulties score is 0.06 SD while the average increase in Big 5 is around 0.03 SD. Our

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<sup>3</sup>Headey et al. (2014) show that parents' and their offspring's life satisfaction do affect each other, even when the children have grown up and have moved away from home.



analysis of adolescents (11-14 years) shows that higher maternal life satisfaction is associated with a 0.03 SD increase in their life satisfaction, better school grades and an increase in their Big 5 in a range of around 0.02 SD. Importantly, adolescent outcomes are self-reported and thus alleviating concerns about the association being driven by more satisfied mothers judging their children more favourably.

We observe child development indicators of primary school-aged children and of adolescence twice per child, allowing us to also estimate simple value-added models. While the outcomes exhibit a significant auto-correlational element over time, our results suggest that contemporary maternal life satisfaction still plays a crucial role for child development but that past maternal life satisfaction does not have an additional effect on child development except through its direct effect on past child outcomes. Related to our previous concern regarding heritability of personality, the findings from the value-added model confirm that it is not simply the case that children inherit their mothers' happy personality.

## 2 Data

Our analysis uses the German Socio-Economic Panel (SOEP, [Goebel et al., 2019](#)). SOEP is a longitudinal household survey running annually since 1984. In recent years, around 15,000 households and 35,000 individuals are included. SOEP contains information on a wide range of topics, such as labour market outcomes, socio-demographic characteristics, detailed information on children, and information on life satisfaction and personality traits of respondents.

SOEP is particularly suited to our analysis as in 2003<sup>4</sup> a new set of questionnaires assessing the development of children were added (“mother & child”, “parent”, “pre-teen” and “early youth” questionnaires, see [Spiess, 2011](#)). These age-specific questionnaires contain an extensive range of well-established psychometric measurements described in the following paragraphs. [Richter et al. \(2013\)](#) document in detail how each of the scores we use are constructed (see also the discussion in [Berger and Spiess, 2011](#)). Appendix Figure [A.1](#) plots child age in years, for which age-specific measurements of child development are contained in the SOEP data.<sup>5</sup> For children up to eleven years the metrics are based on responses of parents, for children above that age the measures are based on children's responses. Appendix Figure [A.2](#) illustrates the timing of SOEP questionnaires considering

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<sup>4</sup>So far, the indicators of child development are covered in the survey years 2003 to 2020. More than 90% of observations stem from the years 2010 onward as more samples were added to the survey for which the indicators are collected.

<sup>5</sup>In Appendix Figure [A.3](#) we show how much time mothers are spending with their children overall and specifically on interactive child care activities using German time-use data from 2012/13. Both indicators of time use decrease continuously with child age.

child development outcomes.

For 2-3-year-old children (toddlers) skill attainment is measured with the Vineland adaptive behaviour scales (VAB, Sparrow et al., 1984; Sparrow and Cicchetti, 1989). The outcomes are measures of early skill attainment. Collectively they are a modification of the German Vineland scale (Tietze, 1998). In each of four areas – verbal skills, activities of daily living, motor skills, and social skills – mothers (fathers only in exceptions) were asked to rate their child’s ability to perform five skills as either yes, to some extent, or no. Each individual score is calculated as an equally weighted average of these responses. In addition to the individual scores, we also provide results for a summarising VAB score. Similar to all other outcomes considered, we standardise the indices to have a mean of 0 and a standard deviation (SD) of 1, such that the coefficients can be directly interpreted and compared.

For older, primary school-aged children, 5-6 and 9-10 years, we construct the socio-emotional behaviour (SEB) of children, which is measured with the Strengths and Difficulties Questionnaire (SDQ, Goodman, 1997). We focus on the *total difficulties score* which is an aggregate of hyperactivity, emotional symptoms, conducting problems and peer problems (for ease of interpretation the score is reverse coded such that a positive coefficient reflects a desired outcome).<sup>6</sup> We also use a score for prosocial behaviour. Besides the SEB scores, at this age children’s Big 5 personality traits (openness, conscientiousness, extraversion, agreeableness, neuroticism, Costa Jr. and McCrae, 1995) are measured where each of the traits is based on two questions.

When children are turning twelve in the calendar year of the survey, questionnaires are directly given to them. For 11-14-year-old children (adolescents) we use the outcomes life satisfaction, school grades (German, maths and in a foreign language), as well as their Big 5 personality traits. The Big 5 for these older children are based on three questions each and also answered by the children themselves.

Similar to Berger and Spiess (2011), maternal life satisfaction is the main explanatory variable in this study. The question on “satisfaction with life in general” is asked in every survey year on a Likert scale ranging from 0 to 10 with higher values indicating a higher life satisfaction. Appendix Figure A.4 plots life satisfaction of mothers and childless women over the life cycle. Life satisfaction is somewhat higher for mothers from the mid-20s onward before reaching a similar level at age 40. But overall there is no indication that mothers are a selective group with regard to life satisfaction. We describe in the following section 3 how we specify maternal life satisfaction in different ways in our empirical models to identify the “effect” of life satisfaction on our different psychometric measures of child development.

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<sup>6</sup>Disaggregated results for each of the scores are available from the authors upon request.

### 3 Estimation

To identify the effect of maternal life satisfaction on child outcome, ideally one would be able to exploit some (quasi-) experimental variation in life satisfaction leaving other confounding factors constant. Regrettably, we are not aware of such variation which would allow for a clean estimation of the causal impact on child development. Thus, we turn to the second-best approach and estimate several models where we control for a rich set of covariates in order to establish the conditional association of child development at different ages and maternal life satisfaction. In a first step, we estimate the simple following regression model:

$$y_{i,t} = \beta_0 + \beta_1 LS_{i,t} + \beta_2 X_{i,t} + \beta_3 Big5_{i,t} + \epsilon_{i,t} \quad (1)$$

where  $y_{i,t}$  is an age-specific measure of development of child  $i$  measured in survey year  $t$ . To simplify the indices, we use the same subscript  $i$  for children and their mothers, i.e. effectively for a child-mother-nexus. The coefficient of interest is  $\beta_1$  which measures the conditional association between maternal life satisfaction and standardised child outcomes.

The vector  $X_{i,t}$  contains a rich set of control variables on the mother-, child- and household-level; age of mother, born in Germany (0/1), relationship status of the mother, employment status, education dummies for mother and her partner (if applicable), (log) household income, age of child, child sex, time spent in day care (if applicable), and survey year dummies to account for general time trends. By accounting for these characteristics, we can abstract from many distorting factors that are likely to affect both child development and maternal life satisfaction (e.g. both education and household income are positively correlated with child development and maternal life satisfaction).

We control for mothers' Big 5 personality traits in our preferred estimation. The curious reader may wonder why the personality traits are only used as control variables rather than as explanatory variables of interest as themselves. The idea behind the concept of the Big 5 is that these are traits which have been identified to be relatively stable over the life cycle of individuals, i.e. truly time-invariant characteristics. [Cobb-Clark and Schurer \(2012\)](#) demonstrate the stability over four-year periods with negligible mean population changes.<sup>7</sup> As time-invariant characteristics, there is little role for policy to impact on these (although the role of maternal Big 5 on child development may naturally be of interest in its own right). In our estimation, we control for the Big 5 traits as we want to isolate the effect of maternal life satisfaction on child development by netting out the relationship

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<sup>7</sup>In a meta-analysis covering hundreds of studies, [Bleidorn et al. \(2022\)](#) confirm that personality traits stabilise in young adulthood.

between the personality traits and life satisfaction and to control for heritability.<sup>8</sup>

An obvious issue of our estimation is that the measure of *general* maternal life satisfaction is likely to not only capture overall satisfaction but may also reflect *short-run fluctuations*. If the measurement error is random, this will bias estimates towards zero (Griliches and Hausman, 1986). To reduce measurement error in the explanatory variable, we replace  $LS_{i,t}$  with an average of the measures of life satisfaction of the current, and the previous two survey years, i.e.  $LS_{\overline{t-2,t-1,t}}$  for whichever of these are available. This is similar to other studies analysing life satisfaction (e.g. Headey et al., 2014) or to studies analysing intergenerational mobility, which often average parental earnings over several years (Solon, 1999).

However, this does not address another, arguably larger, concern; reverse causality between child development and maternal life satisfaction. Positive measures of child development could increase mothers' life satisfaction, as it makes her proud of having a child with high ability and could also reduce concerns about whether her child is developing adequately. This would lead  $LS_{i,t}$  to be positively correlated with the error term  $e_{i,t}$  which impedes a consistent estimation of  $\beta_1$ .

To circumvent this, we follow Berger and Spiess (2011) and instrument contemporaneous maternal life satisfaction in survey year  $t$  with her life satisfaction measured two years *before* her first birth,<sup>9</sup>  $LS_{i,fb-2}$ . By using a pre-motherhood measure of life satisfaction, we can address both the issue of reverse causality—even unexpected problems arising during pregnancy which affect child development should not have influenced pre-birth life satisfaction—and also the issue of measurement error. The instrumental variable rests on two main assumptions; (i) the instrument causes variation in the instrumented variable (“relevance”, this can be statistically tested) and (ii) the instrument has no direct effect on the outcome variable other than through the indirect effect of the treatment variables (“exclusion” Angrist and Pischke, 2009). Formally we estimate the following first-stage regression:

$$LS_{i,t} = \gamma_0 + \gamma_1 LS_{i,fb-2} + \gamma_2 X_{i,t} + \gamma_3 Big5_{i,t} + u_{i,t} \quad (2)$$

and replace  $LS_{i,t}$  in eq. (1) with the predicted value  $\widehat{LS}_{i,t}$  obtained from eq. (2). For this estimation the panel structure of the SOEP data is crucial as respondents are often observed over many years and even decades. Yet, as we require both contemporaneous measures of life satisfaction and child development together with pre-birth measures of life satisfaction this naturally reduces the sample sizes substantially and more so for outcomes measured at older child ages. To assess whether differences in coefficients stem from the reduced sample or the estimation strategy, we also show

<sup>8</sup>Appendix Figure A.5 illustrates the well-established (Diener et al., 2003) correlation between maternal life satisfaction and her Big 5 personality traits in our data.

<sup>9</sup>The first birth can refer to a different birth than that of the child for which outcomes are estimated. This allows us to avoid distortions due to changes in life satisfaction related to any other sibling of the child of interest.

estimates based on the specification shown in eq. (1) using the sample of the instrumental variable estimation. While from an identification point of view the instrumental variable estimation might be seen as preferable, it comes with the downside of less precisely estimated coefficients and lower sample sizes. In this paper, we therefore first show the plain OLS results obtained from eq. (1) as the main estimates and are careful to interpret them as conditional associations rather than as causal effects. In a second step, we present estimates from the averaged measure of life satisfaction and from the instrumental variable specification to support that the conditional associations we estimate may indeed have the flavour of a causal relationship.

For primary school-aged children (5-10 years) and adolescents (11-14 years) we observe some development indicators twice at different ages. This enables us to estimate a simple value-added model where in line with the notion that child development is a cumulative process we account for lagged inputs (lagged maternal life satisfaction) as well as the lagged child development as a baseline development measure (Koedel et al., 2015; Todd and Wolpin, 2003). Note that this is akin—but not identical—to including child fixed effects in the estimation covering two periods. We estimate the following equation:

$$y_{i,t} = \delta_0 + \delta_1 y_{i,t-h} + \delta_2 LS_{i,t} + \delta_3 LS_{i,t-h} + \delta_4 X_{i,t} + \delta_6 Big5_{i,t} + v_{i,t} \quad (3)$$

where  $\delta_1$  identifies the effect of the child development indicator measured  $h$  years earlier and  $\delta_3$  how past maternal life satisfaction impacts on current child outcomes besides its effect on past child development. This model also nets out the effect of any selectivity induced by heritability.

## 4 Results

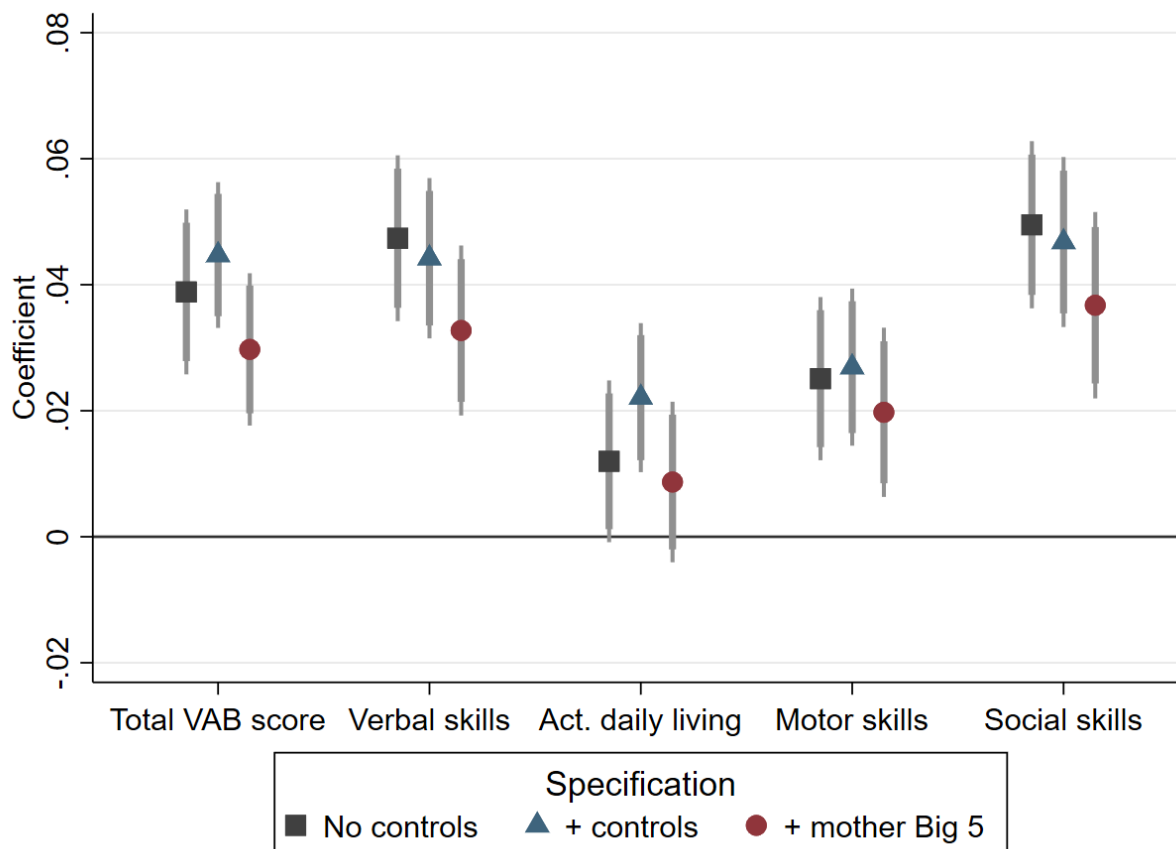
We present results for various child ages starting with toddlers (2-3 years) up to adolescents (11-14 years) where we examine different age-appropriate psychometric measures of child development. For each age group, we start by plotting coefficients of several OLS models, before we turn to the IV estimation or value added models (if feasible).

### 4.1 Toddlers (2-3 years): VAB Scores

Figure 1 reports the coefficients of contemporaneous maternal life satisfaction on VAB scores. Dark grey squares show the raw correlation, blue triangles include controls at the mother-, household- and child-level (see figure notes), and maroon circles—our preferred specification—additionally includes the Big 5 personality traits of mothers in the estimation. Overall we find that the coefficients do

not differ fundamentally between the specifications, but there is a tendency, although differences are not statistically significant from another, that controlling for mothers' personality traits moves coefficients somewhat towards zero, indicating that the relationship between maternal life satisfaction and child development runs to some degree through her personality traits.

Figure 1: VAB scores and maternal life satisfaction



Notes: Figure shows coefficients of contemporaneous maternal life satisfaction on various indicators on child development obtained from estimating eq. (1). All child outcomes are standardised. Child age ranges from 15-49 months. Control variables at mother level: age, born in Germany, relationship status (married, partner, no partner / unknown), employment status (full-time, part-time, marginal or unemployed), education and partner's education (university, vocational or no degree), log household income. Control variable at child level: age, sex, hours in day care (none, 1-20, 21-30, 31+). All estimates include survey year fixed effects. Range plots indicate 90% (thick line) and 95% (thin line) confidence intervals. Source: SOEP v37

A higher maternal life satisfaction of one point on the 11 point-Likert scale is associated with a higher VAB score of around 0.03 standard deviations (SD). Looking at the individual contributions to the score, substantial increases are identified for all scores with the exception of activities of daily living for which we cannot reject that the coefficient is zero. To put the size of the coefficients into perspective, we consider the age-equivalent effects of the estimates (Berger and Spiess, 2011), i.e. we compare the coefficients to the age-effect of the child from the same estimation. A one-month increase in child age increases the VAB score by 0.09, so the estimated effects of maternal life satisfaction

correspond to around a third of a monthly increase. We investigate heterogeneities by child gender in Appendix Figure A.6. The literature on child development effects of e.g. formal childcare often identifies such differences (see a discussion of this literature in, e.g., [Datta Gupta and Jessen, 2023](#)), but we see no evidence for such differential effects.

In Table 1 we consider different specifications of maternal life satisfaction as outlined in section 3. As a reference, the first row contains the same estimates as the full specification including control variables and maternal personality traits in Figure 1 (maroon circles). The second row uses the average of the contemporaneous life satisfaction and that of the two preceding survey waves to reduce measurement error in the explanatory variable caused by short-term fluctuations. Estimates are statistically indistinguishable. The bottom rows introduce the instrumental variable estimates. In the third row we first use the same specification of the first row, but use the same sample as in the IV estimation in the final row to contrast the estimates with the identical samples. The sample size reduces by 80%<sup>10</sup> and thus reduces the precision of the estimates and point estimates are smaller but all point in the same direction.

Table 1: VAB scores—Specifications of maternal life satisfaction

	Total VAB score (1)	Verbal skills (2)	Act. daily living (3)	Motor skills (4)	Social skills (5)
Life satisfaction <sub>t</sub>	0.030*** (0.006)	0.033*** (0.007)	0.009 (0.006)	0.020*** (0.007)	0.037*** (0.008)
N	8,112	8,104	8,109	8,108	8,109
Life satisfaction <sub><math>\frac{t-2,t-1,t}{3}</math></sub>	0.035*** (0.007)	0.036*** (0.008)	0.010 (0.008)	0.022*** (0.008)	0.047*** (0.009)
N	8,154	8,146	8,151	8,150	8,151
Life satisfaction <sub>t</sub> (IV sample)	0.022 (0.015)	0.016 (0.014)	0.013 (0.016)	0.012 (0.015)	0.023 (0.015)
N	1,554	1,554	1,554	1,554	1,554
Life satisfaction <sub>t</sub> (IV <sub>fb-2</sub> )	0.042 (0.052)	0.079 (0.051)	-0.030 (0.058)	0.058 (0.054)	0.061 (0.058)
F-statistic	99.535	99.535	99.535	99.535	99.535
N	1,554	1,554	1,554	1,554	1,554

*Notes:* First row of estimates contains contemporaneous maternal life satisfaction similar to the maroon circles in Figure 1. Rows below use life satisfaction two survey years before. 2nd row shows the available average of life satisfaction over three years, if not all waves are covered, average is taken over the ones included. 3rd shows estimates for contemporaneous life satisfaction with the same sample as the following IV estimates. IV estimates instrument contemporaneous life satisfaction with life satisfaction 2 years before the first birth ( $fb$ ). All estimates include control variables. Robust standard errors in parentheses, \* < 10% \*\* < 5% \*\*\* < 1% Source: SOEP v37

<sup>10</sup>The reduced sample size is due to panel-attrition and new SOEP entrants and the requirement that we need information two years before first birth. E.g., if for the IV estimation of a child aged three years, it is required that their mother has been in the SOEP survey for at least five years with non-missing information on life satisfaction.



The last row finally reports the IV estimates, where current life satisfaction of mothers is instrumented with her life satisfaction two years before her first birth (observed at least four years earlier). The F-statistic of almost 100 meets even conservative thresholds discussed recently (Lee et al., 2022) and confirms the relevance of the instrument. Coefficients are larger for all outcomes but activities of daily living, but as standard errors are inflated about seven- to eight-fold, none of the estimates are statistically significant at conventional levels. While we lack precision in the IV approach in the last two rows to make definite statements using this estimation strategy, we nonetheless interpret the coefficients as supporting the conclusion that maternal life satisfaction is positively associated with indicators of child development for toddlers.

The result leads to the next question; is it life satisfaction itself or something that it closely proxies which similarly affects child development? Our data and setting do not allow to provide a definitive answer on this, but the rich data allow us to provide some insights on this nonetheless. A higher maternal life satisfaction may imply that this enables her to be more engaged and active in her parenting. Fortunately, for children aged 2-7 years SOEP asks parents how regularly they are conducting a list of 13 activities with their children (ranging from daily to never). From these responses we create two standardised parental activity indices; the first index consists of all activities whereas the second focuses on activities that according to the literature (e.g. Del Bono et al., 2016; Kalb and Van Ours, 2014; Mayer et al., 2019; Price and Kalil, 2019) ought to be particularly development enhancing for children (singing to and with the child, handicraft work, reading stories, looking at picture books and playing games together).

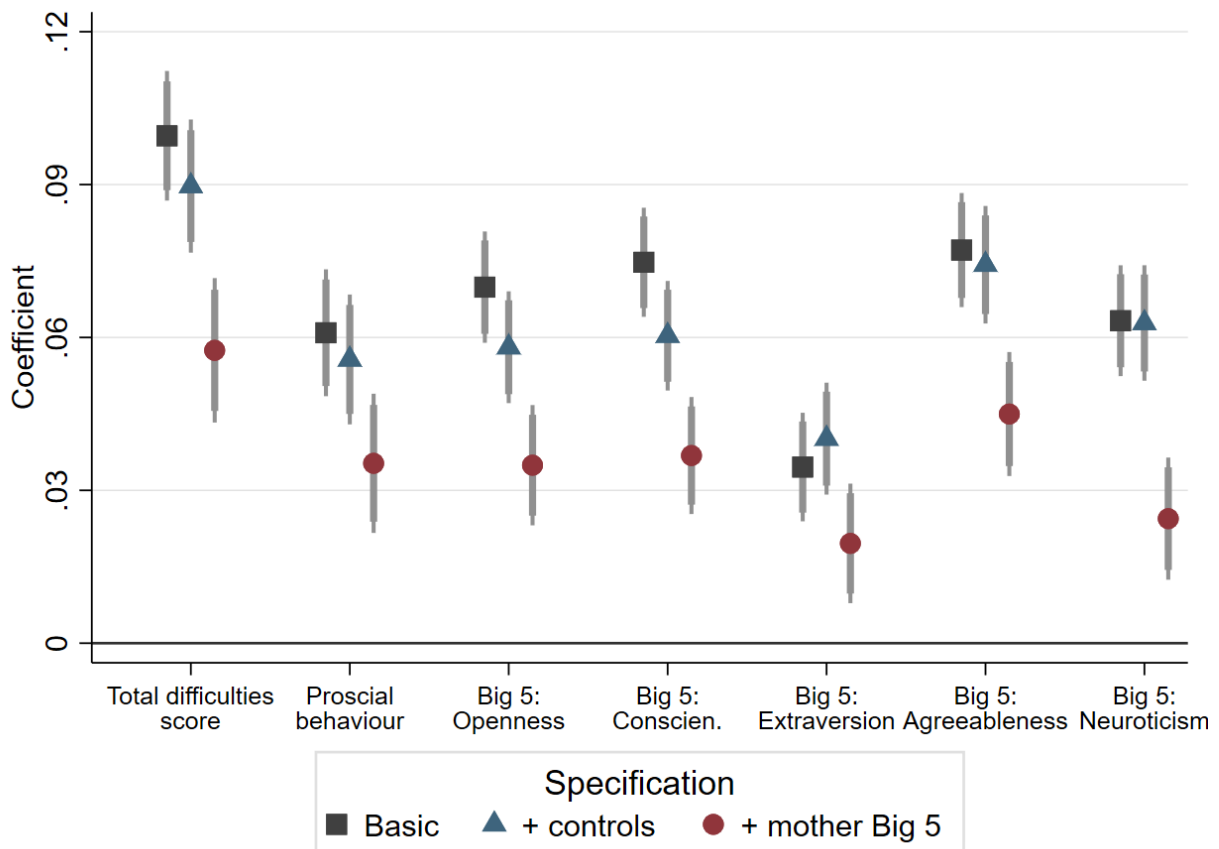
In Appendix Figure A.7, panel (a), we first show that these indices are indeed strong predictors of VAB scores. We estimate the same specification for contemporaneous life satisfaction including control variables and maternal personality traits, and additionally include the parental activities index in two separate estimations. The summarising VAB score increases by 0.2 SD when our preferred parental activity index 2 is 1 SD higher. In line with a vast literature showing that parenting activities matter greatly for child development, we see that our indices seem to be catching something meaningful. In panel (b) of Figure A.7 we then plot coefficients for contemporaneous maternal life satisfaction when we additionally control for the parenting indices. The point estimates for maternal life satisfaction are only very slightly reduced when the parenting indices are added to the estimation. Maternal life satisfaction does not only work through the channel of improving the *frequency* of development enhancing child care activities. But it may of course be that a higher life satisfaction improves the *quality* of these interactions and we do not argue that life satisfaction and parenting activities are mutually exclusive explanations, but that an increase in the quality of interactions might be a mechanisms explaining the positive association.



## 4.2 Primary School-aged Children (5-6 and 9-10 years): SEB Scores and Big 5

We move on and now consider outcomes of children of primary school age, for which the SDQ scores and Big 5 personality traits of children based on responses by their mothers are covered in the age-specific questionnaire. For these outcomes, the indicators of child development are assessed at two different age brackets (see Appendix Figure A.1). For brevity in the exposition of results in the main text, we pool both age groups and show these. In the Appendix we show estimates separately for the two age groups. We also take advantage of the panel structure and that these outcomes are measured twice for children at different ages and estimate a simple value-added model in an attempt to disentangle whether contemporaneous maternal life satisfaction still matters once we control for lagged indicators of child development and whether past life satisfaction still has an impact beyond what is captured by the lagged outcome (which we argue is directly influenced by past life satisfaction).

Figure 2: SEB scores, child Big 5 and maternal life satisfaction



Notes: Figure shows coefficients of contemporaneous maternal life satisfaction on various indicators on child development obtained from estimating eq. (1). All child outcomes are standardised. Child age ranges from 62-133 months. See Figure 1 for other notes. Source: SOEP v37

Estimates for the total difficulties score (reverse coded), prosocial behaviour and Big 5 personality traits (neuroticism reverse coded) of children are shown in Figure 2. In contrast to the estimates for toddlers (Figure 1) we see that controlling for mothers' Big 5 has a much stronger impact on the coefficients, reducing them to about half on average compared to the raw correlation. Higher maternal life satisfaction is associated with a higher total difficulties score of 0.06 SD (a positive outcome due to reverse coding), prosocial behaviour and child Big 5 increase by about 0.03 SD on average. Interestingly, the coefficients for the standardised outcomes are at least as large (or larger) than for toddlers, although mothers at this age are spending substantially less time with their children at this older age (see Appendix Figure A.3). When considering children aged 5-6 and 9-10 years separately in Appendix Figure A.8, no clear pattern emerges for differential effects by age of child with, if anything, suggestive evidence that the positive association with prosocial behaviour is larger for *older* children who are mandated to attend primary school at this age. We find no differences by children's gender (Appendix Figure A.9).

Table 2: SEB and child Big 5—Specifications of maternal life satisfaction

	Total	Prosocial	Big 5				
	difficulties score	behaviour	Openness	Conscien.	Extraversion	Agreeableness	Neuroticism
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Life satisfaction <sub>t</sub>	0.057*** (0.007)	0.035*** (0.007)	0.035*** (0.006)	0.037*** (0.006)	0.020*** (0.006)	0.045*** (0.006)	0.024*** (0.006)
N	9,132	9,130	12,080	12,083	12,071	12,051	12,071
Life satisfaction <sub><math>\overline{t-2,t-1,t}</math></sub>	0.071*** (0.009)	0.051*** (0.009)	0.044*** (0.007)	0.046*** (0.007)	0.022*** (0.007)	0.055*** (0.007)	0.032*** (0.007)
N	9,219	9,217	12,146	12,149	12,139	12,116	12,137
Life satisfaction <sub>t</sub> (IV sample)	0.090*** (0.018)	0.051*** (0.017)	0.038** (0.018)	0.079*** (0.018)	0.032* (0.018)	0.072*** (0.019)	0.023 (0.019)
N	1,524	1,524	1,521	1,522	1,522	1,518	1,518
Life satisfaction <sub>t</sub> (IV <sub>fb-2</sub> )	0.176** (0.072)	0.141* (0.074)	0.181** (0.079)	0.204*** (0.078)	0.137* (0.075)	-0.002 (0.082)	0.165** (0.080)
F-statistic	64.165	64.165	62.583	62.572	62.873	62.285	63.244
N	1,524	1,524	1,521	1,522	1,522	1,518	1,518

Notes: See Table 1 and Figure 1 for notes.

Results for different specifications of maternal life satisfaction are reported in Table 2. The averaged life satisfaction indicator yields estimates that are larger than the main estimates by around 0.01 SD on average. In contrast to the estimates for toddlers, coefficients for the IV sample are quite similar to the estimates using the full sample. The IV estimates in the bottom row are large, but again quite noisily estimated. Despite the large point estimates, we cannot reject equality of the coefficients to those from the model in the first row. For most outcomes, the IV estimates are statistically significant at the 5% or 10% level. Even at this older age, it thus seems as if maternal

life satisfaction positively impacts on child development.

We next turn to the value-added estimation as for most children the outcomes are first measured at age 5-6 and then again usually four years later at ages 9-10. In Table 3 we present results for the three specifications as in the previous figures, that is the raw correlation (Panel A, now including lags of the outcome and of life satisfaction), with additional control variables (Panel B) and taking mothers' personality traits into account (Panel C). All indicators of child development display a strong autocorrelation over time, with coefficients of the lagged outcome of 0.33 to 0.51 SD across the indicators in Panel A. Even when the baseline development measures are considered, current maternal life satisfaction indicates a strong positive effect on child outcomes with coefficients in the same ballpark as those in Table 2. Including control variables has only a minor impact on the coefficients, but, in line with the previous results, controlling for mothers' Big 5 mutes the effect of maternal life satisfaction on child development somewhat. We find no evidence for a role of past maternal life satisfaction beyond the direct effect on past child development.

Table 3: SEB and child Big 5: Value-added model

	Total	Prosocial	Big 5 (child)				
	difficulties score	behaviour	Openness	Conscientiousness	Extraversion	Agreeableness	Neuroticism
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Basic specification							
Lagged outcome	0.513*** (0.024)	0.333*** (0.025)	0.504*** (0.021)	0.505*** (0.018)	0.499*** (0.018)	0.464*** (0.019)	0.379*** (0.017)
Maternal life satisfaction	0.067*** (0.016)	0.055*** (0.017)	0.037*** (0.013)	0.050*** (0.012)	0.027** (0.012)	0.030** (0.012)	0.027** (0.012)
Lagged mat. life sat.	0.032** (0.015)	-0.002 (0.016)	0.027** (0.012)	0.012 (0.011)	-0.005 (0.011)	0.026** (0.012)	0.029** (0.012)
N	2,068	2,068	3,043	3,044	3,041	3,033	3,041
Panel B: + Controls							
Lagged outcome	0.491*** (0.025)	0.319*** (0.024)	0.481*** (0.021)	0.487*** (0.018)	0.499*** (0.019)	0.459*** (0.019)	0.377*** (0.017)
Maternal life satisfaction	0.063*** (0.016)	0.058*** (0.017)	0.029** (0.013)	0.044*** (0.012)	0.025** (0.012)	0.030** (0.012)	0.024* (0.013)
Lagged mat. life sat.	0.032** (0.015)	0.002 (0.016)	0.019 (0.012)	0.005 (0.011)	-0.003 (0.011)	0.028** (0.012)	0.026** (0.012)
N	2,068	2,068	3,043	3,044	3,041	3,033	3,041
Panel C: + maternal Big 5							
Lagged outcome	0.459*** (0.025)	0.302*** (0.024)	0.469*** (0.022)	0.468*** (0.019)	0.480*** (0.019)	0.440*** (0.019)	0.347*** (0.017)
Maternal life satisfaction	0.040** (0.016)	0.042** (0.017)	0.016 (0.014)	0.031** (0.012)	0.014 (0.012)	0.017 (0.012)	-0.003 (0.013)
Lagged mat. life sat.	0.016 (0.015)	-0.013 (0.016)	0.012 (0.012)	-0.001 (0.011)	-0.009 (0.012)	0.018 (0.012)	0.012 (0.012)
N	2,036	2,036	3,010	3,011	3,008	3,000	3,008

Notes: Tables shows estimates based on a value-added model specified in eq. (3). Sample is restricted to children for whom outcomes are observed twice at different ages, commonly two years apart. Basic specification only includes the variables listed. Control variables as listed in Figure 1. \* < 10% \*\* < 5% \*\*\* < 1% Source: SOEP v37

### 4.3 Adolescence (11-14 years): Child life Satisfaction, School Grades, Big 5

In a final step of our analysis, we turn our attention to adolescents aged 11-14 years. At this age, the development indicators are self-reported and not based on responses by their mothers. This allows us to alleviate concerns that the positive association between maternal life satisfaction and child outcomes is driven by a systematic bias that more satisfied mothers assess their children's development more generously. E.g., [Datta Gupta et al. \(2018\)](#) show that maternal distress is linked with a systematic misreporting of child functioning.

Adolescence's life satisfaction is measured on the same 11-point Likert scale as for mothers. Similarly, Big 5 personality traits of adolescence are now based on the same set of questions as for mothers. School grades are measured as is common in Germany from 1 to 6. We again standardise all outcomes and code them such that positive values indicate better outcomes (otherwise lower school grades in Germany are better with 1 being the best grade).

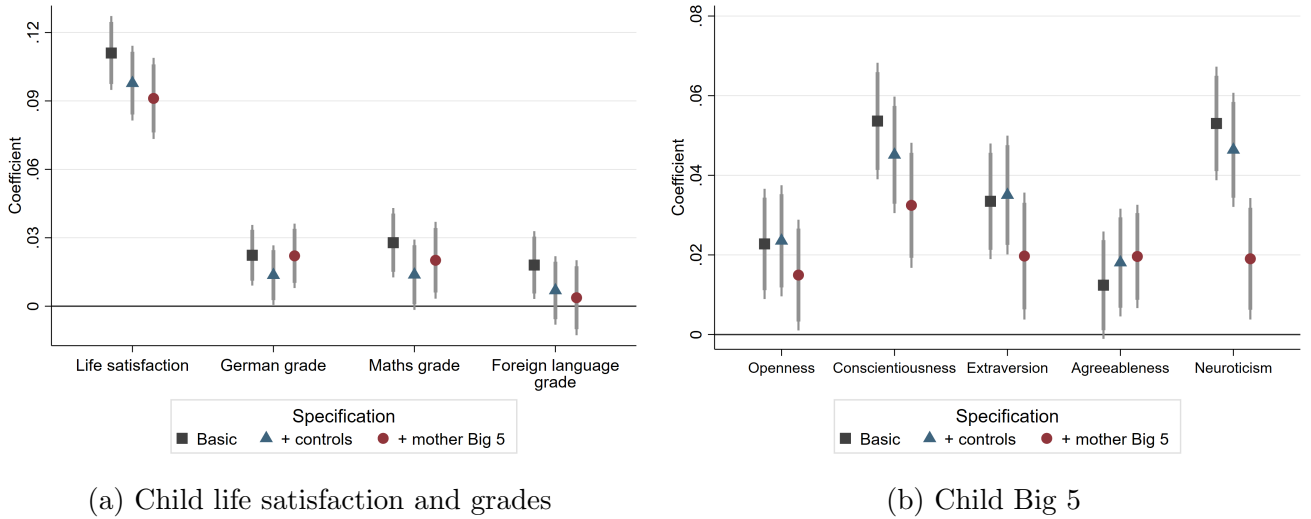
In adolescence, mothers are on average spending less than one hour per day on child care activities.<sup>11</sup> At younger ages, when children spent a substantial amount of their time with their mothers, a positive influence of maternal life satisfaction on her children's development may be expected. But at older ages, the influence of schools, friends and other peers becomes more and more important. However, maternal life satisfaction could still have a positive impact as it could be a decent proxy for a positive and supportive environment at home.

Figure 3 reveals that even at this advanced age, maternal life satisfaction is strongly correlated with child outcomes. Maternal Big 5 only moderates the impact on some child outcomes. The largest coefficient, perhaps not too surprisingly, is for life satisfaction of adolescents which increases by 0.09 SD. But as panel (a) shows, there are also smaller positive effects on academic achievement reflected in better school grades (the effect for foreign language is not statistically significant once control variables are added). Panel (b) shows the association of maternal life satisfaction with self-reported Big 5 of her adolescent children. In our preferred specification with maternal personality traits included, all coefficients are statistically significant and in a range of 0.02 to 0.03 SD. As in the estimates for children of primary school age in Figure 2, the coefficients for neuroticism exhibits the largest move towards zero indicating that for this outcome a larger part of the effect is moderated through mothers' personality. Estimates by gender of adolescents are—as for the other outcomes—not statistically different from one another (Appendix Figure A.10).

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<sup>11</sup>Defined as supervision, help with homework, playing or doing sports with the child, reading to the child or other residual child care activities.

Figure 3: Child life satisfaction, school grades, child Big 5



Notes: Life satisfaction ranges from 0-10. School grades are standardised with a higher grade being better. Big 5 scores also standardised. Child age ranges from 134-182 months. Source: SOEP v37

Table 4: Life satisfaction, school grades, Big 5: Specifications of maternal satisfaction

	Life		Foreign		Big 5				
	satisfaction (1)	German grade (2)	Maths grade (3)	lang. grade (4)	Openness (5)	Conscientiousness (6)	Extraversion (7)	Agreeableness (8)	Neuroticism (9)
Life satisfaction <sub>t</sub>	0.157*** (0.016)	0.022*** (0.007)	0.020** (0.009)	0.004 (0.008)	0.015** (0.007)	0.032*** (0.008)	0.020** (0.008)	0.020*** (0.007)	0.019** (0.008)
N	6,063	5,651	5,657	5,541	6,099	6,099	6,099	6,099	6,099
Life satisfaction <sub>t-2,t-1,t</sub>	0.189*** (0.018)	0.038*** (0.009)	0.039*** (0.010)	0.014 (0.010)	0.022** (0.009)	0.039*** (0.010)	0.024** (0.010)	0.024*** (0.008)	0.026*** (0.010)
N	6,182	5,758	5,764	5,647	6,223	6,223	6,223	6,223	6,223
Life satisfaction <sub>t</sub> (IV sample)	0.249*** (0.060)	0.040 (0.026)	0.014 (0.030)	0.042 (0.033)	0.027 (0.023)	0.063** (0.028)	0.003 (0.030)	0.018 (0.018)	0.045 (0.028)
N	575	553	554	548	580	580	580	580	580
Life satisfaction <sub>t</sub> (IV <sub>fb-2</sub> )	0.908*** (0.292)	0.177 (0.119)	-0.055 (0.146)	0.119 (0.144)	0.048 (0.118)	0.264* (0.159)	-0.184 (0.151)	-0.088 (0.097)	-0.172 (0.148)
F-statistic	15.158	13.905	13.205	12.215	15.191	15.191	15.191	15.191	15.191
N	575	553	554	548	580	580	580	580	580

Notes: See Table 1 and Figure 1 for notes.

As for the other indicators of child development measured at different ages, we present results for different specifications of maternal life satisfaction in Table 4. The IV estimation is increasingly demanding with older child age, as the availability of a pre-birth measure of maternal life satisfaction requires for mothers to have participated in SOEP over a period of 13 years (though not necessarily all years in-between). Due to this, the sample is now reduced by more than 90% and the F-statistic is becoming weak. For transparency these results are included, but due to the small sample size, insufficient values of the F-statistics and bloated standard errors, we are reluctant to put much weight on this estimation for the older age group.

For adolescents all child development indicators are also elicited twice, which again enables us to implement the same value-added specification. The outcomes are measured only two survey years apart compared to four years apart for younger children. Due to the auto-correlational nature of the indicators, this could reduce the influence of contemporaneous maternal life satisfaction to a larger degree. Yet this is not what the estimates in Table 5 show; even in the full specification including mothers' Big 5 the association between their life satisfaction and child development is statistically significant for many outcomes. The coefficient for life satisfaction is again largest with an increase of 0.062 SD in the full specification.

Table 5: Life satisfaction, school grades, Big 5: Value-added model

	Life		Foreign		Big 5				
	satisfaction	German grade	Maths grade	lang. grade	Openness	Conscien.	Extraversion	Agreeableness	Neuroticism
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<b>Basic specification</b>									
Lagged outcome	0.333*** (0.029)	0.536*** (0.021)	0.502*** (0.023)	0.489*** (0.022)	0.384*** (0.027)	0.416*** (0.022)	0.418*** (0.023)	0.107*** (0.031)	0.396*** (0.022)
Maternal life satisfaction	0.071*** (0.016)	0.027** (0.012)	0.016 (0.015)	0.001 (0.014)	0.025* (0.013)	0.049*** (0.013)	0.058*** (0.014)	0.028** (0.014)	0.030** (0.014)
Lagged mat. life sat.	0.017 (0.016)	-0.000 (0.012)	0.026* (0.015)	0.007 (0.014)	-0.011 (0.013)	-0.018 (0.013)	-0.013 (0.015)	-0.019 (0.014)	-0.004 (0.014)
N	1,954	1,776	1,781	1,737	1,973	1,973	1,973	1,973	1,973
<b>+ Controls</b>									
Lagged outcome	0.324*** (0.029)	0.496*** (0.022)	0.476*** (0.024)	0.472*** (0.022)	0.360*** (0.027)	0.407*** (0.023)	0.415*** (0.024)	0.102*** (0.032)	0.379*** (0.022)
Maternal life satisfaction	0.067*** (0.016)	0.020* (0.012)	0.008 (0.015)	-0.003 (0.014)	0.020 (0.013)	0.044*** (0.013)	0.056*** (0.014)	0.022* (0.013)	0.036*** (0.014)
Lagged mat. life sat.	0.013 (0.016)	-0.006 (0.012)	0.018 (0.015)	0.001 (0.014)	-0.009 (0.013)	-0.017 (0.013)	-0.010 (0.015)	-0.016 (0.013)	-0.004 (0.014)
N	1,954	1,776	1,781	1,737	1,973	1,973	1,973	1,973	1,973
<b>+ maternal Big 5</b>									
Lagged outcome	0.315*** (0.029)	0.487*** (0.022)	0.466*** (0.024)	0.474*** (0.022)	0.375*** (0.026)	0.419*** (0.023)	0.417*** (0.024)	0.115*** (0.030)	0.366*** (0.022)
Maternal life satisfaction	0.062*** (0.017)	0.022* (0.013)	0.007 (0.016)	-0.009 (0.015)	0.016 (0.012)	0.041*** (0.013)	0.046*** (0.014)	0.023* (0.012)	0.020 (0.014)
Lagged mat. life sat.	0.013 (0.017)	-0.002 (0.013)	0.022 (0.016)	0.001 (0.015)	0.004 (0.012)	-0.016 (0.013)	-0.005 (0.015)	-0.000 (0.013)	-0.017 (0.015)
N	1,890	1,729	1,735	1,693	1,908	1,908	1,908	1,908	1,908

Notes: Sample is restricted to children for whom outcomes are observed twice and two years apart. Basic specification only includes the variables listed. Control variables as listed in Figure 1. \* < 10% \*\* < 5% \*\*\* < 1% Source: SOEP v37

## 5 Conclusion

Gary Becker noted in his Nobel lecture that “Parental attitudes and behavior have an enormous influence on their children” (Becker, 1992). By now, the importance of parents for their children can seem like conventional wisdom. Cunha and Heckman (2007) argue that this point is largely accepted and often emphasised in the economic literature on child development, but that (both parental and non-parental) investments at different periods of childhood must be distinguished from one another.

Investments in early childhood are commonly seen as being particularly productive with no equity-efficiency trade-off in contrast to later investments (Cunha et al., 2006; Knudsen et al., 2006). While these influential studies consider different types of parental investments, their logic can arguably be transferred to the focus of our study: maternal life satisfaction. Policies improving maternal life satisfaction can have large returns not only for mothers themselves, but as we argue, also for their children.

What makes our findings of a strong association between maternal life satisfaction and numerous indicators of child development remarkable, is that we identify a strong relationship even at older child ages and when controlling for past outcomes arguably capturing a larger part of previous parental investments and past maternal life satisfaction. Mothers are important for children’s development at all ages we analyse and not only at a young ages when they are their main caregiver spending many hours with them each day.

A fruitful avenue for future research is thus identifying policies which can improve maternal well-being as this is likely to have large positive pay-offs on children’s development and through this also generate overall societal benefits. And these policies should not only focus on parents of younger children. It is important to remember that our effects hold while controlling for factors such as income or employment, so these policies do not necessarily need to directly influence these outcomes. However publicly provided day care, for instance, is a family policy measure which increases maternal well-being (Schmitz, 2020) and could through this also affect children via more satisfied mothers who have more capacity to dedicate high-quality interactions to their children (Chaparro et al., 2020; Jessen et al., 2022). The same might apply to family policies related to older children, such as all-day schooling or all-day-care for school children. Moreover, labour market policies, such as flexible working hours or employer-related family friendly measures, which may increase the well-being of employed mothers (Lauber and Storck, 2019), can play an important role as well. The increase in working from home induced by the COVID-19 pandemic may also have long-run effects; besides an increase in worker job satisfaction, a substantial amount of time saved due to not commuting has been dedicated to care-giving among parents (Aksoy et al., 2023). Through their potential effect on the next generation’s human capital, such policies impacting maternal life satisfaction can affect the future workforce as well.

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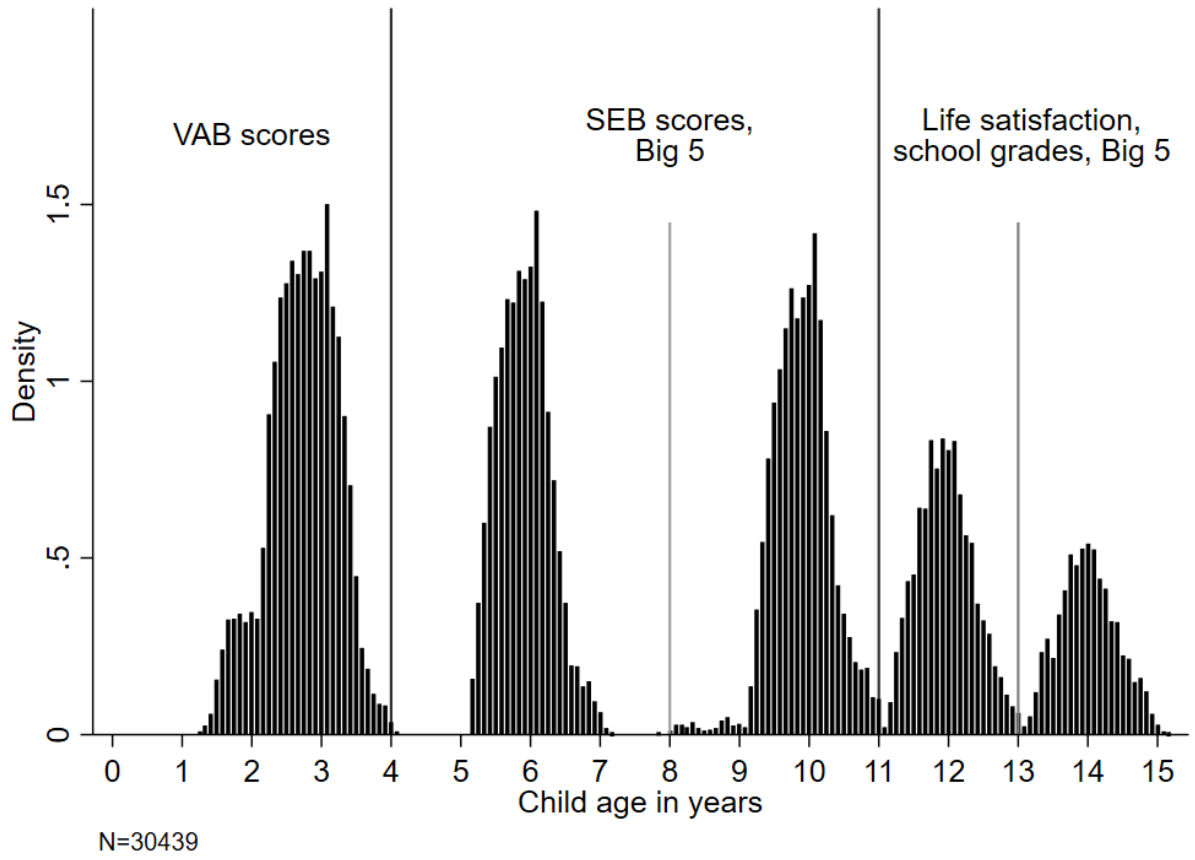
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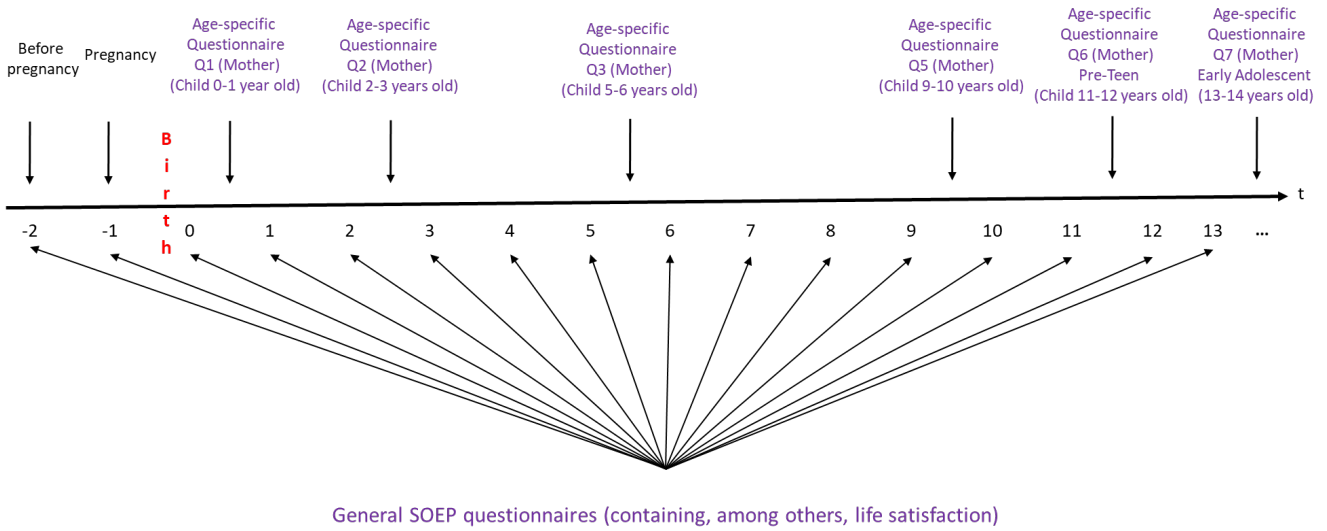
## A ONLINE APPENDIX

Figure A.1: Age distribution of children with psychometric measures



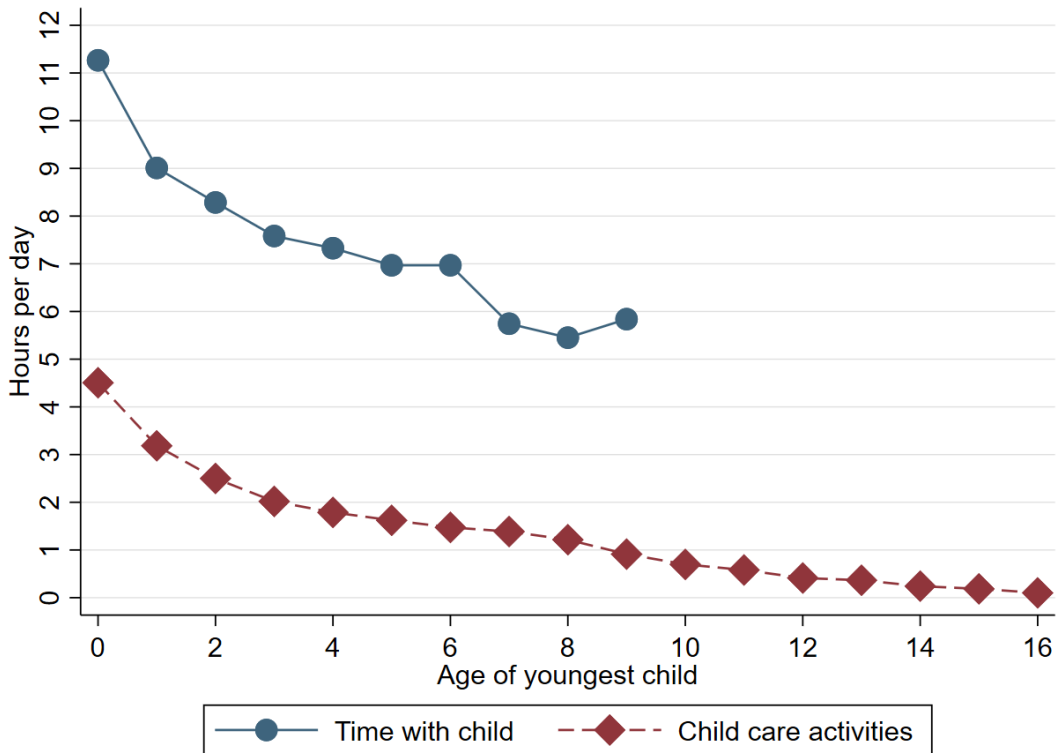
Notes: Figures shows the age distribution of children for which child development indicators (psychometric measures or school grades) and information on maternal life satisfaction are available. Source: SOEP v37

Figure A.2: SOEP questionnaires



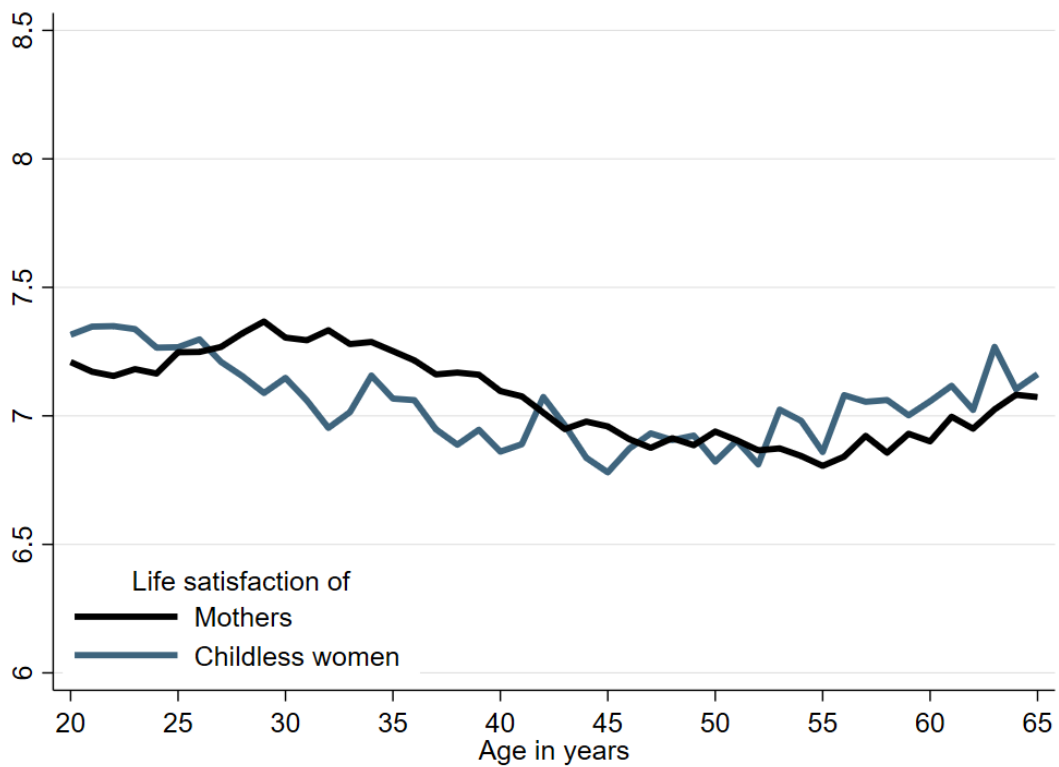
Notes: Figures shows the timing of SOEP questionnaires on child outcomes and life satisfaction. Source: Own illustration

Figure A.3: Time spent with child and on childcare activities of mothers by age of youngest child



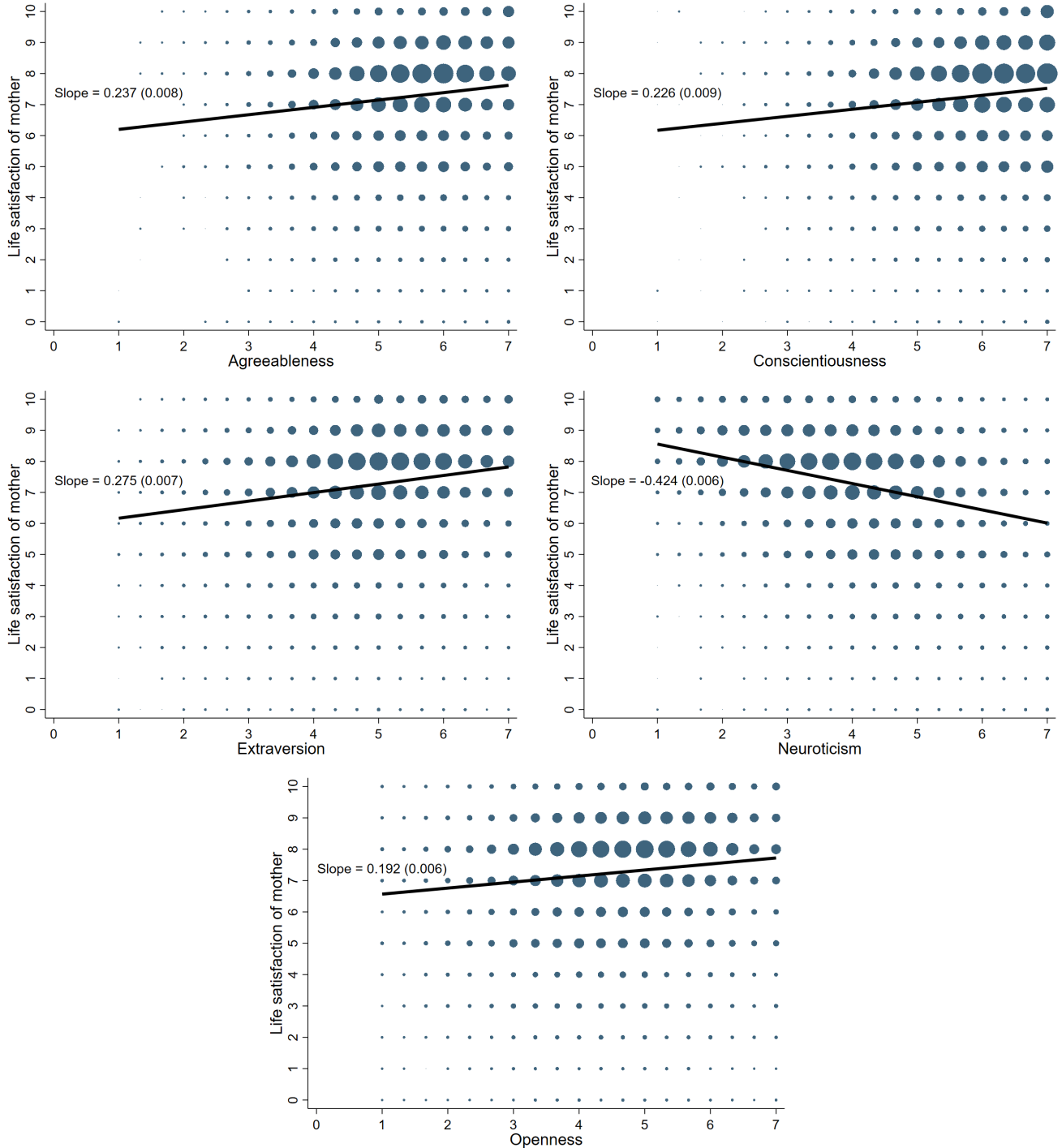
Notes: Information on time spent with a child is only available for children up the age of 10. Activities other than child care (e.g. housework or paid work) can be indicated while a child is present. Source: German Time-use Study 2012/13

Figure A.4: Life satisfaction—mothers and childless women



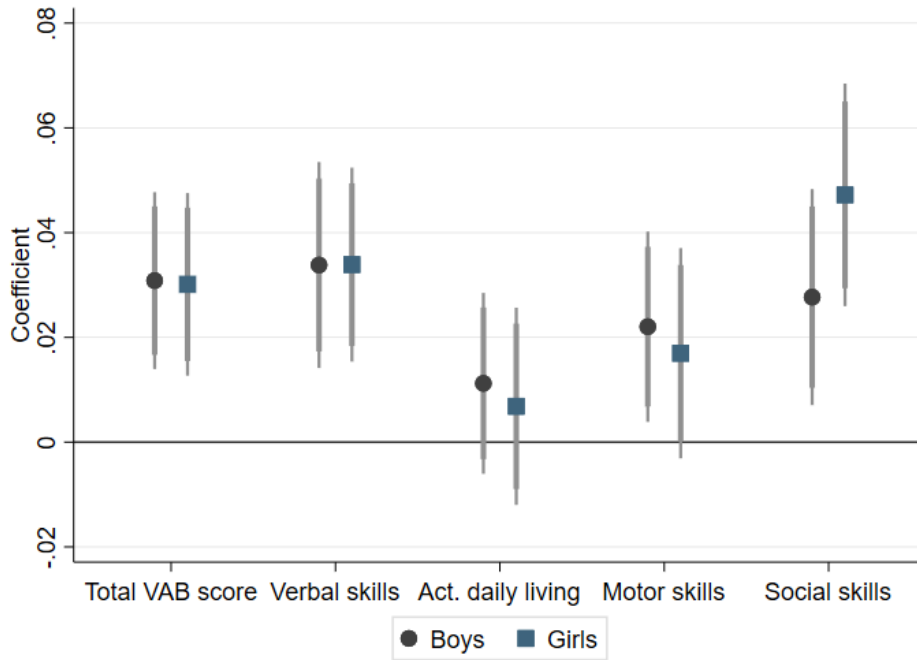
Notes: Life satisfaction is coded on a 0-10 Likert scale. “Mothers” indicate that women are having a child at some point observed in the data, and vice versa for “childless women”. Source: SOEP v37

Figure A.5: Maternal life satisfaction and Big 5 personality traits



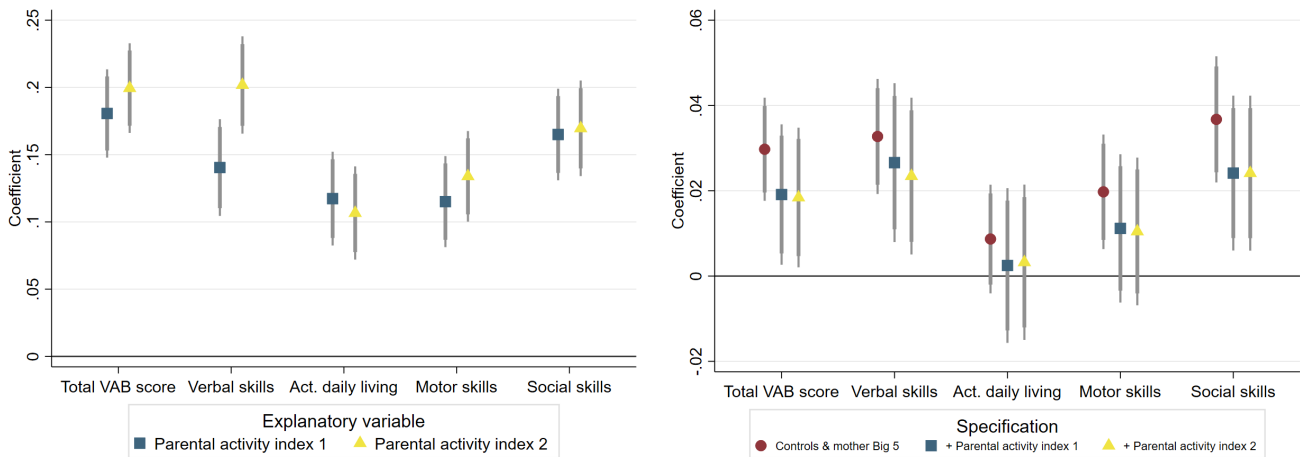
Notes: Figures show the correlation between maternal life satisfaction and her Big 5 personality traits. Scatters are weighted by the number of observations in each combination. The slope with standard errors in parentheses refer to the linearly fitted line. Source: SOEP v37

Figure A.6: VAB scores and maternal life satisfaction by child gender



Notes: Figure shows the association between VAB scores and maternal life satisfaction separately by child gender. Estimates are based on the full specification including control variables and maternal Big 5. See Figure 1 for other notes. Source: SOEP v37

Figure A.7: VAB scores and parental activities



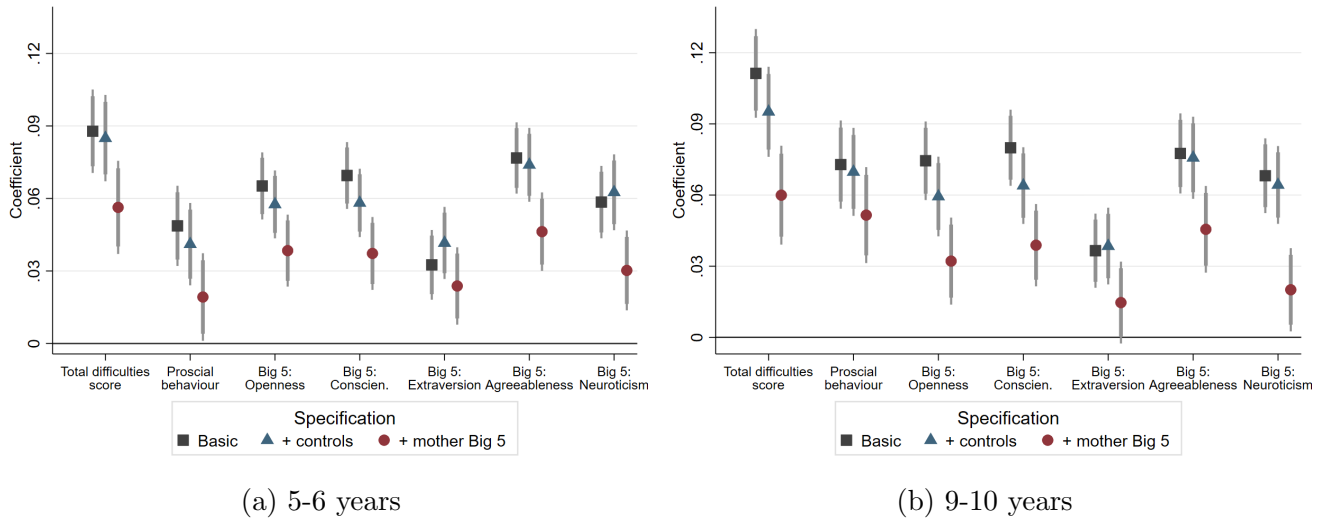
(a) Coefficients for parenting

(b) Controlling for parenting

Notes: Parenting index 1 is a composite index of the frequency of 13 parent-child activities. Parenting index 2 consists of singing to and with the child, handicraft work, reading stories, looking at picture books and playing games together. Panel (a) shows coefficients for the parenting indices, Panel (b) shows coefficients for maternal life satisfaction. Source: SOEP v37

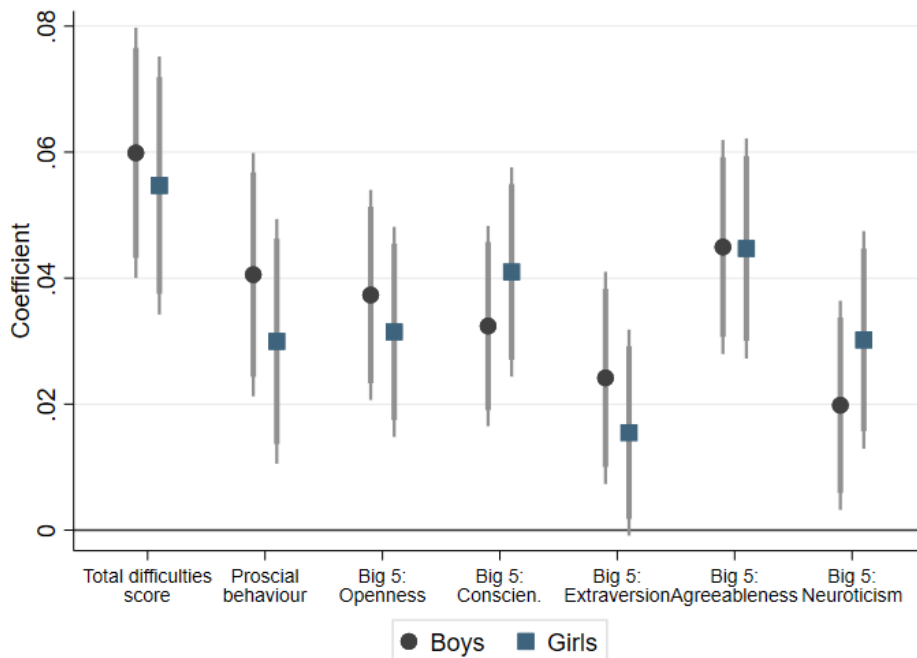


Figure A.8: SEB scores, child Big 5 and maternal life satisfaction by child age



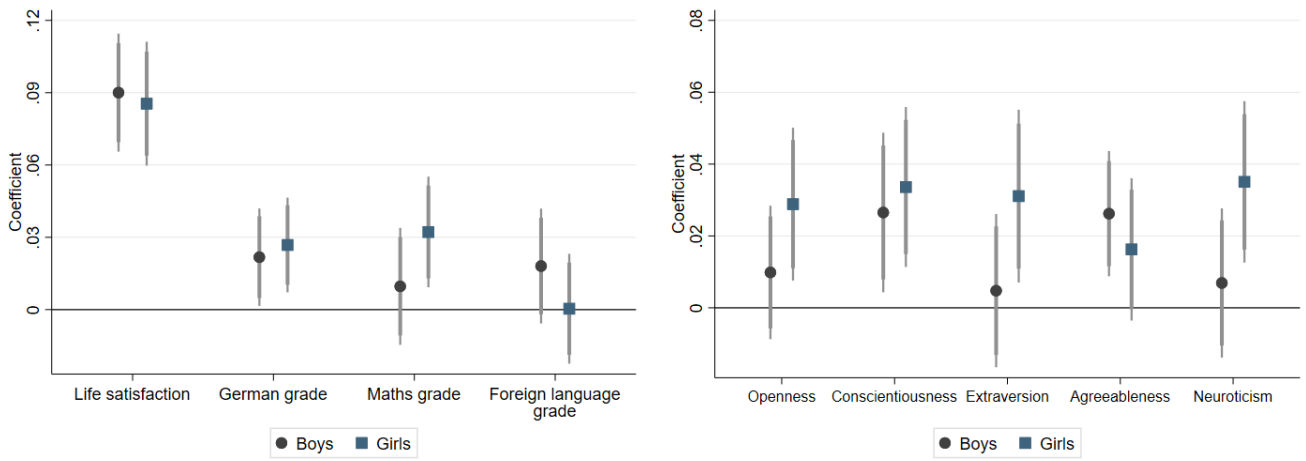
Notes: In Figure 2 the two child ages at which SEB scores and child Big 5 are measured are pooled. This figure shows estimates separately for the two age bins when the information is collected. Source: SOEP v37

Figure A.9: SEB scores, child Big 5 and maternal life satisfaction by child gender



Notes: Figure shows the association between SEB scores, child Big 5 and maternal life satisfaction separately by child gender. Estimates are based on the full specification including control variables and maternal Big 5. See Figure 1 for other notes. Source: SOEP v37

Figure A.10: Life satisfaction, school grades, Big 5



(a) Life satisfaction and grades

(b) Big 5

*Notes:* Figure shows the association between adolescents' life satisfaction, school grades and personality traits with maternal life satisfaction separately by child gender. Estimates are based on the full specification including control variables and maternal Big 5. See Figure 3 for other notes. Source: SOEP v37