

**Expansion of full-day childcare and subjective well-being of mothers: interdependencies  
with culture and resources**

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## **Abstract**

This study investigates whether an expansion of state-subsidized full-day childcare may improve the subjective well-being of mothers of children under school age by acting as a boundary-spanning resource to facilitate the combination of employment and childcare responsibilities. It extends previous studies which showed contradictory results by demonstrating that the relationship with parental subjective well-being may vary by local work-care culture and family resources. To this effect, we compare mothers in East and West Germany and mothers with and without a partner in the household, respectively. The empirical analysis links individual-level data from the Socio-Economic Panel for 2007 to 2012 and from the ‘Families in Germany’-Study for 2010 to 2012 with administrative records on day-care provision at the county level. We apply fixed-effects panel models to samples of 3,203 families with a youngest child under school age. Our results show that greater provision of full-day care is modestly positively associated with satisfaction with family life and with life overall among partnered mothers in East Germany but not in West Germany. The level of full-day care availability in a county and take-up of full-day childcare, however, moderate the relationship of maternal transitions to long part-time or full-time employment with satisfaction with family life in West Germany. In both East and West Germany, switching to full-day care for the youngest child is more positively associated with satisfaction with family life for lone mothers than for partnered mothers.

## **Introduction**

To support increasing aspirations and needs of mothers to pursue a career, maintain financial independence, or contribute to family income, many Western welfare states have introduced policies which facilitate combining formal employment with family care. Among them, state-subsidized day-care services for young children have been expanded massively. Several countries have been criticized for their subsidized provisions of relatively short hours of care, which make a combination with full-time or long part-time work hours difficult (Büchel & Spiess, 2002; Lewis, 2003). A significant gap between attendance rates and full-time equivalent attendance rates for under-three-year-olds can be noted in particular in Anglo-Saxon and German speaking countries, and in the Netherlands (OECD Family database, 2014). For children aged three years to school age, data from West Germany and the US suggest that the discrepancies in some countries can be even greater for this age group, with only 40 and 61 percent of enrolled children, respectively, attending full-day care in 2012 (National Center for Education Statistics, 2013; Statistisches Bundesamt, 2013).

Previous studies have assumed that day-care availability should promote parental well-being by providing greater choice between different combinations of formal employment and family care but empirical findings have been contradictory. In this paper, we investigate whether expanding hours of day-care provisions have improved German mothers' satisfaction by facilitating reconciliation of employment and family care. Germany provides an interesting case to study these relationships. Starting with two reforms in 2005 and 2008, the provision and use of day-care services - in terms of places as well as opening hours - for young children has expanded massively. We develop theoretical arguments and present empirical evidence that the effect on parental subjective well-being depends on local work-care cultures and family resources. We exploit variation in day-care provision at the county level between 2007

and 2012 and compare effects in different cultural contexts of East and West Germany and across family forms of partnered and lone mothers.

### **Previous studies**

A number of cross-sectional international comparisons examined whether greater day-care availability may offset negative associations of longer work hours with subjective well-being of parents, either by providing greater time flexibility or by altering social norms. Empirical findings have been contradictory. Treas et al. (2011) showed that full-time employed married women are less happy than those in part-time jobs or who are not employed, but this difference was smaller in countries with more extensive day-care provision. Some comparative studies also reported evidence that work hours- induced work-family conflict is smaller in countries with more widely available day-care (Stier, Lewin-Epstein, & Braun, 2012; Strandh & Nordenmark, 2006), whereas others found no indication of this (Chung, 2011; Steiber, 2009; Van der Lippe, Jager, & Kops, 2006). All of these studies, however, considered only day-care availability for under-threes and few of them relied on large enough country samples to include measures of day-care provision alongside other institutional and cultural controls. Therefore, they are unable to disentangle the influence of policy changes in day-care provision from longer-term cultural influences regarding work and care. Furthermore, they have all been based on cross-sections which limit the possibilities to consider unobserved factors possibly affecting day-care provision and parental work-family conflict perceptions.

A recent Australian longitudinal study found that higher regional availability of centre-based childcare correlated negatively with the perceived difficulty of obtaining a day-care place and of finding 'good quality' childcare, and positively with mothers' satisfaction with the amount of free time available (Yamauchi, 2010). This study, however, failed to control for other period influences. The most rigorous studies available consist of longitudinal evaluations of

the introduction of universal day-care subsidies in Quebec in 1997. Interestingly, they found adverse effects on life satisfaction, paternal self-reported health, maternal depression, work-family conflict, and relationship satisfaction (Baker, Gruber, & Milligan, 2008; Brodeur & Connolly, 2012). Among low income and highly educated parents, the reform had positive effects on parental life satisfaction, whereas the relationship was negative among middle income families (Brodeur & Connolly, 2012). These studies however have not investigated possible explanations for how day-care availability may improve parental well-being, and why results may vary across contexts and population groups.

In this study, we extend the literature by investigating the impact of expansions of full-day care services on maternal subjective well-being. We consider the intensity of provision and take-up rather than mere attendance. We describe several theoretical mechanisms which may explain heterogeneous associations. In particular, we examine the relevance of cultures of maternal employment and using day-care for young children as moderating factors by comparing the effects across East and West Germany. Furthermore, we investigate whether the importance of day-care availability for maternal well-being may depend on family resources, in particular the presence or absence of a partner. Adopting a life course perspective, we focus on parents with children under school age for whom work-family balance issues and recent reforms are directly relevant. By following and observing parents and their subjective well-being as day-care services expanded in East and West Germany over several years, we are able to overcome several methodological shortcomings of most previous studies.

## **Institutional and cultural context**

### *Early childhood policies*

Parental leave periods used to be long but relatively low-paid. Since 1992, each parent in Germany has been entitled to take job-protected leave for the first three years of the child's

life. For up to 24 months, parents could receive a means-tested childrearing benefit of up to €300 per month. However, recent reforms in Germany indicate a paradigm shift in family policies which aimed at improving work-family balance, speeding up maternal labor market return, and increasing paternal childcare involvement. In 2007, the German government introduced an income-related parental leave benefit of twelve months and an individual ‘use-it-or-lose-it’ entitlement of two months of leave benefit for each parent (Deutscher Bundestag, 2008a). Depending on previous income, the compensation rate varies between 65 and 100 percent and is capped at €1800. Since a reform in 2008, in principle all parents, also single parents, can be expected to be employed or looking for work once the youngest child turned three years (OECD, 2011).

Since 1996, all children aged three years to school age have been entitled to a half-day slot in day-care, whereas availability for children under three years has been traditionally very low, especially in West Germany (Spiess 2008). Day-care services are understood to include all forms of state-subsidized and regulated forms of group care for children under school age, including mostly day-care centres and to a lesser extent family day-care. From age three, over 93 and 96 % of children attended day-care in West and East Germany, respectively, in 2012 (Statistisches Bundesamt, 2012). Day-care provision for children under three has been expanded since two federal laws in 2005 and 2008 provided extra funding, granted prioritized access for children with parents in employment or education, and stipulated a legal right to a day-care place for all children aged one year or over from August 2013. The attendance rates for children under three years subsequently increased from 8 to 24 percent in West Germany and from 40 to 50 percent in East Germany between 2006 and 2012 (Statistisches Bundesamt, 2012). Some federal states and municipalities stipulated that certain groups, such as lone parents, should be granted prioritised access (Spiess, Berger, & Groh-Samberg, 2008).

The ‘Kinderförderungsgesetz’ in 2008 (Deutscher Bundestag, 2008b) mentioned that parental hours of employment or education, commuting times, labor market integration programmes and other social reasons related to child or family welfare are to be taken into account in determining the hours of need for children under the age of three. This law also stipulated that youth welfare office districts should aim at providing a need-oriented supply of full-day places in day-care institutions for all children from the age of three. Between 2008 and 2013, the percentages of children who were granted a full-day care slot, defined as more than seven hours per weekday, rose continuously for children under and over three years and in East and West Germany. The increases were strongest, from 20 to 32 percent, for children aged three years to school age in West Germany, followed closely by rises of just under 10 percentage points among both age groups in East Germany<sup>1</sup> (see Figure 1). These averages mask great regional variation. For both age groups, the rate of full-day care rose by over 20 percent in many counties of Rhineland-Palatine and Hesse. By contrast, very low expansion rates of below 10 percent were observed in Thuringia and in parts of Lower-Saxony and Bavaria (AKJstat, 2014, Maps 18 and 24). Reasons for the extension of hours of care probably included demand exceeding actual availability of full-day care slots for children over three in West Germany (Lotte, 2010), increased attention to parental desires for time flexibility, and to the importance of continuity and stability of care for children’s welfare (Fuchs-Rechlin, 2011).

In Germany, most day-care services are provided by the non-profit sector or by municipalities (Spiess, 2008). Parents’ fees are largely income-dependent and relatively low compared to most other OECD countries (Immervoll & Barber, 2005). On average, parental fees range between €61 and €161 per child and month depending on the child’s age and hours of attendance (Müller et al., 2013). Some German states provide free day-care services for

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<sup>1</sup> Similar trends can be observed based on survey data from the Socio-Economic Panel.

children from households with very low income and for all children from a certain age. Due to the low fee levels, costs have been found to be less influential for maternal work-care choices than the restricted availability of day-care (Wrohlich, 2011).

### *Work-care cultures*

Before the German reunification in 1990, West German family, tax and labor market policies favored male breadwinner/female carer families. By contrast, policies in the German Democratic Republic encouraged a fast and full-time return to the labor market for mothers by providing shorter maternity leave and widely available state-subsidized day-care for young children ( Rosenfeld, Trappe, & Gornick, 2004). These historical differences are still reflected in more conservative attitudes of parents towards maternal employment and using formal day-care for young children in West Germany compared to East Germany. In 2012, almost half of women in West Germany considered family members rather than state or employer institutions as providing the best care for children under school age compared to just under one fifth of women in East Germany (Schober & Stahl, 2014). Over the past two decades, taking relatively long maternal leave followed by part-time return to the labor market has become the predominant arrangement in both parts of Germany. Mothers in East Germany, however, continue to return to their jobs faster and to work longer hours (Keller & Haustein, 2012). We exploit these cultural variations across regions within Germany to investigate whether they moderate the relationship between increasing full-day care availability and subjective well-being of mothers.

### **Theoretical framework**

We draw on the demands and resources approach toward perceived work-family balance (e.g., Voydanoff 2005), work-care culture perspectives (Kremer, 2007), and on social production function theory (Ormel, Lindenberg, Steverink, & Verbrugge, 1999) to consider how the



expansion of full-day childcare may impact parental subjective well-being. We conceptualize subjective well-being broadly as including domain satisfaction and a global judgement of life satisfaction. Of the two domains work and family, which are expected to be most closely related to work-family reconciliation issues, in our data we can capture only changes over time in satisfaction with family life. Following the demands and resources approach toward perceived work-family balance (Voydanoff 2005), state-subsidized day-care services can be understood as boundary-spanning resources, which may be used to meet structural or psychological demands in the work or family domain. According to social production function theory (Ormel et al., 1999), individual behavior is determined by the two ultimate goals to maximise one's physical and social well-being. The achievement of these goals relies on progress in a set of intermediate domains including comfort, stimulation, social status, behavioral confirmation, and affection.

The expansion of full-day care availability as a boundary-spanning resource may be expected to improve parental subjective well-being through several mechanisms:

Firstly, by improving the fit between current (or preferred future) work demands and family resources, the expansion of full-day care reduces work-family conflict and improves the ability to achieve well-being-related goals: To improve social well-being, social status can be derived primarily from employment including future career prospects, whereas affection is an important resource frequently gained from family life. Physical well-being relies on both the comfort derived from an intact family life as well as stimulation from employment. The greater availability and take-up of additional day-care resources is assumed to generally increase flexibility of day-care use and to facilitate the reconciliation with existing work demands, especially for mothers who work long part-time or full-time. It may also facilitate congruence of behavior with short-term preferences or longer-term goals by enabling

mothers, who wish to do so, to extend their work hours now or make them anticipate this future possibility.

Secondly, the expansion aimed at granting easier access to full-day care for groups with particular need, such as lone parents. Especially this group may use day-care to reduce their own childcare time in favor of leisure activities which benefit physical and social well-being. We would therefore expect a positive association with subjective well-being, irrespective of employment status.

Thirdly, through behavioral confirmation, comparisons with other mothers who adjust their employment and day-care take-up upwards may either increase mothers' satisfaction as the desirable state of (future) full-time employment/day-care take-up appears more feasible, or reduce it if these changes are at odds with individual preferences.

By influencing the desirability of full-time employment and of acceptance of full-day care, local work-care cultures (Kremer, 2007) are likely to moderate the relationship between availability and use of full-day care and parental subjective well-being. In West Germany where until recently the ideal of maternal care for young children has been a dominant social norm, we expect that greater availability and use of state-subsidized full-day care may increase satisfaction mainly for mothers who are full-time employed. By contrast, in a cultural context like East Germany, where long part-time or full-time work hours and using full-day care for young children are widely accepted, we might expect more generally positive effects of the day-care expansion on subjective well-being of partnered mothers. This may vary less strongly by employment status, as also non-employed mothers and those working short part-time hours may plan future full-time employment. Alternatively, one may expect greater increases in satisfaction as day-care availability expands in West Germany, where the level of provision has been much lower and excess demand has probably been greater than in East Germany.

*Hypothesis 1a:* Greater availability and use of full-day care services is positively related to changes in subjective well-being only for full-time employed mothers in West Germany, whereas the relationship is positive for all mothers in East Germany.

Hypothesis 1b: Greater availability and use of full-day care services is more positively related to subjective well-being in West than East Germany.

Furthermore, we expect that the absence or presence of a partner as an important resource in the family domain moderates the relationship between day-care availability and parental satisfaction. Extended day-care support may be particularly important for lone mothers to facilitate reconciliation with existing work demands but also to reduce the burden of childcare responsibilities irrespective of work demands. Lone parents have received special attention in recent day-care legislations and their eligibility for day-care support has been less closely linked to their employment than for partnered mothers.

*Hypothesis 2:* In both parts of Germany the greater availability and use of full-day care is more positively related to changes in satisfaction of lone mothers compared to mothers with partners in the household.

## **Data and method**

We draw on the German Socio-economic Panel Study (SOEP), a longitudinal dataset representative of German households (Wagner, Frick, & Schupp, 2007), and an extension study called ‘Families in Germany’ (FiD). The latter dataset provides panel information on large birth cohorts of very young children and is representative of the population of German families with children born between January 2007 and March 2010 (Schröder, Siegers, & Spiess, 2013). In addition, the FiD oversample of parents with particular needs is used for the analyses of single mothers. We match the individual level data of the SOEP waves 2007 to

2012 and of the FiD waves 2010 to 2012 with annual youth welfare office statistics on day-care provision at the county level.

In our multivariate analyses, we apply fixed-effects panel models<sup>2</sup> to control for any unobserved time-invariant characteristics (Allison, 2009). Probable candidates of such characteristics are for instance personal work and family orientations, gender role identities, occupational and industry characteristics, as well as individual-specific response tendencies with respect to subjective well-being. To explore heterogeneity between groups varying in family resources and cultures, we run separate models for mothers who are resident in East versus West Germany and by partnership status, respectively.

We restrict our sample to mothers living with at least one child under school age (mostly age six in Germany) and use an unbalanced panel of mothers observed at least twice between 2007 and 2012. For 3 and 11 percent of mothers, respectively, some items were missing for their own and their partners' characteristics. The final samples consist of 2,612 mothers in couples and 591 single mothers.

### **Operationalization of the dependent and independent variables**

Our dependent variables capture satisfaction with family life and life overall. The wording for the domain satisfaction questions has been 'how satisfied are you today with the following areas of your life?' with one aspect being 'family life'. Furthermore, respondents were asked 'how satisfied are you with your life, all things considered?'. The answers to both questions have been measured on an 11-point Likert scale ranging from 'completely dissatisfied' to 'completely satisfied'. The variables are treated as continuous and their correlation is strongly positive ( $r=.49$ ).

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<sup>2</sup> A Hausman test comparing random and fixed effects models was conducted and rejected the null hypothesis of no systematic difference, therefore favoring the fixed-effects estimator.

A central independent variable is the rate of full-day attendance, which measures in March of any given year the percentage of children in a county who were granted a place in a day-care institution for over seven hours per weekday. We also tested the overall rate of day-care attendance in a county. Both variables are linked to mothers through identifiers of the county the family lived in each respective year. Given that discrete rates are available for children under three and children between three and five years of age, we assign rates to mothers in accordance with the age of their youngest child, while controlling for the child's age in year dummies across all models.

Another key explanatory variable is mothers' employment status. We distinguish five categories: Non-working, part-time work, and full-time work, unemployed, and in education. Full-time employment is defined as working more than 30 hours a week and therefore captures also maternal transitions into relatively long part-time hours.

To investigate the relationship with actual use of day-care, we consider a categorical measure distinguishing between three categories: no use of day-care, half-day use, and more than half-day use. Notably, based on the phrasing of the questions which varied over time, half-day care is understood as only morning or afternoon care or less than five hours per day. Hence, this measure does not mirror exactly the measure of full-day care at the county level.

Separate analyses are conducted for mothers living in East and West Germany and with different relationship status. Relationship status distinguishes between i) married mothers, ii) unmarried mothers who cohabit with their partner, and iii) single women living without a partner. The former two categories are combined to represent partnered mothers.

We consider a number of other variables as potential mediators or to control for other potential confounding factors. Care by relatives is a binary variable signifying if any other relative provides care for the youngest child on a regular basis. Fathers' self-reported

childcare and housework hours on a typical weekday represent proxies of informal support available to the mother on a daily basis. We also control for partners' labor force status using the same categories as for maternal employment. We consider the logarithm of the inflation-adjusted equivalized net household income after taxes and transfers to capture access to economic resources including changes as a result of employment transitions. To reduce the likelihood of reverse causation of changes in well-being leading to changes in labor force status, we control for mothers' self-reported health status. We also consider the age of the youngest child in year dummies and the number of children in the household. Period effects are incorporated in all models using year dummies.

To control for labor market conditions, economic prosperity and public finances, we consider variations in county-level unemployment rates and public expenditure per capita. A dummy is included for changes in the county-level indicators of day-care and economic context due to shifts in county borders which occurred in some counties of four federal states. In the regression models all continuous control variables are mean-centered. We also control for moves across counties. Table 1 displays descriptive statistics for the dependent and independent variables.

[Table 1]

### **Analytical strategy**

We first estimate baseline models of maternal subjective well-being ( $swb_{it}$ ) including only the main effect of the regional rate of full-day care use ( $c_{ct}$ ) and control variables at the individual ( $x_{it}$ ) and county level ( $z_{ct}$ ).  $u_i$  denotes the entity-specific intercepts, and  $\varepsilon_{it}$  is the error term (see equation 1).

$$swb_{it} = \beta_{1t} + \beta_2 c_{ct} + \beta_3 x_{it} + \beta_4 z_{ct} + u_i + \varepsilon_{it} \quad [\text{eq.1}]$$

The next two estimation steps involve adding potential mediating variables, such as maternal employment and day-care take-up to the model. In a fourth step, we include an interaction effect between maternal employment status and the regional day-care availability. We furthermore examine whether the mother's actual use of day-care for the youngest child reduces any negative effect of maternal full-time employment as one possible mechanism by interacting maternal employment status with take-up of day-care.

By using fixed effects panel models, we analyze how changes in the day-care context and in work-care arrangements are associated with changes in subjective well-being within the same individuals over time. Therefore, only individuals who experience changes in any of the respective variables are considered in the estimation. Noteworthy, in the estimation of interaction terms, all individuals with variation in either of the two interacted variables are considered. Hence, several interpretations are possible, for instance, for maternal employment interacted with full-day care availability: 1) a change in maternal employment status is differently associated with subjective well-being depending on the (possibly stable) regional level of full-day care provision, or 2) expansions in day-care availability over time may correlate differently with changes in satisfaction among mothers with different (but possibly stable) employment status during the observation period. To clarify the interpretations of the interaction terms, we firstly tested an interaction of maternal employment with a time-invariant within-person mean of full-day care availability over all periods, and secondly estimated models separately for employment subgroups of mothers who did not change employment status. Significant associations in the latter models would provide evidence in support of a direct effect of the day-care expansion on changes in satisfaction. A significant interaction effect with the time-constant average level of day-care availability observed for each person during the observation period may point to unobserved context variation which

correlates with day-care availability playing a role, such as social acceptance of maternal employment.

Compared to the baseline models shown in Table A1 in the Appendix, the associations with the county full-day care rates hardly changed after including further potential mediators such as maternal employment status and childcare arrangements. Therefore, fixed-effects panel models including these variables are shown in Tables 2 and 3. Only for satisfaction with family life among partnered mothers in West Germany, two additional modelling steps pointed to significant interaction effects and are therefore also shown. Due to the small samples of lone mother and limited numbers of employment transitions observed, interaction effects cannot be reliably tested for lone mothers and are therefore omitted.

## **Results**

### *Partnered mothers*

For West German mothers in couples, the county rate of full-day care use is not significantly associated with satisfaction with family life in Model 1. However, an interaction term with maternal employment status in Model 2 is significant. Further tests with county means of the full-day attendance rate over the observation period show a very similar interaction effect. The results indicate that transitioning into (or out of) long part-time or full-time employment is associated with reductions (increases) in maternal satisfaction with family life in counties with limited take-up levels of full-day care below 20 percent, whereas the change is not significantly different from zero otherwise. In the former counties the strength of this association equals a quarter of a standard deviation. For illustration purposes, Figure 2 plots predicted values of maternal satisfaction as a function of employment status and regional full-day use of day-care. In separate models for the subgroups of (full-time) employed mothers, satisfaction with family life does not correlate with increased availability of full-day care



suggesting that the expansion may not have affected satisfaction directly. We also find a significant interaction effect of maternal employment status with individual use of day-care in Model 3 (see Figure 3). Using full-day care partly compensates for an otherwise negative association of full-time employment with maternal satisfaction with family life. However, the difference between full-day and half-day care is not statistically significant. This provides some evidence that greater full-day care availability may benefit full-time working mothers by increasing their probability of using this form of care. By contrast, for non-employed or part-time working mothers, switching to half-day or full-day care (or stopping the take-up) is associated with negative (positive) changes in satisfaction with family life, respectively. The strengths of the associations equal about 9 and 17 percent of a standard deviation, respectively. This may be due to increased (reduced) anxiety about the quality of care. However, the direction of this relationship could also be reverse, as less satisfied mothers may be more likely to start using day-care. Overall, these findings indicate that, if anything, full-day care services may act as a boundary-spanning resource only for full-time employed mothers. The significant regional variation in the association of a transition to full-time work with satisfaction with family life may be due to other differences in local contexts, such as social norms and ideals around maternal employment and childcare, which are likely to correlate with levels of availability of full-day care across West German counties.

Neither increased availability of full-day care at the county level, nor maternal employment transitions, nor changes in day-care use correlate significantly with life satisfaction of West German mothers in couples.

[Table 2 and Figures 2 and 3 about here]

By contrast, we observe a very different relationship between day-care availability, maternal employment and satisfaction with family life and with life overall in East Germany (last two columns of Table 2). An increase in the county full-day care rate is positively associated with

maternal satisfaction with family life and with life overall across all employment groups (significant at 10-percent level). The strength of these associations is modest. A 10-percentage point increase in full-day care provision is associated with an increase in satisfaction of around 8 percent of a standard deviation. Transitioning from non-employment into (out of) part-time employment is positively (negatively) associated with changes in satisfaction with family life, whereas a return to (exit from) full-time employment appears to raise (reduce) satisfaction with life overall for mothers in East Germany. The strengths of the associations are moderate with 17 and 31 percent of a standard deviation, respectively. Additional modelling steps including interaction effects and separate models by employment status showed that the increases in subjective well-being following rising full-day care rates were not greater among full-time employed mothers compared to other groups.

Surprisingly, the categorical variable of day-care use and further tests with interactions of maternal employment and day-care use were not statistically significant. One reason may be that our categorical measure of day-care use is inadequate to capture any changes which mainly involve greater flexibility or which occur at more than five hours of care per day, the norm in East Germany. Alternatively, the positive association with the county day-care rate may reflect maternal observations of their social networks and perceptions of greater choice now and in the future rather than actual take-up. We also cannot exclude an influence of all-day school reforms for school-aged children during the same observation period.

Overall, these results provide some support for differences in work-care cultures between East and West Germany moderating the effects of the expansion of full-day care on maternal satisfaction as expected in Hypothesis 1a but not 1b. Additional joint models for the whole sample of partnered mothers with three-way interaction terms between East Germany, county full-day care rate and maternal employment confirm significant differences between East and West Germany in the associations of full-time employment with satisfaction and in the county

rate of full-day care for all but full-time employed mothers. East-West differences in day-care use were not statistically significant. This may be partly due to more dissatisfied mothers in both regions increasing their use of day-care.

### *Single mothers*

We now turn to lone mothers and examine whether the relationship between greater availability and use of full-day care is more positive among single than partnered mothers, as assumed in Hypothesis 2. Looking at the results in Table 3, we find no significant associations of the county full-day care rates with satisfaction of lone mothers in either East or West Germany, although the coefficients are of similar magnitude as for partnered mothers. This is likely to be due to the smaller sample size.

For lone mothers in East Germany, a strong positive (negative) association (just under half of standard deviation) of switching to (exiting from) full-day care with satisfaction with family life may be interpreted as some support for Hypothesis 1a assuming a positive effect in East Germany. For West German lone mothers the coefficient is also positive but smaller and does not reach statistical significance. However, additional tests for statistically significant differences between partnered and lone mothers confirm that changes in take-up of more than half-day care are significantly more strongly associated with changes in satisfaction with family life of lone mothers than of partnered mothers in both parts of the country. Since most of these changes actually represent increases in day-care use among non-employed single mothers, these results suggest that lone mothers may mainly use day-care to alleviate pressures in the family sphere rather than to meet work demands.

Increased availability or use of full-day care is not significantly related to lone mothers' life satisfaction. We thus find support for significant differences by partnership status in East and West Germany in line with Hypothesis 2 only with respect to satisfaction with family life.

[Table 3 about here]

The control variables show the expected relationships with maternal satisfaction. Improvements in health status, getting married, increased paternal childcare or housework, and transitions to education are positively associated with changes in satisfaction of partnered mothers in one or both domains, whereas partners' unemployment and more children in the household reduce satisfaction with life and with family life, respectively. From birth, satisfaction with both domains decreases until the youngest child is about three years old (coefficients not shown). For lone mothers, health and, only in East Germany, unemployment and household income are significant predictors of satisfaction. Altered public expenditures per capita correlate with changes in satisfaction with family life for single and partnered mothers in West Germany.

#### *Sensitivity analyses*

We carried out a number of sensitivity analyses (results available from the authors). We tested all models including interaction effects with the county day-care rate for under-three-year-olds which was not found to be significant. In addition to interactions with day-care provision, we also tested interactions of maternal employment or day-care use with proximity of grandparents or regular childcare support from informal carers. We also examined three-way interactions of maternal employment, the youngest child's age, and the county rate of full-day care or day-care use, respectively. We found very few statistically different relationships in the effects of day-care provision or take-up on maternal satisfaction between mothers with a child under and over three years of age. In alternative specifications, we excluded families who moved across counties and calculated robust standard errors clustered at the county level. Additional tests showed no differential effects between married and cohabiting mothers and no significant associations with satisfaction with health. Finally, we examined these

relationships also for male partners in couples, which showed similar patterns to mothers but no significant associations.

## **Discussion**

This study set out to explore whether greater availability and use of full-day care as a boundary-spanning resource may impact the subjective well-being of mothers with young children positively by making it easier to meet work or family demands. Our analyses point to heterogeneous effects of availability of full-day care across groups varying in both internalized cultures and access to family resources, which fits with the varied results found in previous studies. In West Germany, we do not find that the expansion of full-day care availability had any effect on maternal satisfaction in the short run. Yet our results point to regional variations within West Germany insofar as taking-up long part-time or full-time employment is negatively associated with satisfaction with family life only in counties with low levels of full-day care use. The latter relationship is similar to the moderating effects identified in a cross-national study of married women by Treas et al. (2011). They however find day-care provision for under-three-year-olds in general to have a moderating effect of full-time employment, whereas we find this in West Germany only for the rate of full-day care use.

East German mothers differ from West German mothers in important ways, which can only be interpreted meaningfully by drawing on work-care culture. Growing prevalence of full-day care has been modestly positively associated with satisfaction with family life and with life overall among partnered mothers in East Germany, irrespective of employment status. Notably, maternal returns to (exits from) long part-time or full-time employment are more positively (negatively) associated with changes in subjective well-being for East German mothers in couples compared to their West German counterparts.

We found some support for partner resources being important moderators of the effect of day-care use on maternal satisfaction with family life in East and West Germany. For lone mothers, taking up (exiting) full-day care appears to relieve (exacerbate) pressures in the family domain more strongly than for partnered mothers.

By using fixed-effects panel models and including a rich set of control variables as well as conducting several sensitivity analyses, we have tried to isolate the observed relationships and describe potential mechanisms. Yet, we cannot control for time-variant unobserved factors, such as the expansion of after-school care, or attitudinal changes which may go along with mothers switching work-care arrangements. Despite these shortcomings, one of the contributions of this study has been to draw attention to the difference between prevalence of any day-care attendance versus full-day attendance. By comparing the different cultural contexts of East and West Germany and mothers with different levels of resources in terms of support from a partner, we also provide a more differentiated analysis of maternal employment transitions and interdependence with contextual day-care support and actual take-up for maternal subjective well-being than previous studies.

As this is one of the first studies considering specifically intensity of care in addition to day-care enrollment rates, future studies for other countries are needed to see to what extent the findings are transferable to other contexts. Ideally, future longitudinal studies should draw on more detailed measures of childcare arrangements, including quality aspects, on direct measures of work-care ideals, and explore relationships with more proximal measures of work-family conflict and other well-being outcomes related to affect and health. Finally, before any policy conclusions can be drawn from this study with respect to further expansions of day-care services in Germany, the consequences of longer hours of care for child development need to be thoroughly assessed, given recent debates about dissatisfying levels of quality in the majority of German day-care centers.

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Table 1: Descriptive statistics of dependent and independent variables by mothers' partnership status (pooled 2007 to 2012)

	<b>Partnered mothers</b>		<b>Lone mothers</b>	
	<u>Mean</u>	<u>Std. Dev.</u>	<u>Mean</u>	<u>Std. Dev.</u>
Satisfaction with family life	8.41	1.59	7.23	2.38
Satisfaction with life overall	7.67	1.49	6.61	1.86
County full-day care rate	20.93	20.61	31.20	23.33
County day-care rate for under 3s	24.01	14.07	29.99	16.23
Not working	0.42	0.49	0.25	0.44
Part-time work (PTW)	0.40	0.49	0.35	0.48
Full-time work (FTW)	0.12	0.33	0.15	0.35
Mother in education	0.01	0.11	0.02	0.14
Mother unemployed	0.04	0.21	0.23	0.42
Not attending day-care	0.51	0.50	0.31	0.46
Day-care half-day (HDC)	0.21	0.41	0.20	0.40
Day-care full-day (FDC)	0.28	0.45	0.49	0.50
Childcare support by relatives	0.27	0.45	0.36	0.48
Housework hours of father	0.81	0.93		
Childcare hours father	2.48	2.44		
Ln equiv. net household income	7.22	0.44	6.82	0.38
Father not working	0.03	0.18		
Father part-time	0.05	0.23		
Father full-time	0.86	0.35		
Father unemployed	0.05	0.22		
Father in education	0.01	0.07		
Mother poor health	2.26	0.84	2.56	0.98
Cohabiting	0.17	0.37		
Youngest child age 0	0.19	0.39	0.08	0.27
Youngest child age 1	0.22	0.42	0.14	0.35
Youngest child age 2	0.22	0.41	0.18	0.38
Youngest child age 3	0.16	0.36	0.19	0.39
Youngest child age 4	0.11	0.32	0.18	0.38
Youngest child age 5	0.07	0.26	0.15	0.36
Youngest child age 6	0.03	0.18	0.08	0.27
Number of children in household	1.90	0.92	1.79	0.97
Regional unemployment rate	9.22	4.34	10.69	4.66
Municipality expenditure per capita	272.88	279.19	245.16	284.04
Moved between counties	0.01	0.09	0.01	0.09
County border reform	0.02	0.13	0.02	0.14
Year 2007	0.09	0.28	0.05	0.23
Year 2008	0.10	0.29	0.07	0.26

Year 2009	0.10	0.30	0.07	0.25
Year 2010	0.25	0.44	0.25	0.43
Year 2011	0.25	0.43	0.31	0.46
Year 2012	0.21	0.41	0.25	0.43
Observations	7702		1566	
Number of mothers	2,612		591	

Source: Socio-economic Panel Study 2007-2012 (SOEP v29), Families in Germany 2010-2012 (FiD v3.1).

Table 2: Fixed-effects models of satisfaction with different domains for mothers in couples with a child below school age

Satisfaction with..	West Germany				East Germany	
	.. family life- M1	.. family life- M2	.. family life- M3	.life overall - M1	.. family life - M1	.life overall- M1
County full-day care rate	0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	0.01+ (0.01)	0.01+ (0.01)
Part-time work (PTW)	-0.04 (0.06)	-0.09 (0.06)	-0.03 (0.07)	-0.02 (0.05)	0.26+ (0.16)	0.15 (0.14)
Full-time work (FTW)	-0.19 (0.12)	-0.43* (0.13)	-0.45** (0.17)	-0.15 (0.10)	0.21 (0.21)	0.48** (0.15)
PTW*county full-day care rate		0.00 (0.00)				
FTW*county full-day care rate		0.01* (0.01)				
Day-care half-day (HDC)	-0.11+ (0.06)		-0.14 (0.09)	-0.09 (0.06)	0.01 (0.17)	0.11 (0.16)
Day-care full-day (FDC)	-0.21** (0.07)		-0.26* (0.11)	-0.03 (0.07)	-0.04 (0.14)	-0.16 (0.11)
PTW*HDC			0.02 (0.10)			
PTW*FDC			0.02 (0.13)			
FTW*HDC			0.32 (0.23)			
FTW*FDC			0.42* (0.22)			
Mother in education	0.42* (0.20)	0.42* (0.20)	0.45* (0.20)	0.07 (0.17)	0.18 (0.24)	0.58** (0.22)
Mother unemployed	-0.05 (0.13)	-0.05 (0.13)	-0.03 (0.13)	-0.23 (0.15)	0.07 (0.19)	-0.15 (0.19)
Childcare support by relatives	-0.09 (0.05)	-0.08 (0.05)	-0.09 (0.05)	-0.00 (0.05)	0.04 (0.11)	0.05 (0.10)
Housework hours of father	-0.01 (0.03)	-0.02 (0.03)	-0.01 (0.03)	0.02 (0.03)	0.10+ (0.05)	0.08+ (0.05)
Childcare hours father	0.02 (0.01)	0.02+ (0.01)	0.02+ (0.01)	0.03* (0.01)	0.02 (0.03)	0.01 (0.02)
Ln equiv. net household income	0.07 (0.13)	0.05 (0.13)	0.07 (0.13)	0.12 (0.11)	-0.21 (0.19)	0.32+ (0.18)
Father part-time	-0.07 (0.20)	-0.06 (0.20)	-0.08 (0.20)	-0.10 (0.16)	0.41 (0.33)	-0.17 (0.26)
Father full-time	-0.03 (0.16)	-0.03 (0.16)	-0.05 (0.16)	0.16 (0.13)	0.20 (0.28)	-0.18 (0.24)
Father unemployed	-0.15 (0.19)	-0.16 (0.19)	-0.17 (0.19)	-0.38** (0.15)	0.40 (0.28)	-0.52+ (0.30)
Father in education	-0.03 (0.24)	0.00 (0.23)	-0.07 (0.24)	0.27 (0.42)	0.57+ (0.33)	-0.22 (0.46)
Mother poor health	-0.15*** (0.03)	-0.15*** (0.03)	-0.15*** (0.03)	-0.30*** (0.03)	-0.14* (0.06)	-0.30*** (0.05)
Cohabiting	-0.26+ (0.14)	-0.26+ (0.14)	-0.26+ (0.14)	-0.36* (0.15)	-0.35+ (0.21)	-0.11 (0.15)
Constant	8.58*** (0.19)	8.60*** (0.19)	8.60*** (0.19)	7.79*** (0.17)	7.99*** (0.36)	7.30*** (0.30)
Observations	5,900	5,900	5,900	5,900	1,802	1,802
Number of mothers	2,022	2,022	2,022	2,022	590	590
R <sup>2</sup> within/betw./overall	.03/.02/.02	.03/.02/.02	.03/.02/.02	.06/.16/.12	.06/.03/.03	.08/.19/.16

Note: Robust standard errors in parentheses. All models include the following additional control variables: dummies for the age of the youngest child, number of children in household, county unemployment rate, municipality expenditure per capita, move to different county, county border reform, and year dummies.  
\*\*\* p<0.001, \*\* p<0.01, \* p<0.05, + p<0.1

Source: SOEP 2007-2012 and FiD 2010-2012 linked with regional youth welfare office statistics.

Table 3: Fixed-effects models of satisfaction with family life and with life overall of lone mothers with a child under school age in West and East Germany

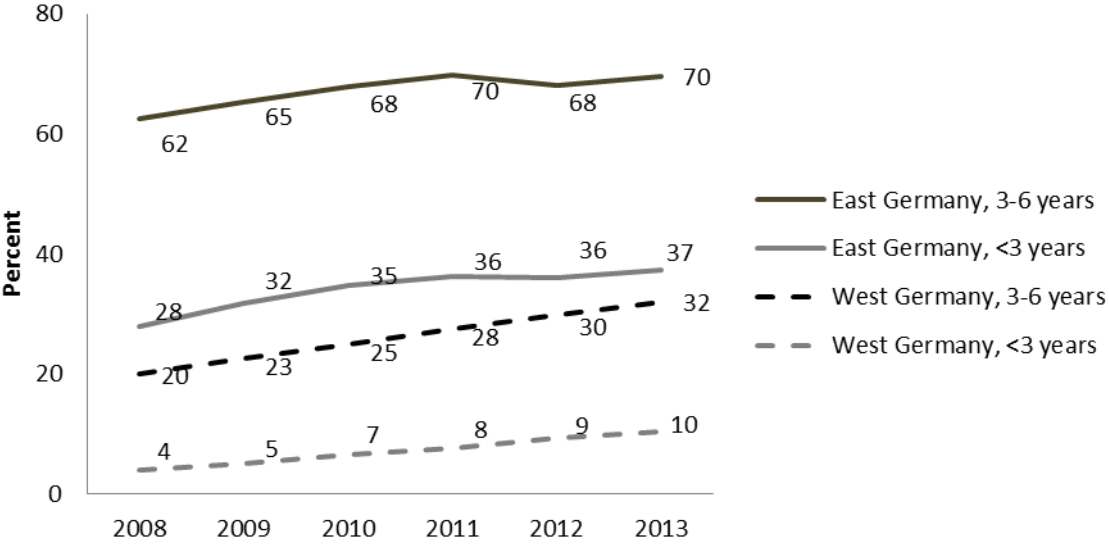
Satisfaction with....	West Germany		East Germany	
	.. family life	..life overall	.. family life	..life overall
County full-day care rate	-0.01 (0.02)	-0.00 (0.01)	0.01 (0.02)	0.01 (0.02)
Mother part-time	0.04 (0.29)	0.22 (0.22)	-0.64 (0.41)	0.17 (0.27)
Mother full-time	-0.11 (0.48)	0.17 (0.31)	-0.83 (0.57)	0.32 (0.36)
Half-day care	-0.10 (0.25)	0.06 (0.24)	1.02* (0.48)	-0.02 (0.34)
Full-day care	0.16 (0.26)	0.02 (0.21)	1.16** (0.38)	0.15 (0.28)
Mother in education	-0.39 (0.56)	0.70 (0.57)	0.78 (0.71)	0.32 (0.47)
Mother unemployed	0.34 (0.29)	0.06 (0.22)	-0.74+ (0.40)	0.03 (0.25)
Childcare by relatives	0.28 (0.20)	0.06 (0.17)	-0.26 (0.25)	-0.16 (0.17)
Ln equiv. net household income	0.05 (0.31)	0.38 (0.26)	1.05+ (0.57)	0.38 (0.33)
Mother poor health	-0.40*** (0.12)	-0.38*** (0.09)	-0.20 (0.16)	-0.63*** (0.10)
Constant	5.47*** (0.86)	6.08*** (0.85)	7.13*** (0.85)	6.72*** (0.67)
Observations	948	948	618	618
Number of mothers	371	371	220	220
R <sup>2</sup> within/betw./overall	.06/.06/.06	.06/.04/.04	.08/.02/.04	.15/.22/.18

Note: Robust standard errors in parentheses. All models include the following control variables: dummies for the age of the youngest child, number of children in household, regional unemployment rate, municipality expenditure per capita, move to different county, county border reforms, and year dummies.

\*\*\* p<0.001, \*\* p<0.01, \* p<0.05, + p<0.1

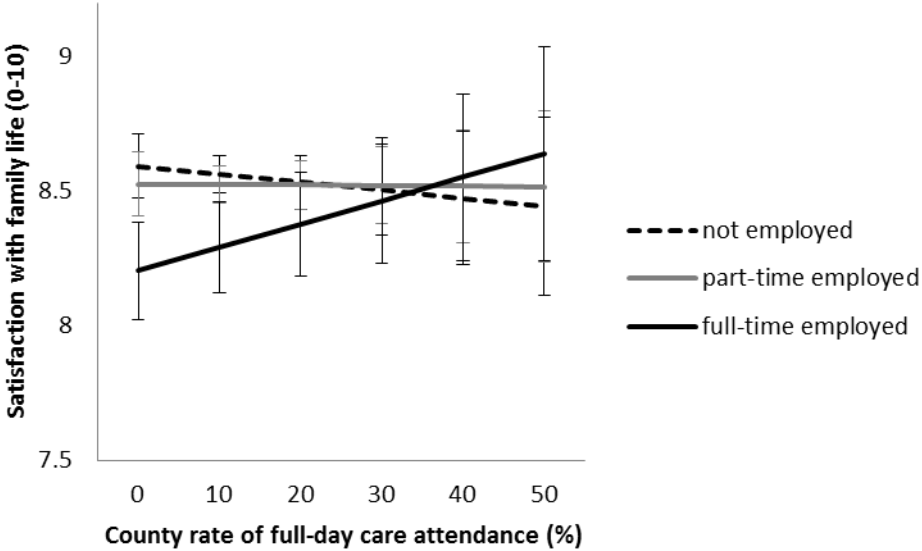
SOEP 2007-2012 and FiD 2010-2012 linked with regional youth welfare office statistics.

Figure 1: Percentage of children aged under school age who attended state-subsidized day-care institutions in East and West Germany in full-day care (7 hrs per day or more), 2008 to 2013



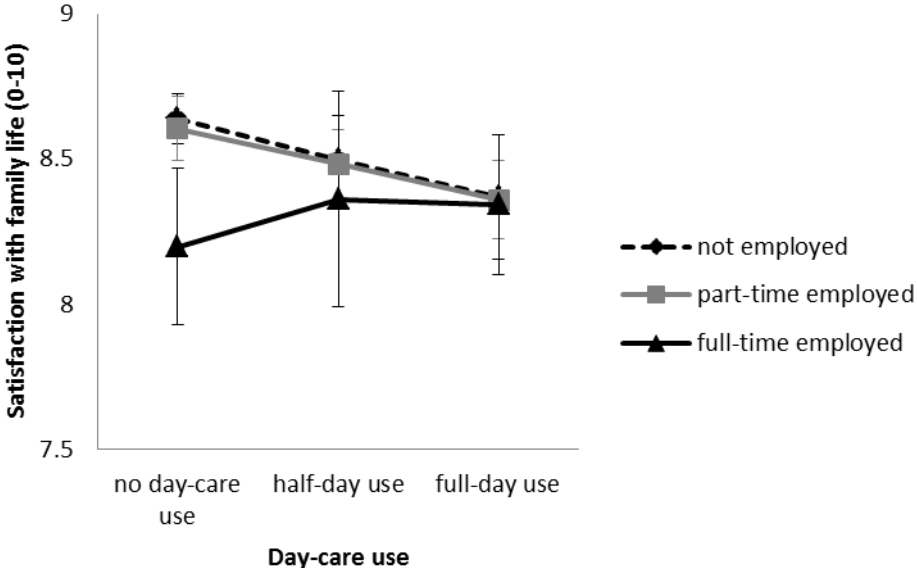
Source: Statistisches Bundesamt, 2013.

Figure 2: Interaction effect of full-day attendance rate with maternal employment status on satisfaction with family life of West German mothers (based on Model 2 in Table 2)



Source: SOEP 2007-2012 and FiD 2010-2012 linked with regional youth welfare office statistics. N=2,022 mothers; n=5,900 observations.

Figure 3: Interaction effect of day-care use with maternal employment status on satisfaction with family life of West German mothers (based on Model 3 in Table 2)



Source: SOEP 2007-2012 and FiD 2010-2012 linked with regional youth welfare office statistics. N=2,022 mothers; n=5,900 observations.

## Online appendix

Table A1: Fixed-effects panel models of satisfaction with different domains for mothers with a child below school age, by partnership status and region (Model 0)

Satisfaction with..	Partnered mothers				Lone mothers			
	West Germany		East Germany		West Germany		East Germany	
	.. family life	.. life overall	.. family life	.. life overall	.. family life	.. life overall	.. family life	.. life overall
County full-day care rate	-0.00 (0.00)	-0.00 (0.00)	0.01+ (0.01)	0.01+ (0.01)	-0.01 (0.02)	-0.00 (0.01)	0.01 (0.02)	0.01 (0.02)
Ln net household income	-0.00 (0.12)	0.08 (0.10)	-0.00 (0.19)	0.45* (0.18)	0.10 (0.31)	0.46+ (0.26)	1.10+ (0.60)	0.43 (0.31)
Father part-time	-0.06 (0.20)	-0.13 (0.16)	0.24 (0.33)	-0.25 (0.26)				
Father full-time	-0.06 (0.15)	0.07 (0.12)	-0.02 (0.26)	-0.32 (0.23)				
Father unemployed	-0.12 (0.18)	-0.37** (0.14)	0.33 (0.28)	-0.55+ (0.30)				
Father in education	0.01 (0.23)	0.10 (0.39)	0.36 (0.30)	-0.28 (0.46)				
Mother poor health	-0.15*** (0.03)	-0.29*** (0.03)	-0.17** (0.06)	-0.30*** (0.05)	-0.40*** (0.12)	-0.38*** (0.09)	-0.21 (0.17)	-0.60*** (0.10)
Cohabiting	-0.24+ (0.14)	-0.38* (0.15)	-0.43* (0.21)	-0.13 (0.16)				
County unemployment rate	0.02 (0.04)	0.01 (0.03)	-0.03 (0.05)	-0.01 (0.03)	-0.04 (0.21)	0.15 (0.11)	0.12 (0.11)	-0.11+ (0.07)
County expenditure per capita	0.00+ (0.00)	0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00+ (0.00)	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Constant	9.06*** (1.10)	8.04*** (0.88)	10.08*** (1.70)	5.01*** (1.51)	5.88+ (3.34)	1.71 (2.29)	-2.39 (4.70)	6.91** (2.53)
Observations	5,900	5,900	1,802	1,802	948	948	618	618
Number of mothers	2,022	2,022	590	590	371	371	220	220
R <sup>2</sup> within/betw./overall	.02/.02/.02	.06/.18/.14	.05/.02/.03	.06/.21/.17	.06/.04/.05	.06/.05/.04	.06/.02/.04	.15/.16/.14

Note: Robust standard errors in parentheses. All models include the following additional control variables: dummies for the age of the youngest child, number of children in household, move to different county, county border reform, and year dummies.

\*\*\* p<0.001, \*\* p<0.01, \* p<0.05, + p<0.1

Source: SOEP 2007-2012 and FiD 2010-2012 linked with regional youth welfare office statistics.