

The Roles of Type and Timing: Rethinking the Education Gradient in Childcare Based on the German Case

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30th April 2014

Preliminary draft - Please do not cite without author's permission - Comments are very welcome

Abstract

Parental investments shape differences in human capital development. Time is a particular important resource. Using the latest German Time Use Survey from 2001/02 this paper investigates if educational patterns in the allocation of parental time to childcare have the potential to explain observed disparities in child development. The analysis pays special attention to both partner's contribution and to the child's age by defining three child-age groups (0-3, 4-6, 7-9). Using estimation techniques that meet the specific requirements of time use data I am able to show that there is no unambiguously positive educational gradient for mothers in Germany. In the youngest group there is even a negative relationship between maternal university education and childcare, while it is associated with much higher caring times by the father. Next, exploring the effect of education on the allocation of the time with children to specific types of care, the analysis reveals that higher educated mothers devote relatively more time to those childcare activities that can be assumed to foster human capital development in each child-age group. High educated fathers most strongly focus on basic care when the children are young. I provide comparable estimates for the U.S. based on the American Time Use Survey of 2003. The pattern for the allocation of time is almost the opposite. Besides it is the partner's education which raises the mother's caring time. There are similarities for types of care. Stimulating activities seem to be preferred and both higher educated parents seem to adapt relatively better to the child's age-dependent needs.

JEL Classification: D1, J13, J22, J24

Keywords: childcare, family, education, time use

Acknowledgments: Comments of the participants of the Barcelona GSE Summer School in Labor Economics (BLSS), the Public Economics Seminar at the University of Konstanz, the Research Seminar Empirical Social Research at the University of Konstanz, the Cluster Seminar at DIW Berlin and the 34th IATUR Conference are gratefully acknowledged. I would like to thank Friedrich Breyer, C. Katharina Spiess and Benjamin Villena-Roldan for their advice.

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1 Introduction

Differences in a human capital development are already observable at an early stage of a child's life. These differences do not only persist but may even amplify over time (Feinstein 2003; Heckman et al. 2006). It is argued that investments in the early years are most important for later outcomes. These investments are found to be complementary to later investments as they reinforce the effectiveness of these subsequent investments (Cunha and Heckman 2007). This model of the human capital production process was also shown to be applicable to the human capital production process in countries, such as Germany (Pfeiffer and Reuß 2008).

There is a strong relationship between the child's development and the parents' socioeconomic background and education (Ermisch et al. 2012: chap. 2-4). In economic research the underlying process was left to be a "black box" for a long time, even though economic theory provides some intuitive mechanisms calling for empirical investigation.¹ Nowadays a large part of the literature focuses the role on institutions for the child's skill outcomes and their effectiveness in closing the gap between advantaged and disadvantaged groups. However, in the early years, the family itself plays a particular important role. The family even seems to be at least as important as educational institutions in producing human capital (Carneiro and Heckman 2003; Cunha and Heckman 2009).

Family investments do not only comprise financial support, but also non-pecuniary inputs as family stability (Haveman and Wolfe 1995) and even more importantly, in particular for young children, parental time. Relatively early research recognized the positive association between parental time and children outcomes (Leibowitz 1974b; 1977). Several channels through which parental time may impact child development were exposed in the literature, ranging from preferences to specific endowments (see Cardoso et al. (2010) for an overview). Differences in parental time input by education or socioeconomic status can consequently be suspected to explain a significant part of the development gap for children.

Many studies use maternal employment as a proxy for childcare time.² This is problematic for two reasons. First, not all the time that is not spent working is actually allocated to the children. Second, this proxy does not allow to analyze if it is actually the total amount of childcare time that makes the difference or rather the type or the way the time is spent. The distinction may be crucial. While on part of the research indicates suggests that the total amount of childcare time could be the driving force, research that analyzes the effect of specific indicators of parental time use, as for example reading to the child, points into the direction that the type of parental activities is essential (Sénéchal and LeFevre 2002). Only time use data allows to get more detailed information on the allocation of non-working time.

Most of the studies analyzing differences in childcare with time use data are based on U.S.-data. They

¹Economic and sociological theories imply and offer explanations for the positive relationship of parental time inputs and child outcomes (Becker 1981; Coleman 1988).

²See for example Ruhm (2008) for an overview.

agree that higher education is associated with relatively more caring time in particular for mothers.³ These findings are not necessarily applicable to other countries, such as Germany. There are major differences related to working behavior, the organization of the labor market as well as the provision, prices and quality of caring alternatives that are inseparable from family norms (Kreyenfeld and Hank 2000).⁴ The role of family policies for child caring behavior is non-negligible. Joesch and Spiess (2006) for example find that mothers spend less time looking after children when it is easier for them to reconcile motherhood and paid work.

The existing studies also neglect another crucial point. As the importance of child investments varies over a child's life, it is plausible that the impact of different types of care on child development changes, too. The receptiveness of children for certain kinds of care varies with age and the possibilities to substitute for parental care changes over the child's life. Better educated parents may not only allocate a certain type of time to their children more often, but there may also be a more pronounced adjustment of their investment behavior according to the child's needs.

This paper contributes to this line of literature by providing evidence of the education gradient, referring to the effect of education, in Germany in the total amount of childcare time and in the distribution of the time with children to specific types of care activities. I consider activities that are obviously related to child development in terms of cognitive skills, as for example reading time, or in terms of health development, as for example body care, but also activities as talking and cuddling with the child that are indirectly linked to the child's cognitive development via non-cognitive skills (Heckman et al. 2006). I pay special attention to two crucial factors: The interaction effect between parents and child's degree of maturity, by analyzing three child-age groups and the childcare time of both parents separately. I facilitate the comparison to the farthest studied country by providing of similar estimates for the United States.

I acknowledge that time use data cannot provide any information about non-parental caring time. We only observe parents' report of their own caring time. For example, if a parent allocates less time to playing on the diary day, that does not mean that the child is exposed to less playing. There could be other persons or institutions who resume this task. It is, however, possible to draw conclusions about the importance parents assign to certain childcare activities by analyzing the allocation of a given amount of parent-child

³This is surprising as high educated mothers face higher opportunity cost of time.

⁴In Germany the financial support for families is much stronger, especially the long paid leave periods and relatively high child raising benefits. These policies in combination with the "income splitting" tax regime and the co-health-insurance reduce financial pressure to the family and at the same time the incentives for mothers to participate in the labor market. The proportion of mothers who work less than 30 hours a week is much higher than the OECD average (Renz and Eggen 2004). There is still a conservative fraction in Germany that argues that mothers should not participate in the labor market (Fortin 2005). Depending on the age of the youngest child the one-full-time earner or the one-full-one-part-time earner model strongly dominates the two-full-time earner system (OECD Family database 2012). Daycare centers and kindergartens are subsidized and quality is monitored, but the slots are limited and opening hours are not very flexible. There is universal part-time daycare provision of relatively high quality for 3 to 6 year old children that is ensured by law since 1996. For younger children the provision of daycare in particular in West Germany is, however, very low, with 2 to 3 available slots per 100 children in 1998 and 19.8 percent in 2011, but less than 15 percent in full-time care (Hank et al. 2004; Deutsches Jugendinstitut 2008; Destatis 2007; 2012). The fraction of pupils in all-day schools is also rather low (Kolvenbach 2004).

shared time to specific childcare activities. Even though there are certainly some restrictions, because some activities have to be carried out either way, as for example body care, this analysis can still be interpreted as exposure of differing caring approaches by education.

Using a Seemingly Unrelated Related Regression approach for total parental caring times and a combination of a Two-Part specification of a Fractional Logit model for the allocation of the time with children to the subcategories of care this paper delivers two main insights. There is no evidence that education unambiguously increases caring time in Germany. For households with a child that is not older than three years, I even find a negative effect of university education on time with children for mothers. Those children are certainly not worse off. The partners of university educated mothers invest significantly more time in childcare and in addition these families are more likely to use formal care arrangements. In households with a youngest child in the age between four and six years and household with a child that is between seven and nine years old, there is a moderate positive effect of high education on the mother's caring time. In this group higher educated mothers use a larger amount of care provided by other private persons in addition to their own caring time.

Regarding the parent-child shared time it turns out that university educated mothers spend a relatively larger share of their time on *Physically Stimulating Care**. In the middle group a positive educational differences can be found for *Verbally Stimulating Care**, while in the group with a youngest child between seven and nine only university educated mother devote a larger share of their time with children to *Instructional and Appointment Time**. Higher educated partners mainly focus on health-related care activities, like ensuring the child's physical well-being by providing *Basic Care**, but also spend a relatively larger fraction of parent-child shared time on *Verbally Stimulating Care* and *Appointment Time** when the youngest child is between zero and three years old. In the group with children between seven and nine years old the mother's high education increases her partner's *Basic Care** time as well as the share of time with children devoted to *Instructional Time**.

The results are fairly robust to different specifications. Making the educational groups as comparable as possible in terms of household composition seems to matter. The Two-Part model makes a difference if the distribution of caring time is skewed and truncated, because it allows a different process for the participation and the amount equation.

A comparison to the United States reveals that there is no such compensating behavior of parents in the groups of families with children age zero to three. In the United States higher education rather leads to an increase of the caring time of mothers. The allocation of the time with children to specific caring activities, however, shows some similarities to Germany. In particular, there is a larger share of *Verbally Stimulating Care** in the younger groups and more *Instructional Time** for mothers with bachelor degree or beyond or mother's with a partner with such high education. The fathers also focus very much on *Basic Care** and

*The definition of the caring types can be found in section 4.

*Appointment Time** in the youngest group. In the two older groups fathers who are in a relationship with a high educated mother devote a larger share of their time with children on *Physically Stimulating Care*, *Verbally Stimulating Care** and *Instruction Time**. The reminder of the paper is structured as follows. Section 2 gives an overview over the past evidence on the association between parental education and caring time. In section 3 the theoretical background is discussed. Section 4 introduces the Germany Time Use Survey (GTUS) of 2001/2002 and the estimation strategy. Section 5 presents detailed evidence on the childcare behavior of German parents. Section 6 provides some comparable estimates for the US using the American Time Use Survey (ATUS). Section 7 concludes.

2 Related Literature

The studies discussed briefly in the following nearly all analyze time use data, which is either collected using diary technique as it is standard in the European time use surveys or via recall at the next day as it is for example common in the American Time Use Survey. An overview can be found in tables A1 and A2 in the appendix. In most studies childcare is define as the sum of primary activities that are related to childcare. Primary activities are those activities which are predominantly conducted by the reporting individual. Only some time use surveys collect secondary activities. In addition a measure of time with children or passive care is sometimes calculated from the information from the questions about the persons, who were with the respondent when he or she carried out the activity.

Research on the effect of education or socioeconomic status on total childcare time started in the 1970s and 1980s but then did not get much attention until the 2000s. In the United States early studies found a strong and unambiguous positive effect of socio-economic status, predicted wage or education on total maternal caring time (Leibowitz 1974a; 1975; Hill and Stafford 1980; 1974). This is confirmed in more recent studies by Kimmel and Connelly (2007) and Guryan et al. (2008), who find for families with at least one child under the age of 18, that high educated mothers in the U.S. spend much more time on total childcare compared to lower educated mothers. Between the reference group of mothers with less than 12 years of schooling and the mothers with 16 and more years of schooling lies a difference of more than 9 hours per week for non-working and more than 6 hours per week for working mothers.

Analyses on the effect of education on the total amount of caring time outside the United States often confirms a positive correlation of education and caring time, but not without limitations. Comparing countries Guryan et al. (2008) reveal that the magnitude of the education gradient for many European countries is smaller than for the United States. With a binary high-education indicator the difference between high and low educated women turns out to be more than 3 hours per week for working and 5 hours for non-working women in the United States. With data from 1991 this difference was only 0.04 hours or 0.84 hours for Germany, respectively. The findings also vary strongly between the other analyzed countries. Sayer et al.

(2004b) compare Canada, Germany, Italy and Norway. Using data from the beginning of the 1990s and controlling for occupational characteristics they find a much weaker positive effect of education in Germany for mothers compared to the three other countries. For German fathers the effect was positive and quantitatively similar to Norway. Gracia et al. (2011) compare the education effects for Denmark, Flanders, Spain and the United Kingdom. Controlling for working time, they find significantly positive effects of education on childcare only for parents in Spain and mothers in the United Kingdom. For fathers there is even a negative effect of education in the United Kingdom and Flanders. Gracia et al. (2011) also analyze the effect of the partner's education on caring time and show that fathers spend more time with their children if the mother is college educated⁴

Primary care is most often analyzed as a total. The analysis of specific types of caring time only started recently. Unfortunately the categorization in different studies is not always directly comparable. In most studies, however, one can find on the one hand basic care activities and on the other hand educational, quality or developmental care. Obviously the division into subcategories is related to the relevance for the child's human capital development (see for example Bittman et al. (2004) on the typology of childcare.).

In this area Guryan et al. (2008) show in their working paper version that the positive effect of education in the United States holds across all four subcategories of child care: basic, educational, recreational and travel related to childcare. For Australia Craig (2006) finds that university educated parents spend more time on developmental and physical care. In this country fathers with university education contribute relatively more to childcare. According to Gutiérrez-Domenech (2010), there is positive trend of mother's and father's own education on basic and quality primary care in families with at least one child under 17 in Spain. The effects are stronger for fathers. The partner's education positively affects the mother's quality care time and the father's basic care time.

The most recent paper explicitly dealing with educational care time is Gimenez-Nadal and Molina (2013). They compare the effect of parental education on educational care time in Spain and the United Kingdom in the group of households with children under the age of 18. Here the mother's education has a positive effect on the partner's educational care time in both countries, but only on her own time-use in Spain. Only in Spain increases maternal education physical care time of both parents. Overall they conclude that the mother's education is the driving force for the time investments in educational care of mothers and fathers. Up to now there are only two unpublished papers who connect maternal time investments to the child's cognitive outcome using the Child Development Supplement of the Panel Study of Income Dynamics (PSID) in the United States. Carneiro and Rodrigues (2009) and Villena-Roldán and Ríos-Aguilar (2012) show that an increase in maternal caring time leads to better scores in a test of cognitive skills, but this seems only to

⁴Across countries maternal care time seems to have increased over the last decades (Sayer et al. 2004a), but this is not the case for Germany (Berghammer 2013). In the US childcare time also increase but the gap between higher and lower educated even widened, too (Ramey and Ramey 2010). Maternal employment increased as well. It seems that there is no 100 percent pass-through of working time on childcare time. (Bianchi 2000; Bryant and Zick 1996; Gauthier et al. 2004). Felfe and Hsin (2012) show that maternal employment mostly reduces general mother-child-interactions but not educational time.

be the case for white children in high-educated households. The type of care consequently seems to play a major role.

Nearly all of the existing studies provide average results for families with a child that can be at any age between 0 and 18 years. Only a few acknowledge that education could have a different impact depending on the child's age. According to Bryant and Zick (1996) higher educated mothers in the United States spend relatively more time caring for the younger child in a family, while higher educated fathers spend relatively more time with the older child. Gracia (2014) distinguishes between age groups when he analyzes the effect of education on the father's care time. He finds a much stronger education gradient in households with a youngest child that is between three and five years old. Kalil et al. (2012) exploit information of maternal care time in five waves of the American Time Use Surveys. Instead of analyzing each age-group separately they include interactions of three age-group dummies and education in a Tobit model. Thus they implicitly assume that other factors, such as the number of brothers and sisters or maternal age have a constant effect across age-groups. Their findings suggest that the difference by education is strongest when the youngest child is between zero and five years old. Only for teaching time the difference by maternal education is strongest when there is a child in the age between 3 and five in the household. The difference between college educated and high school educated is, however, only maximum 5 minutes per day, while for basic care it is nearly 24 minutes and for playing 11 minutes. Only for management time the gap is largest in the group with children between 6 and 13 years.

Yet it is still unclear if parents in all countries respond similar to changes in the child's age and more importantly if parents with different educational level react differently. Most studies also miss an important point when they do not look at the interplay between parents and do not control for family composition. For Germany, for example, there is some evidence that higher educated women space their births relatively more closely, such that their children are more similar in age on average (Kreyenfeld 2002).

3 Theoretical Considerations

The different pathways through which education can impact the time inputs can be understood by illustrating the households decision problem in an allocation-of-time framework, which goes back to Becker (1965; 1981) and Gronau (1977), but was continuously enhanced and reinterpreted (see Leibowitz et al. (1992), Chiappori (1992), Apps (2003), Apps and Rees (2009) or Leibowitz (2003).). This way of modeling differs insofar from standard economic household models that every commodity is produced by using market inputs and the family members' time. The ratio of market to time inputs depends on the commodity.⁵ It is assumed that parents value child quality, such that it is part of the household utility function U . Parents could just be altruistic or derive utility from the child's future outcomes for social and status preservation reasons.

⁵Examples for such a categorization can be found in Gronau and Hamermesh (2006).

In a very simple form this could be formalized as:

$$\begin{aligned}
\max \quad & U = u(X_i, \theta^m(e^m), \theta^p(e^p)) \\
\text{s.t.} \quad & X_i = h_i(t_i^m, t_i^p, g_i, \gamma^m(e^m), \gamma^p(e^p), o_i), \\
& Y + w_m(e^m)t_w^m + w_p(e^p)t_w^p = \sum_i \rho_i x_i, \quad T_j = t_w^j + \sum_i t_i^j \quad (j = m, p), \quad (i = 1, \dots, n)
\end{aligned}$$

Household utility is maximized subject to the production technology, the budget constraint and the time constraint. Child quality is one of the commodities X_i , that have a direct impact on household utility and are weighted by the preference parameters (θ_i^m, θ_i^p) . The commodities are produced, using time and goods input g_i (for childcare including formal and informal care), which produce the outcome depending on the productivity (γ_i^m, θ_i^p) and other factors o_i .

The each parent's optimal time input into the production of child quality is then a functions of the mothers's (m) and her partners's (p) wage w , a vector of their preference parameters θ , their productivity parameters γ and a vector of market goods prices ρ as well as exogenous household income Y and the other factors o_i .

$$t_Q^j = t_Q^j(w^j(e^j), \theta_Q(e^j), \gamma_Q(e^j), \rho, Y) \quad (j = m, p).$$

Wages, preferences and productivity can be thought to be a function of the mother's and the partner's education e^m, e^p .⁶ It is difficult to draw any directly testable hypothesis from these household production models. Based on the available data it is in particular difficult to distinguish the impact of preferences from productivity. However, this illustration highlights potential mechanism and in the case of between group comparisons, they offer some explanations for differences in effects (Folbre 2004).

Gronau (1977) divides non-market time into home production and pure leisure, because the two elements do not react similarly to changes in the socio-economic environment. Kimmel and Connelly (2007) point out that it may be necessary to make an additional distinction between housework and childcare. It is not even convincing that childcare can be summed up into one commodity.

It is very plausible that childcare is not only motivated by satisfaction about the outcome, but also by so called "process benefits" (Folbre and Bittman 2004: chapter 1). In this case performing childcare is itself utility providing. This is also known as "joint production" (see Graham and Green (1984), Kerkhofs and Kooreman (2003) or Hallberg and Klevmarken (2003)). The more direct utility is provided by childcare time, the more likely it is that the household does not purchase market care, if these two types of care are substitutes.⁷

⁶The work of Michael (1973) on productive efficiency is based on the idea that individuals may not only differ in their market productivity but also in their non-market productivity. There are some studies that reject the productive efficiency in favor of the allocative efficiency theory for health production (Grossman 2006).

⁷The predictions of the model are not unambiguous in many cases. If wages increase, due to higher education, time spent producing a commodity for which time and market goods are easy to substitute will decrease, while the opposite is true if market inputs and time are not easy to substitute. If a household member is more engaged in activities for which time and goods are

Education leads to higher wages and as such increases the (opportunity) cost of non-market work. This mechanism would lead to a lower level of caring time by higher educated parents. If this is not the case, one or a combination of the following mechanisms would lead to a positive education gradient for childcare time:

- In the relevant area the income elasticity of childcare time is relatively large. The marginal utility of spending one more minute in childcare must be higher than for other activities.
- Better educated parents may be more productive in caring for children. The productivity in caring has to increase more strongly with education than the productivity in other time-use.
- Better educated parents have a relatively strong preference for the commodity that is produced by childcare time compared to commodities produced by other using the time differently.

These effects are stronger if market alternatives for childcare are not seen to be a good substitute for parental care, while market goods are a good substitute for other non-market production, as for example housework. Another explanation in line with Becker and Tomes (1976) is that the marginal return to their time investment is higher for high educated parents. This argument relies on the assumption that higher educated parents have children with higher (learning) abilities.⁸

It is plausible that these mechanisms are stronger for specific subcategories of childcare, for example those that are strongly related to human capital development or that are at least understood to be “good” care. Estimating the education gradient conditional on the parent-child shared time could isolate these effects. In such a model relative shares of the mother and father in home production and childcare depend on relative wages, because the ratio of marginal productivity has to equal the ratio of the wages in the optimum. If the couple’s time inputs are easy to substitute the partner with lower wage should specialize in non-market production. A higher potential wage of the mother relative to the partner’s wage consequently leads to a more equal distribution of market and non-market activities within the household. This would, however, create a negative effect of maternal education on her own childcare time, but a positive effect on the partner’s caring time.

The idea that relative endowments matter was further developed by collective and bargaining household models. In these models the relative strength of the partners are crucial for observed behavior.⁹ Under the assumption that the mother has relatively stronger preferences for childcare her education would increase the caring time in this extended framework.

relatively easy to substitute it’s labor supply will increase (Gronau 1977).

⁸Other theories argue that parents may also try to compensate and therefore invest more in disadvantaged children (Behrman et al. 1995).

⁹In the collective model the household does not maximize one function U , but a weighted function of the partners utility functions. The weight of each partner depends on her or his relative strength. Pareto efficiency of the outcome is assumed. See Vermeulen (2002) for an overview over the development of the household models.

Given the above discussed mechanisms it can be expected that *education has a crucial effect on parental care time investments*. The theoretical discussion above also highlights that the direction and the strength of the effect is not determined. Previous empirical research, however, suggests a positive association between parental education and childcare time. The role of country-specific institutions in framing the relationship between parental education and parental time investment allows to question whether the size or even the sign of the effect will be equal to those found for other countries. Stronger financial support relaxes the income constraints and this decreases the necessity for lower educated women to work long hours.

The above discussed framework in the comparative advantage and bargaining models gives clear expectations for the *allocation of responsibilities within the family*: The mother's education is expected to increase the partner's caring time and the usage of non-market alternatives, if she does not have strong preference for caring herself.

The economic framework highlighted above takes a long term perspective, but time use data reports daily behavior.¹⁰ Time constraints differ between weekend and weekday, because on weekends for a large fraction of people working is not an option. Therefore, one can assume that *educational attainment has a more positive impact on childcare time on weekends compared to weekdays*.¹¹

Under the assumption that higher educated parents are either interested in social status preservation or have a relatively better understanding of the mechanisms behind the child quality production function, one can expect that *higher educated parents spend relatively more time on activities that are assumed to increase the child's human capital development*. Activities that are less directly linked to human capital development may be substituted for market alternatives.

Given that the availability of substitutes, the financial support by the state and the receptiveness of children for parental time inputs vary with a child's age, *the effect of education is expected to vary with the age of the youngest child in the household*, too. The educational patterns for pre-kindergarten, kindergarten and primary school children are expected to differ substantially, not only related to the total amount of childcare time, but also related to the type of care predominantly chosen.

4 Time Use Data

This analysis is done using data from the German Time Use Survey (GTUS) which was collected in the years 2001 and 2002 and provided by the German Federal Statistical Office. The GTUS Scientific Use File is a 95%-percent subsample of the original sample. This national representative survey includes 5400 households with 37700 collected diaries, based on 10 minute intervals from household members that were at least 10 years old. Each household member was asked to fill in the diary on two days during the week and

¹⁰See Frazis and Stewart (2012).

¹¹The diary data used in the following captures three days of a week, while in many other time use surveys only one or two days are observed. The effect of unusual days that contradict an interpretation in terms of a long-term optimization, are therefore reduced.

one day at the weekend. This diary data is more reliable and accurate compared to stylized questions in large surveys like the German Socio-Economic Panel (GSOEP), that asked for the average time spent on a certain activity (Bonke 2005). Background information was conducted in additional questionnaires. The survey followed the guideline of EUROSTAT that aims to harmonize time diary surveys in Europe (HETUS). The data includes 272 activity codes for primary and secondary activities. Among these activities 11 are directly related to childcare.

This study focuses on parents in West Germany in the age between 20 and 60 years. Due to a different history of family policies that had a strong influence on norms and preferences, but also on the availability of public daycare, it is not reasonable to combine the samples for East and West Germany. Unfortunately less than one fifth of the observations were conducted in the area of East Germany. The sample size is too small for a separate analysis.

People who participate currently in any kind of training are excluded, because their educational level is difficult to determine. The analysis focuses on couple-households (20304 observations). Single parents and other households are not considered, because the time constraints for these parents in these households differ crucially.

The dataset does not provide a measure for years of schooling. Germany has a dual educational system. Education levels are not as easy to rank as for example in the US, because schooling is not sequentially and therefore the correlation with abilities and income is less clear. Vocational training in Germany is not part of the curriculum of colleges. The largest part of pupils leave high school after 9 (*Hauptschule*) or 10 years (*Realschule*), but then succeed in getting a vocational degree. Many pupils who after 13 years reach a high school degree that enables them to go to university (*Abitur*) or after 12 years reach a degree that enables them to go to technical college (*Fachabitur*) do not decide to do so. Only around 34 percent of the mothers analyzed here have chosen to go to university, even if they had reached the *Abitur*. For fathers this number is with about 60 percent much higher.¹²

The empirical analysis shows that there are differences for the kind of secondary and tertiary education. For this reason relatively narrow educational groups are defined. The highest level refers to university education, followed by technical college education. A third group includes those with *Abitur* or *Fachabitur* but only vocational training (*13/12+Voc.*). The reference group consequently includes individuals with vocational training or no training, who left school before they reached the *Fachabitur*. This group is the largest. The analysis focuses not only on own education but also on the partner's education, which can be assumed to have an effect by setting norms or providing income. There is a considerable pattern of assortative mating by education (tables A6 - A8), which is a common phenomenon in modern societies (Blossfeld and Timm

¹²This finding is not unusual for Germany. In the years 1975 until 2006 taken together only 65 to 75 percent of women with a degree that enables to go to college decided to do so. However, more than 30 percent of these women did not complete their studies at a university and more than 10 percent stop studying at a technical college before they reach a degree. See Autorengruppe Bildungsberichterstattung (2012) tables F1-1A and F3-1A.

2003). Including the partner’s education is an extension to most of the existing research.¹³

One may worry that combining those with less than 12 years of schooling and vocational training with those without training would have an impact on the results. However, in the final sample only 4 percent of mothers and 3 percent of their partners belong to this group (table 1). The sensitivity analysis reveals that excluding these few observations does not change the results.

Table 1: Distribution of Education for Mothers and Partners

	Mother		Partner	
	Observations	Percent	Observations	Percent
University	175	9	287	15
Technical College	194	10	199	10
13/12 + Voc.	398	2	248	13
Less than 12 + Voc.	1,094	56	1,155	60
No Training	76	4	49	3
Total	1937	100	1937	100

Source: GTUS 2001/02, own calculation.

Three types of time use are measured by the GTUS: Primary activities and secondary activities. In additional individuals were asked who was around when they conducted an activity. The time is reported as minutes per day. The following two types of childcare are relevant for the analysis:

- **Primary care (*Care*):** All activities that are related to childcare and reported as being the primary activity. These activities can be best interpreted as quality time, because the parents focus on caring. The activities can be seen as being the parents’ number one choice of time use. I only sum these activities when a child that is younger than ten years was around. The aim is to create a measure that is comparable to “Time with Children”, which is only available for children up to the age of 9 years (see below).
- **Time with Children (*TwC*):** This variable sums up all the time where the mother or her partner reports that a child is around (parent-child shared time). This measure for example includes the time when the mother is preparing meals and a child is in the kitchen. In the GTUS parents were only asked to tick a box if a child younger than 10 years was around.¹⁴ There is no information about older children. Therefore it is only reasonable to interpret this measure in households with at least one child that is not older than nine years.

Care time will be divided into subcategories. These subcategories can be defined according to the type and the intensity of parent-child interaction. The following definitions are applied:

- **Basic Care (Basic):** Body care and supervision and other care.¹⁵
- **Physically Stimulating Care (Physical):** Playing and exercising (sports) and cuddling.¹⁶

¹³Groups would become too small if one would in addition allow for interactions.

¹⁴A similar measure as “Time with children” is used by Guryan et al. (2008), they find no effect of education on this measure.

¹⁵GTUS codes: zh380, zh381 and zh389.

¹⁶GTUS code: zh383 and zh385.

- Verbally Stimulating Care (Verbal): Talking to the child and reading to the child.¹⁷
- Instructional Time (Instruct): Giving instructions, teaching the child and helping with homework.¹⁸
- Appointment Time (Appoint): Accompanying the child and keeping appointments with the child.¹⁹

For *Basic Care* the contact between parent and child is of relatively low intensity and not directly targeted to child development, but these activities ensure child well-being and health by supervising and meeting basic physical needs. *Physically Stimulating Care* includes activities that are assumed to foster the child's physical and mental health as well as emotional development. The communication is, however, non-verbal. *Verbally Stimulating Care* includes activities that are also believed to be critical for the child's development, but that are communicated on a verbal level. Children are likely to differ in their receptiveness for *Physically and Verbally Stimulating Care* depending on their age. Instructional time will be analyzed separately. The expectations for the effect of education on the allocation of time to this type of care are slightly different. Activities that are summed up in *Physically and Verbally Stimulating Care* can be seen as an investment, but also be expected to provide utility directly. In this sense there would be "process benefits". Care that is summed up in *Instructional Care*, however, could be seen as a task that is only performed if the child actually needs help or needs correction. The need for help may also be correlated with parental education. In addition daycare centers, nannies and schools may provide a better substitute for *Instructional Time*. The last category includes the time related to appointments with the travel time itself. Travel related to childcare is not considered. These travel times are to a significant part not spent with the child. If a parent picks up a child the whole time is counted as travel related to childcare, but it is a period of time, where the child is actually not around (Folbre and Yoon 2007). This kind of time is also hard to classify in terms of intensity of interaction and stimulation.

Time use data is not able to provide evidence on the care of young children over the whole day, because it provides no detailed information on the kind of care the child is exposed to by other people. It is, however, very informative about the time the mother and her partner spend with their children. Therefore, the distribution of the time where parent and child are observed together is of main interest. The just described caring activities will consequently not be analyzed in total minutes per day, but as a percentage of the time the parent and the child are observed together ($=TWC$). For every sub-category of care the amount of time devoted to this activity when the box "child younger than 10 years was around" was ticked is summarized. For example, if a mother spends 10 minutes playing with one of her children that is not older than nine years in the morning and 10 minutes playing with an older child in the afternoon, this variable only counts the 10 minutes of playing in the morning. This time variable is then divided by the total time that is spent with children that are younger than 10 years that day.

¹⁷GTUS codes: zh384 and zh388.

¹⁸GTUS code: zh382.

¹⁹GTUS code: zh386.

$$\text{Fraction of subcategory } x = \frac{\text{Time use for subcategory } x \text{ when child age } < 10 \text{ was around}}{TwC} \quad (1)$$

Proceeding this way, one obtains a measure that can be interpreted in terms of child-care intensity and as the expression of preferences for certain types of care, as it gives the allocation of a given amount time with children on certain child care activities. If there are differences in the allocation of parent-child shared time it may provide one explanations for differential child development even under the very simplifying assumption that the non-parental care time is of the same quality for all children. It is, however, even more plausible that the quality of non-parental caring time is also correlated with parental socio-economic status, such that differences in parental caring time may rather serve as an additional explanation.

The caring behavior of a family is told from the mother's point of view depending on her own and her partner's educational level. Research indicates that the mother is still the main caretaker. Therefore here it is the question how her and her partner's education change the allocation of her own time between caring and other activities and in addition how it affects the partner's contribution. Secondly, after determining how the division of time between caring and non-caring activities varies with parental education, the focus is on the effect of education on the choice of the preferred type of childcare.

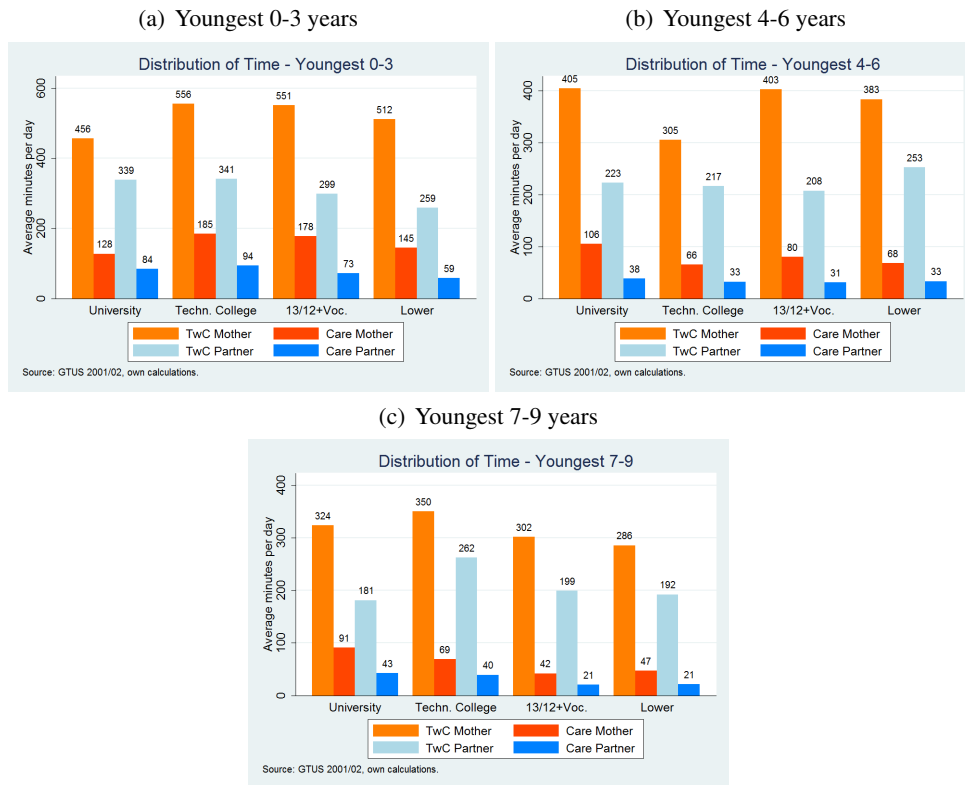
In awareness of different needs and time constraints depending on the age of the children in the household, three groups of households are considered. The first one with a child that is not older than three years, the second one with a youngest child that is between four and six years old, the third with a youngest child that is between seven and nine. These three groups represent different stages of child development and as such children with different needs. At the same time the supply of institutional care differs strongly between these groups. For young children there is only a limited supply of daycare in Germany, for children in the second group there is a large supply of kindergarten slots, but mostly part-time. Children in the third group are legally obligated to go to primary school, which is part-time but in opposite to the other educational institutions free of charge. I believe that a separate analysis of these groups has much more potential to give insights into the role of parental caring time in the child development process than estimates for all households with children under the age of 18, as it was the common approach in most studies until recently. Figure 1 gives the average *TwC* and *Care* by the mother's education. The explanatory power of such descriptive statistics is rather limited as conditioning on the child's age is crucial. However, some basic patterns can already be identified. The mothers and their partner spend only a relatively small fraction of their *TwC* actually focused on childcare. In the younger child-age group more than 450 minutes minutes per day a child surrounds the mother, but only between 128 and 145 minutes of the mother's time is allocated to primary care. For fathers the level is lower, but the patter is similar. The difference between *TwC* and *Care* increases if the youngest child in the household is older. These statistics are in line with the "stylized fact"

that the mother's caring time is much higher, here nearly twice as high, as high as the father's. As expected the caring times decrease with age of the youngest child in the household.

Educational differences are obvious. In the group of households with a youngest child in the age between zero and three years, there seems to be a hump-shaped pattern in *TwC* and *Care* for mothers, while for their partners both caring measures seem to be positively correlated with the mother's education. In the group of households with a youngest child in the age between 4 and 6 there is positive tendency for mothers which is stronger for *Care* than *TwC*. Mothers with technical college degree, however, seem to be an exception with very low caring time on average. There is no strong pattern for fathers.

In the oldest group *TwC* and *Care* are highest on average for university educated and technical college educated mothers. For the partners this is also the case for *Care*, but partners of university educated mothers show the lowest level of *TwC*.

Figure 1: *TwC* and *Care* by Mother's Education (minutes per day)



Figures 2, 3 and 4 picture the differences in the distribution of time with children to different caring activities. In households with a youngest child in the age between zero and three years, there is still the hump-shaped pattern. While mothers with technical college degree or 13/12 years of schooling and vocational degree allocate significantly more than one-third of their *TwC* to *Care*, for the two other groups it is less. In comparison to the lowest education group the higher educated may distribute relatively more time to *Physically Stimulating Care*. The differences are, however, small. In both other groups there seems to be a positive correlation of the mother's education and caring intensity. A larger share of *TwC* may be allocated

to *Verbally Stimulating Care*, but not *Appointment Time* in the middle group. In the oldest group there is such a tendency for *Instructional Time* and *Appointment Time* but also for *Basic Care*.

For partners the differences in the share of *TwC* that is allocated to *Care* increase with the age of the youngest child. There are differences according to the mother's education in *Basic Care*, but also in *Verbally Stimulating Care*, in particular in the group of households with a youngest child in the age between four and six years.

Figure 2: Type of Care as Share of *TwC* by Mother's Education - Age Youngest 0-3

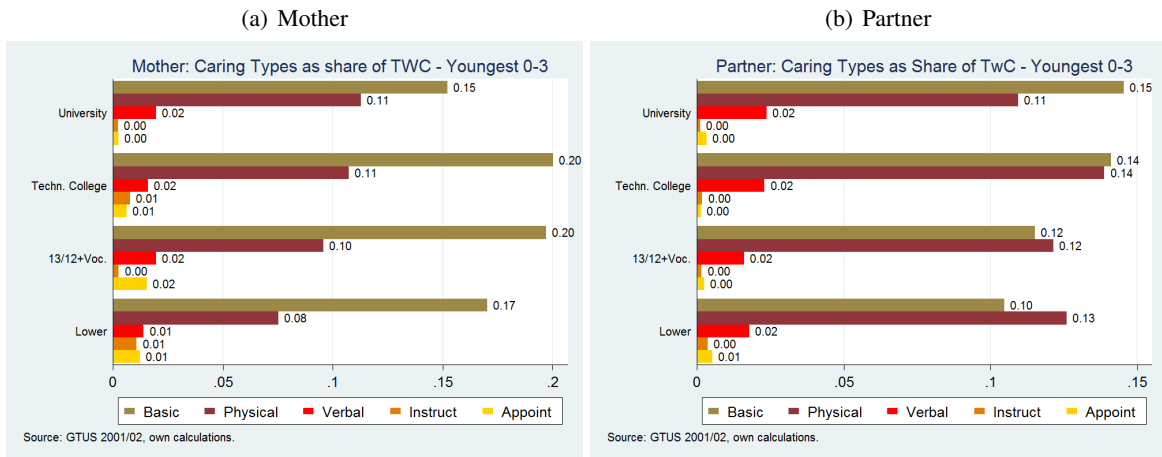
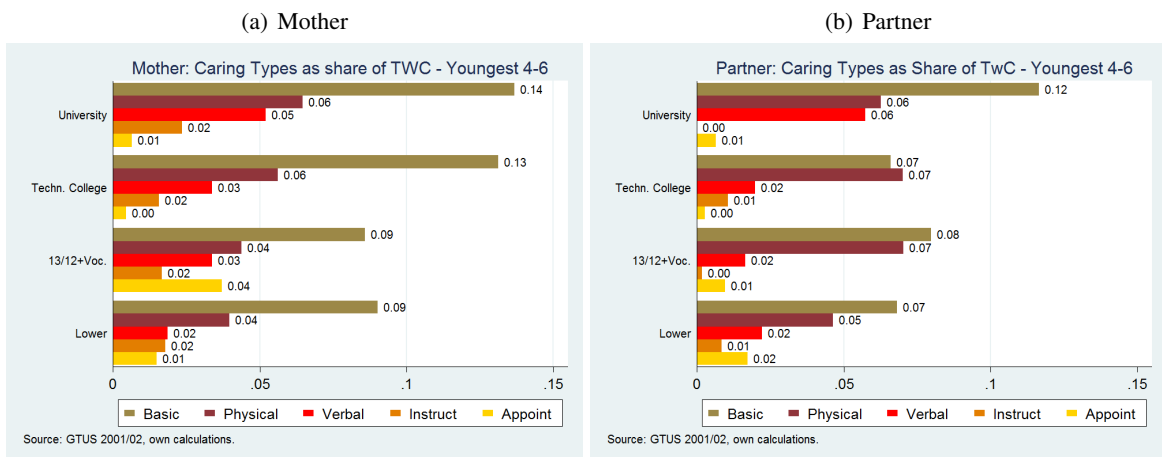


Figure 3: Type of Care as Share of *TwC* by Mother's Education - Age Youngest 4-6

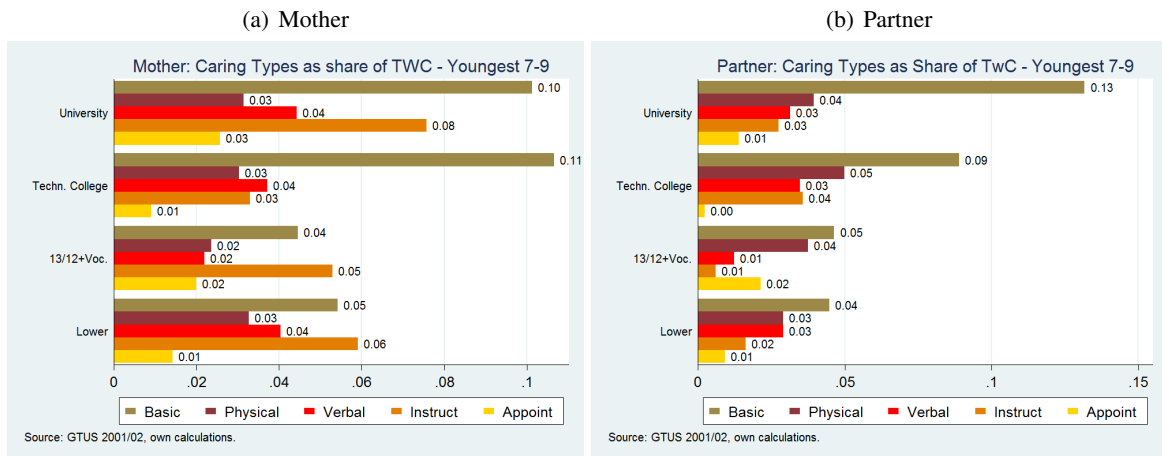


4.1 Estimation Strategy

Time use data should be treated carefully, because the data is often non-standard. In the German case individuals report their behavior on three days. Therefore standard errors in all regressions correct for heteroscedasticity and clustering at the individual level, which is in this case equivalent to clustering on the household level, because the behavior is analyzed from the mother's point of view.

A second important point is the distribution of the data. For a non-negligible group of individuals the time

Figure 4: Type of Care as Share of *TwC* by Mother's Education - Age Youngest 7-9



reported for a certain activity is zero. In the case of childcare for mothers and in the group with young children this is not such a big problem (5 percent). For fathers and older children this number is higher. Even if there are not very many zeros reported the distribution of caring time is skewed to the left (figures A1-A3).

Some researchers use Tobit models to deal with the problem of truncation and skewness.²⁰ The Tobit model imposes the strong assumption that the same mechanism determines the participation and the amount decision. In the case of time diary data, however, observing a time of zero spent for a certain activity on a certain day does not mean that an individual never spends any time on this activity. The observation period may just be too short. Stewart (2013) shows, using simulated data, that the Tobit estimator can be biased in time use studies. She shows that an Ordinary Least Squares model or a Two-Part(*TP*)-model are favorable. The *TP*-model was primarily invented by Cragg (1971). It is also sometimes referred to as a Hurdle model. It includes the Tobit model as a special case, but relaxes the strong assumption of equal effects in participation and amount equation. The estimation can be done in two steps, with a binary model determining the participation in the first step and estimation of the amount equation on the subset of observations with positive values in the second step.²¹

In the case of *TwC* and *Care* the linear approach is plausible. Mass accumulation at low values may only be a problem in the case of father's time use and for both parents in the group of older children (figures A1-A3). A *TP*-model will therefore be estimated checking the results of the standard linear approach.

The mother's and her partner's *TwC* and primary care time are estimated together. It is assumed that the standard errors are correlated, which leads to the Seemingly Unrelated Regression (SUR) approach (Zellner 1962). This approach captures the fact that the caring decisions of the two parents are not independent from

²⁰The Tobit model is motivated by an underlying latent model of time spending. Only non-negative time use is observed, even if there was a situation where an individual would have preferred to report negative values.

²¹Relevant for this setup is the independence of the participation and the amount decision. The Two-Part-model is a Heckman-Correction model that assumes that there is no correlation between the error terms of the selection equation and the activity (=caring) equation (Wooldridge 2001).

each other and as such increases efficiency of the estimation.²²

The analysis of the fraction of T_wC that is spent for a specific care activity calls for a more complex model. An approach that has not been used very frequently for the analysis of time use data is a Fractional Logit model (*F-Logit*) made popular by Papke and Wooldridge (1996).²³ This approach is suitable if a variable is analyzed that can be interpreted as a fraction and is as such bounded between 0 and 1 and as a consequence can lead to heteroscedastic error terms and non-linearities in the effects (Ramalho et al. 2011). The motivation is similar to the one that argues in favor of the logistic model instead of the Ordinary Least Squares model in the binary case. For bounded variables it is not plausible to assume that the effect of any explanatory variable is constant throughout its entire range. In this case the linear model is not appropriate in general, since it does not guarantee that the predicted values of the dependent variable are restricted to the unit interval. The *F-Logit* approach uses a quasi maximum likelihood estimation strategy based on a Bernoulli log likelihood. This function is also well defined for the boundary values of zero and one. For the dependent variable measured as a fraction of time per day (t) the following transformation is assumed: $\log[t/(1-t)] = x\beta + u$. Then one can write $t = \frac{\exp(x\beta+u)}{[1+\exp(x\beta+u)]}$. The interpretation of the estimated average marginal effects is straightforward.

The problem with zero values and right skewed distribution in particular exists for the subcategories. It is not clear if the *F-Logit* alone is able to deal with this problem. Therefore the *F-Logit* is combined with the *TP* model. This version using a Probit specification for the participation equation and a *F-Logit* for the amount equation became recently more popular (Ramalho et al. 2011).²⁴

The average marginal effects from a *TP*-model are derived by calculating the derivative of

$$E(\text{Care}|x) = Pr(\text{Care} > 0|x) * E(\text{Care}|\text{Care} > 0, x) \quad (2)$$

with respect to education, which is one of the variables in x . The first part of equation (2) gives the predicted probability to allocate any time to a specific type of child care and the second part measures the effect on the amount of childcare given that any positive amount of time is spent on child care. For non-linear models the estimated average marginal effects are derived by using the finite-differences method, which is more preferable to calculus methods, because it is the effect of a change from zero to one, instead of an infinitesimally small change which is scaled up to correspond to a large change (Cameron and Trivedi 2010: chapter 10).

All estimations are done conditional on

²²It is assumed that the error terms are jointly normally distributed. Compared to the standard OLS it is assumed that the off-diagonal elements of the variance-covariance matrix are non-zero.

²³Exceptions are Mullahy and Robert (2010) and Cardoso et al. (2010).

²⁴Fractional Logit models can be estimated in STATA using the *glm* procedure for generalized linear models with a binomial family, a logit link-function and standard errors that correct for heteroscedasticity. The more advanced two-part version can be estimated by a similar procedure implemented by the user-written procedure *tpm*, because it allows to derive marginal effects from the combined first- and second-part model (Belotti and Deb 2013).

- Education (mother and partner): University, Technical College and 13/12 years of schooling plus vocational training.
- Child characteristics: Number of children in age group (0-1, 2-3, 4-5, 6-7, 8-9, 9-10, 11-12, 13-15, 16-18, 19 and older), age of the youngest child dummies.
- Parental characteristics: Mother's age (quadratic), partner's age (quadratic), married dummy, dummies indicating mother's and partner's German nationality.
- Time constraints: Dummies indicating that a cinema, a doctor or a high school can be reached by foot, dummy indicating that an adult in the household is in need of care, dummy indicating that the mother provides care for a person outside the household.
- Other characteristics: Dummy for weekday and quarter of the year.

Household income is not included, as this measure is endogenous to the decision about the allocation of time. The decisions about the allocation of time to childcare and working time are highly correlated, even if not to 100 percent (Bianchi 2000). If the caring and working decisions are made simultaneously, a variable such as income which is a result of the working decision should not be included. Based on the same argument the labor market status is not included.

Compared to other studies the empirical specification tries to capture the family structure more exhaustively by controlling very precisely for the age of the children in the household. In order to increase the "common support" the number of children is restricted to four children, because in the higher education groups there is no family with more than four children. Tables A3 to A5 shows that in households with a university educated mother the maximum number of children is four. Similarly the subsample is restricted such that households are also comparable with respect to the age of the oldest child in the household. Households with lower educated mothers are not only more likely to have more children, but the time between two births is also longer, such that the oldest child in the household is in some cases much older. This oldest child on the one hand needs a different kind of care and on the other hand is more likely to take over caring responsibilities for younger brothers and sisters himself.

The living situation can be correlated with the allocation of time. Therefore proxies that serve as measures of distance to crucial institutions are include. Here these institutions are physicians, cinemas and high-schools. Aiming to come as close as possible to a causal interpretation of the effects, it is controlled for other caring responsibilities. In the household questionnaire it is asked if a person in the household is in need of care, in the personal questionnaire if care is provided for an adult outside the household. The caring responsibility for an adult person strongly changes the time restriction for the affected households. In addition this gives some information about the health of people in the household. Unfortunately, there are no direct questions about the respondent's health status.

With a similar reasoning households who care for an ill child on the reporting day are excluded. Even if the event "caring for an ill child" can be seen to be exogenous under the (strong) assumption that education has

no effect on child health, the fact that parents are asked to report their time allocation on three specific days, may lead to a distribution of child illness that is not representative.

A causal interpretation of the estimated effects may still not be appropriate, in particular when total time spent on childcare is in the focus. Reverse causality, meaning that a parent changes his education decision, because she or he has to care for the child, is not the most important issue here, because most of the parents have already completed their education when they decide to start a family. However, unobserved factors that affect the education decision as well as the caring decision are plausible to impact the results. Such factors could be family preferences, experience related to childcare or the expected return to education. If these characteristics lead to higher education levels and also higher caring times, the effect of education on caring time would be overestimated. The problem may be weaker for the allocation of a given time with children to specific sub-categories of childcare. Factors that drive the total amount of time spent with children, as for example unobserved career preferences should have weaker impact here, because the decision of the distribution of time with children does not conflict with the decision on working hours.

Due to data restrictions it is not possible to control for all relevant factors. In particular regional characteristics are missing, such that we have to rely on the mentioned proxies. Using weighted data is one possibility to correct at least for regional factors that were relevant for sampling. Researchers do not agree in general if sampling weights should be used in regression analysis. While in many other areas it seems to be common to use unweighted data in time use research the opposite seems to be the case. The time use weights that are provided by the German Federal Statistical Office do not only adjust the data to the German Microcensus with the aim to increase representativeness, but correct for the disproportionate reporting behavior related to the reporting day, such that these weights ensure that the days of the week are represented equally.

The GTUS is based on a quota sampling which provides an additional reasoning for using weighted data. For the quota sampling the employment status of partners plays an important role. Current econometric research dealing with sampling weights suggests that if there is endogenous sampling, which means that a sampling criterion is correlated with the outcome and as such with the error term, a weighted regression should be preferred (Solon et al. 2013; Winship and Radbill 1994). Endogenous sampling is plausible here, because the employment status and time for non-market activities are certainly correlated. A similar argument would apply to certain regional characteristics.

5 Results

5.1 Results for Total Time With Children (*TwC*) and *Care*

5.1.1 Age of the Youngest Child: 0-3 Years

In households with a child that is not older than three years, the results of the SUR-OLS model (table 2) reveal that university educated mothers spend significantly less time with their children than the reference group. This difference is about -61.65 minutes per day on average. The difference in *Care* as a primary activity is also negative with -20.56 minutes, but not statistically different from zero (table 3). Mothers with technical college degree do not show a statistically different behavior than those mothers with lower education. The difference is positive but small. For mothers in the third highest education group the difference is large but still not significantly different from zero.

The distribution of responsibilities within the household is in line with the predictions of the household models. Especially within households of mothers with a university degree the partner spends with 116.43 minutes on average much more time with the children. A mother with technical college degree increases the partner's time with children by 77.30 minutes on average. For men the mother's high education also leads to about half an hour more *Care* time per day compared to the reference group. This is the case for university educated and technical college educated mothers, even if the effect is only significantly different from zero for the first group. The father's own education decreases the average time with children, but cannot offset the effect of the mother's education, if we keep in mind that there is a large fraction of couples with an equal amount of education.

Additional SUR-estimations (table A10) for other time use show that, as expected, the reduction of time with children for higher educated mothers comes along with a larger amount of time spent working. In this child-age group the desire to participate in the labor market seems to be relatively stronger for higher educated mothers. In addition to formal care in these households the partner's provide a substitute for the mother's caring time. This hypothesis is supported by the fact that this pattern arises on weekdays, but not on weekends when caring time and working time do not conflict for most parents. The probability to use formal care is also higher for households with university educated mothers (table A11). If there is a consumption motive in the caring decision it seems to be dominated by the working decision of mothers in this age group. If university educated mothers face a stronger investment motive, these investments would be conducted by the partner, not the mother herself.

The non-positive educational tendency in maternal caring time may be explainable with features of the German family policy system. Parents receive monetary support for the first year of a child's life and if household income falls below a certain level also for the second year. In addition the job is protected until the child's third birthday. Childcare slots were rarely available in particular in the observation period. Compared to kindergartens for older children they are rather expensive. Labor market participation may,

consequently, only be worthwhile for high educated mothers. Due to assortative mating these mothers may in addition be more likely to have a partner, who is able to support the mother's labor market participation, because of more workspace flexibility and fewer financial restrictions.

The finding that the mother's education plays a crucial role for the father's allocation of time to childcare was also made by Gracia (2014) for Spain and Gimenez-Nadal and Molina (2013) when they compared the association between parental education and educational care in Spain and the United Kingdom.

5.1.2 Age of the Youngest Child: 4-6 Years

If the youngest child in the household is between four and six years old and as such in the typical kindergarten-age in Germany, there is no clear pattern for *TwC* related to education for both parents. The mother's education seems to reduce the parent-child shared time, strongest for technical college education on maternal *TwC* and 13/12 years of school plus vocational training on the partner's *TwC*. A father with more education than the reference group seems to raise maternal *TwC*, but not significantly. In the case of 13/12 years of schooling and vocational training the effect is negative.

The negative association can also be found between the father's third highest education level and maternal time devoted to *Care*. However, here the most remarkable finding is a higher level of caring time is for university educated mothers, by 30.83 minutes per day on average. For both other higher education group the difference is with 6 minutes rather small and insignificant. One can therefore not speak of a positive educational gradient in the sense of a continuous increase of caring time with maternal education. The higher caring time rather seems to be an outstanding behavior of university educated mother.

Compared to the younger group, the mother's and the father's university education are associated with a higher level of working hours (table A10). There is no such pattern of interplay between parents as it was in the younger group. Additional estimates show that these parents are much more likely to rely on informal care alternatives (table A11).

5.1.3 Age of the Youngest Child: 7-9 Years

In the group with a youngest child that should according to its age already be in primary school there is a change in the relative impact of maternal in comparison to paternal education on *TwC*. A higher educational level of the mother slightly reduces *TwC*, while fathers with higher education lead to a higher level of parent-child shared time for mothers and their partners. For men there is actually a continuous increase with the educational level from a difference of 71.40 minutes for fathers with 13/12 years of schooling plus vocational training to 106.75 minutes for fathers with university education. For mother's *TwC* a partner with 13 or 12 years of schooling plus vocational training makes the biggest difference with 88.40 more minutes

on average.²⁵

On the other hand conditional differences in *Care* suggest that only the mother's education makes a difference here. According to these results university educated mothers devote 42.16 minutes per day more to childcare, while their partners also devote 23.08 minutes more to childcare. For mothers with technical college degree there is at least a similar tendency.

This allows the interpretation that the partner's education relaxes income constraints, such that parents may be able to work fewer hours at the labor market but also to devote less time to household chores, because they are able to pay for substitutes. This hypothesis is weakly supported by the educational differences in other time use (table A10). University education, however, seems to have a positive influence on the mother's own and her partner's childcare time, even though there is less time per day the children are actually around.

For families with children in the age between seven and nine years it is much easier to leave these children alone for a while, such that supervising is not that necessary anymore. Secondly, primary school provides non-parental care for all children, but demands a very different parental involvement compared to kindergartens. The investment motive may play a bigger role in this group, but its effect on parental behavior may be stronger for the university educated. The mother's and the father's time do not seem to be substitutes in this group. Within the university educated group both parents devote more time to childcare.

Table 2: *TwC*: Time with child younger 10 years (min. per day) - SUR-OLS

	Age Youngest 0-3		Age Youngest 4-6		Age Youngest 7-9	
	<i>TwC</i> Mother	<i>TwC</i> Partner	<i>TwC</i> Mother	<i>TwC</i> Partner	<i>TwC</i> Mother	<i>TwC</i> Partner
Mother: University	-61.65* (33.09)	116.43*** (31.94)	-3.51 (37.59)	-13.64 (32.61)	-9.90 (47.96)	-61.89 (43.13)
Mother: Techn. College	6.62 (43.82)	77.30** (39.33)	-65.81* (37.88)	-40.40 (34.96)	4.84 (43.99)	6.36 (41.77)
Mother: 13/12 years plus Voc.	29.39 (26.53)	21.74 (22.34)	4.84 (26.26)	-46.11* (24.55)	-10.85 (25.13)	-4.44 (26.61)
Partner: University	15.12 (33.63)	-49.86* (27.49)	49.71 (34.05)	0.94 (32.55)	78.99** (30.70)	106.75*** (40.17)
Partner: Techn. College	38.85 (27.91)	-7.62 (24.15)	67.86 (51.55)	82.93 (53.02)	51.11* (27.32)	78.80** (34.90)
Partner: 13/12 years plus Voc.	-64.98 (41.07)	-35.15 (37.13)	-63.39** (28.90)	40.27 (38.04)	88.40** (37.43)	71.40** (35.14)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	648		586		513	
Mean	520.25	286.88	374.91	236.25	303.57	205.47

Robust standard errors in parentheses correct for clustering at the individual level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Controls variables: Number of children dummies (age groups 0-1 till 19 plus), age of youngest child dummies, age mother (quadratic), age partner (quadratic), weekday dummy, quarter of year dummies, dummy indicating adult in need in household, dummy indicating the provision of adult care outside household, dummies indicating cinema, physician or high school reachable by foot.

Reference group: Less than 12 years of schooling plus vocational training and no training.

Data is weighted. Weights are provided by the Federal Statistical Office.

²⁵In the sensitivity analysis using a two-part model the negative association of maternal university education is much more pronounced with a negative effect of more than 160 minutes. See robustness section.

Table 3: *Care*: Care with child younger 10 years around (min. per day) - SUR-OLS

	Age Youngest 0-3		Age Youngest 4-6		Age Youngest 7-9	
	Care Mother	Care Partner	Care Mother	Care Partner	Care Mother	Care Partner
Mother: University	-20.56 (17.79)	31.40** (13.47)	30.83** (13.28)	-1.95 (7.29)	42.16*** (14.01)	23.08** (9.23)
Mother: Techn. College	11.50 (28.86)	30.41 (22.40)	6.63 (16.73)	-7.43 (6.75)	17.27 (12.34)	7.99 (6.98)
Mother: 13/12 years plus Voc.	17.74 (14.65)	-2.62 (9.66)	6.37 (8.35)	-6.88 (5.81)	-8.75 (8.47)	0.11 (5.09)
Partner: University	7.01 (16.07)	-1.17 (12.25)	-6.81 (10.84)	-2.90 (6.39)	-8.88 (9.48)	-1.05 (6.07)
Partner: Techn. College	5.80 (19.90)	-7.61 (15.04)	-20.77 (14.42)	1.47 (9.01)	2.36 (9.91)	10.98 (7.29)
Partner: 13/12 years plus Voc.	-3.63 (15.81)	0.59 (15.03)	-42.76*** (11.67)	-4.75 (6.17)	4.41 (9.44)	0.46 (6.29)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	648		586		513	
Mean	158.74	68.87	71.13	32.50	52.19	25.11

Robust standard errors in parentheses correct for clustering at the individual level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Controls variables: Number of children dummies (age groups 0-1 till 19 plus), age of youngest child dummies, age mother (quadratic), age partner (quadratic), weekday dummy, quarter of year dummies, dummy indicating adult in need in household, dummy indicating the provision of adult care outside household, dummies indicating cinema, physician or high school reachable by foot.

Reference group: Less than 12 years of schooling plus vocational training and no training.

Data is weighted. Weights are provided by the Federal Statistical Office.

5.2 Allocation of the Time With Children to Specific Types of Care

The previous results show that higher educated parents do not unambiguously devote more time to their children. However, if there are negative tendencies they are much stronger for *TwC* than *Care*. In families with higher educated parents, there is indeed less parent-child shared time, in particular less mother-child shared time. However the time that is spent with children could still be used more intensively. Subsequently one may ask whether the time is used more efficiently by the allocation to specific childcare activities.

5.2.1 Type of Care - Age of the youngest child 0-3

The upper part of table 4 gives the estimated average marginal effects from the two-part model with a Probit specification for the participation decision and a *F-Logit* specification for the amount decision. These average marginal effects are calculated according to (2), by calculating the difference in the prediction for the two groups defined by the dummy variable of interest (finite-differences method).

While there is no overall intensification of caring by education, maternal education increases the share of *TwC* that is devoted to *Physically Stimulating Care*. With 4.3 percentage points this difference is highest for university educated mothers, followed by a difference of 2.9 percentage points between the lowest educational group and mothers with 13/12 years of schooling plus vocational training. For mothers with technical college education there is a difference of 2.1 percentage points, but not statistically different from zero. A look at the coefficients of the *TP*-model (table A12) reveals that this effect is actually driven by the amount equation.

In addition there are highly significant negative differences for *Instructional Time* and *Appointment Time*. These differences are, however, very small with 0.8 percentage points. In the case of *Instructional Time* it is purely driven by the participation equation, which can be interpreted as such that there were no instructional activities on that particular day. The correlation between the mother's education and *Appointment Time* is actually slightly negative.

The partner's education has nearly no additional effects. In households with fathers with 13/12 years of schooling plus vocational training there seems to be a larger share of *TwC* devoted to *Basic Care* and *Verbally Stimulating Care*.

The partner's allocation of his *TwC* to specific caring activities is, contrary to the choice of total caring time, nearly exclusively affected by his own education (table 5). His education increases the share of *TwC* devoted to *Basic Care*. The largest difference occurs for university educated partners with 9.1 percentage points. University and technical college educated partners allocate a 3.8 and 3.9 percentage point lower share to *Physically Stimulating Care*. The fraction of *TwC* spent on *Verbally Stimulating Care* is, however, higher for university educated fathers (3.8 percentage points). The difference is smaller if the mother has a technical college degree or 13/12 years of schooling plus vocational training (-1.3/-1.2 percentage points). Higher educated partners also seem to use a larger share of their time with children for appointments than the reference group (between 5.2 and 11.5 percentage points more). In this case the difference is again smaller if the mother has a technical college degree or 13/12 years of schooling and vocational training (-1.6/-1.3 percentage points). For *Instructional Time* there is no clear tendency. In this case the results should anyway be interpreted with care, as there are only 14 men who report a positive amount of *Instructional Time* on the diary day.

5.2.2 Type of Care - Age of the youngest child 4-6

In the middle group the childcare intensity of university and technical college educated mother is significantly higher than in the comparison group, with 10.1 and 8.1 percentage points. For these two educational groups there are positive tendencies in *Basic Care*, *Physically Stimulating Care* and *Verbally Stimulating Care*. University educated mothers devote a 3.5 percentage point larger share of *TwC* to *Verbally Stimulating Care*. The fraction of *Verbally Stimulating Care* is also higher for the third highest educational group with 1.8 percentage points. Technical college educated mothers allocate a significantly larger share of *TwC* to *Physically Stimulating Care* (3.4 percentage points).

Having a high educated partner leads to smaller differences for *Physically Stimulating Care* and *Appointment Time*. For technical college education it is also the case for *Physically Stimulating Care*. These reductions do not offset the positive effects of the mother's education.

There are no significant differences in the mother's *Instructional Time*. Similarly, few educational differences can be found in the allocation of the partner's *TwC*. The only significant difference is found for

university educated fathers with a 4.5 percentage point larger fraction of *TwC* devoted to *Basic Care*. There seems to be a negative correlation between maternal education and the time their partners devote to *Instructional Time*. However, here the interpretation is again problematic, as for partners of university educated mothers there is not a single non-zero observation on the diary day.

5.2.3 Type of Care - Age of the youngest child 7-9

In the oldest child-age group considered here there is only a significantly different behavior observable for university educated mothers. Their overall caring intensity is higher by 9.2 percentage points. This difference is obviously driven by a 8.3 percentage point higher share of *TwC* devoted to *Instructional Time* and a 4.3 percentage point higher share devoted to *Appointment Time*. Mothers with technical college degree allocate a 6.2 percentage point larger share to *Basic Care*. This difference is smaller if the partner has a technical college degree (-2.0 percentage points), too. The partner's university education slightly reduces the fraction of maternal *Appointment Time* (-2.2 percentage points). The differences in behavior between the reference group and university educated mothers can be interpreted as investment behavior. While younger children may be more receptive for *Physically* and *Verbally Stimulating Care*, children in primary school can be supported by helping with homework or enabling the participation in non-school activities, such as music or sports.

In this group it is again the mother's education that has the strongest impact on the father's allocation of *TwC*. Partners of university or technical college mothers focus more strongly on their children, when they are around. The share of *TwC* devoted do caring activities is on average 12.2 and 5.0 percentage points higher than in the reference group, even if not statistically different from zero for the partners of technical college educated mothers. These differences originate in different shares of *Basic Care* (4.6 and 6.9 percentage points). Partners of university educated mothers also spend a significantly larger share of their *TwC* on *Instructional Time*. This effect is with 14.6 percentage points rather high.

Surprisingly, an "investment behavior" can only be observed in households with a university educated mother. As it was already argued related to the allocation of the total amount of caring time it would be misleading to speak of an educational gradient, in terms of a continuous increase in the share of human capital stimulating activities with parental education. It rather seems to be an outstanding behavior of this specific group.

5.3 Sensitivity Analysis

Aiming to reduce the impact of unobserved factors, such as norms, I exclude parents without German nationality. The results are basically unchanged. This is quite plausible as only two percent of the sample is of foreign nationality, because writing German was an essential tool for filling out the diaries.

Relaxing the restriction that parents who care for an ill child are not included does not significantly change

Table 4: Average Marginal Effects: Percentage of *TwC* - *F-Logit* - Mother

	Care/ <i>TwC</i>	Basic/ <i>TwC</i>	Physical/ <i>TwC</i>	Verbal/ <i>TwC</i>	Instruct/ <i>TwC</i>	Appoint/ <i>TwC</i>
<i>Age Youngest 0-3 (n=641)</i>						
Mother: University	0.006 (0.031)	-0.024 (0.022)	0.043* (0.025)	0.004 (0.006)	-0.008*** (0.002)	-0.008* (0.004)
Mother: Techn. College	0.021 (0.032)	0.000 (0.026)	0.021 (0.020)	0.004 (0.007)	-0.004 (0.003)	-0.009*** (0.003)
Mother: 13/12 years plus Voc.	0.024 (0.023)	0.003 (0.016)	0.029* (0.017)	0.004 (0.004)	-0.005* (0.003)	0.002 (0.005)
Partner: University	0.011 (0.028)	0.008 (0.022)	0.002 (0.015)	0.002 (0.005)	-0.002 (0.003)	-0.004 (0.005)
Partner: Techn. College	0.011 (0.032)	-0.012 (0.017)	0.024 (0.020)	0.000 (0.005)	0.004 (0.005)	-0.006 (0.004)
Partner: 13/12 years plus Voc.	0.039 (0.028)	0.037* (0.021)	0.006 (0.017)	0.013* (0.007)	0.000 (0.004)	-0.006 (0.005)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean	0.308	0.182	0.088	0.017	0.009	0.012
Non-zero observations	623	612	402	188	74	78
<i>Age Youngest 4-6 (n=581)</i>						
Mother: University	0.101*** (0.036)	0.022 (0.019)	0.023 (0.020)	0.035** (0.017)	0.004 (0.008)	0.001 (0.013)
Mother: Techn. College	0.081* (0.044)	0.027 (0.024)	0.034* (0.020)	0.019 (0.012)	0.000 (0.010)	-0.001 (0.009)
Mother: 13/12 years plus Voc.	0.028 (0.020)	-0.005 (0.012)	0.001 (0.009)	0.018** (0.007)	-0.001 (0.007)	0.009 (0.007)
Partner: University	-0.028 (0.021)	0.008 (0.014)	-0.029*** (0.009)	0.007 (0.008)	0.005 (0.009)	-0.012** (0.005)
Partner: Techn. College	-0.055* (0.031)	0.001 (0.018)	-0.018* (0.011)	-0.016*** (0.006)	-0.002 (0.010)	-0.010** (0.005)
Partner: 13/12 years plus Voc.	-0.067*** (0.019)	-0.005 (0.014)	-0.027*** (0.009)	-0.009 (0.007)	-0.016*** (0.005)	-0.013*** (0.004)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean	0.199	0.096	0.043	0.025	0.019	0.016
Non-zero observations	517	464	191	192	116	57
<i>Age Youngest 7-9 (n=500)</i>						
Mother: University	0.092** (0.044)	0.024 (0.021)	-0.005 (0.009)	0.053 (0.033)	0.083* (0.044)	0.049* (0.026)
Mother: Techn. College	0.016 (0.038)	0.062*** (0.018)	0.020 (0.014)	0.010 (0.020)	-0.011 (0.017)	-0.000 (0.022)
Mother: 13/12 years plus Voc.	-0.007 (0.024)	-0.007 (0.009)	0.013 (0.012)	-0.010 (0.011)	-0.005 (0.014)	-0.010 (0.007)
Partner: University	-0.047 (0.029)	-0.003 (0.011)	0.015 (0.015)	-0.018 (0.011)	-0.019 (0.017)	-0.022*** (0.008)
Partner: Techn. College	-0.006 (0.032)	-0.020** (0.009)	0.007 (0.012)	-0.006 (0.013)	-0.019 (0.014)	0.011 (0.011)
Partner: 13/12 years plus Voc.	0.010 (0.031)	-0.012 (0.010)	0.028 (0.020)	0.022 (0.021)	-0.041*** (0.011)	0.019 (0.025)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean	0.202	0.061	0.030	0.037	0.057	0.017
Non-zero observations	388	288	71	141	164	44

Robust standard errors in parentheses correct for clustering at the individual level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Controls variables: Number of children dummies (age groups 0-1 till 19 plus), age of youngest child dummies, age mother (quadratic), age partner (quadratic), weekday dummy, quarter of year dummies, dummy indicating adult in need in household, dummy indicating the provision of adult care outside household, dummies indicating cinema, physician or high school reachable by foot.

Reference group: Less than 12 years of schooling plus vocational training and no training.

Data is weighted. Weights are provided by the Federal Statistical Office.

Table 5: Average Marginal Effects: Percentage of *TwC* - *F-Logit* - Partner

	Care/ <i>TwC</i>	Basic/ <i>TwC</i>	Physical/ <i>TwC</i>	Verbal/ <i>TwC</i>	Instruct/ <i>TwC</i>	Appoint/ <i>TwC</i>
<i>Age Youngest 0-3 (n=613)</i>						
Mother: University	-0.009 (0.035)	0.021 (0.020)	-0.006 (0.029)	-0.003 (0.008)	0.018 (0.015)	0.016 (0.014)
Mother: Techn. College	0.008 (0.041)	0.015 (0.020)	0.046 (0.031)	-0.013** (0.006)	0.000 (0.002)	-0.016*** (0.005)
Mother: 13/12 years plus Voc.	-0.041 (0.029)	-0.006 (0.017)	0.007 (0.023)	-0.012** (0.006)	0.002 (0.004)	-0.013** (0.005)
Partner: University	0.081** (0.040)	0.091*** (0.031)	-0.038* (0.022)	0.038** (0.015)	-0.013* (0.007)	0.052*** (0.020)
Partner: Techn. College	0.014 (0.034)	0.031 (0.021)	-0.039* (0.021)	0.019 (0.016)	-0.006 (0.005)	0.069** (0.035)
Partner: 13/12 years plus Voc.	0.062 (0.038)	0.042* (0.025)	-0.010 (0.026)	0.037* (0.020)	-0.006 (0.005)	0.115*** (0.045)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean	0.261	0.112	0.124	0.018	0.003	0.004
Non-zero observations	508	426	297	111	14	22
<i>Age Youngest 4-6 (n=553)</i>						
Mother: University	0.035 (0.042)	-0.010 (0.022)	0.025 (0.027)	0.023 (0.022)	-0.011*** (0.004)	-0.012* (0.006)
Mother: Techn. College	-0.015 (0.037)	-0.010 (0.019)	0.022 (0.023)	-0.008 (0.010)	-0.004 (0.006)	0.002 (0.013)
Mother: 13/12 years plus Voc.	-0.013 (0.024)	-0.004 (0.017)	0.023 (0.016)	-0.008 (0.008)	-0.010*** (0.004)	-0.006 (0.008)
Partner: University	0.012 (0.038)	0.045* (0.026)	-0.021 (0.014)	0.005 (0.011)	-0.007 (0.005)	-0.008 (0.007)
Partner: Techn. College	-0.010 (0.042)	-0.008 (0.024)	0.007 (0.020)	-0.005 (0.011)	-0.002 (0.005)	-0.016** (0.007)
Partner: 13/12 years plus Voc	-0.061*** (0.023)	-0.030** (0.015)	0.005 (0.018)	0.014 (0.015)	-0.008** (0.004)	0.003 (0.008)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean	0.174	0.075	0.051	0.026	0.007	0.015
Non-zero observations	359	243	144	98	21	22
<i>Age Youngest 7-9 (n=472)</i>						
Mother: University	0.122*** (0.041)	0.046* (0.025)	0.023 (0.030)	0.029 (0.023)	0.146*** (0.053)	-0.008 (0.005)
Mother: Techn. College	0.050 (0.033)	0.069** (0.028)	0.001 (0.017)	0.000 (0.020)	0.008 (0.028)	0.000 (0.012)
Mother: 13/12 years plus Voc.	0.013 (0.023)	0.005 (0.014)	0.032* (0.019)	-0.012 (0.011)	0.000 (0.015)	0.009 (0.007)
Partner: University	-0.040 (0.026)	-0.012 (0.015)	-0.002 (0.015)	-0.022** (0.010)	-0.002 (0.014)	-0.011** (0.005)
Partner: Techn. College	0.004 (0.029)	-0.013 (0.012)	0.007 (0.015)	-0.013 (0.011)	0.029 (0.022)	0.005 (0.008)
Partner: 13/12 years plus Voc	-0.029 (0.030)	0.010 (0.022)	0.020 (0.023)	-0.026*** (0.006)	0.014 (0.032)	-0.006 (0.009)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean	0.143	0.058	0.029	0.026	0.018	0.012
Non-zero observations	254	160	61	75	32	19

Robust standard errors in parentheses correct for clustering at the individual level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
 Controls variables: Number of children dummies (age groups 0-1 till 19 plus), age of youngest child dummies,
 age mother (quadratic), age partner (quadratic), weekday dummy, quarter of year dummies, dummy indicating adult
 in need in household, dummy indicating the provision of adult care outside household, dummies indicating cinema,
 physician or high school reachable by foot.
 Reference group: Less than 12 years of schooling plus vocational training and no training.
 Data is weighted. Weights are provided by the Federal Statistical Office.

the results. Only in the youngest group the effects become slightly weaker. Excluding parents who care for an adult or elderly person either at home or somewhere else has some effects, but nothing substantial on the allocation of *TwC* to specific types of care. The educational differences in the total amount of *TwC* and *Care* become smaller if they are positive and more negative in the case of a negative relationship. This is in particular the case in the oldest group. Table A5 reveals that in this group there is a relatively large share of households with university educated mothers who report that there is an adult in need of care. There is no change in sign.

Relaxing the “common support” restrictions on the number of children and in particular the age of the oldest child weakens the effects slightly in all estimations for total caring time, apart from the effect of education on the partner’s *TwC* in the youngest group, where the effects become slightly stronger. Estimates of the educational gradient in the type of care vary slightly, but by about less than 10 percent of the effect size and with no change in significance.

Changing the just mentioned restrictions decreases the effect of the mother’s university education on the partner’s *Instructional Time* in the group with a youngest child in the age of 7-9 years, but it is always significantly different from zero.

If the three groups are aggregated and households with older children are included, as it is done in most other studies, I end up with the result that maternal education has a small positive effect on caring time, but only if I restrict the control variables to a very limited set. Still the differences are relatively small in particular in comparison to those published for the United States. If the quadratic age of both partners and the number of children in each age group are included as well as other indicators of the living circumstances, the differences are further reduced. In combination with the main analysis this suggests that the positive tendencies in the middle and older group are potentially dominated by the youngest group and possibly by households with even older children. In addition, the analysis indicates that household composition plays a rather important role. Time use data does not give childcare time devoted to every single child, but total parental childcare time. Previous to the estimation of the effect of education, households should be made comparable in terms of composition and living circumstances to avoid a misleading interpretation of differences in these household characteristics as educational effects. In particular, if higher educated parents have relatively more children in similar ages we cannot be sure that a positive coefficient of high education can be interpreted such that these children actually experience more caring time if it is not controlled for the child-age distribution within the household.

Specifying the SUR-Model as a *F-Logit*, by dividing the caring time by the available minutes per day (1440), leads to very similar results for *TwC* and *Care*. Allowing for a separate process generating the participation and the amount decision by estimating a *TP-* model, leads to some changes in the estimated average effects, in particular in the cases where there is a significant amount of zero time spent with children (figures A1-A3). For fathers only the size of the effect changes marginally but sign and significance are confirmed. For

mothers there is a noticeably larger negative difference in TwC for university educated mothers in the oldest group, estimated by about -164 minutes. Estimating the Fractional Logit model for the types of care as ‘one-part’ model leads to slightly smaller differences for mothers in the two youngest groups and slightly bigger effects in the oldest group, but the quantity and significance changes only marginally. There are differences in the effect size but not sign and significance for fathers, too. It seem that the ‘one-part’ version leads to larger effects if there is a large fraction of zero time spent on an activity, while the opposite seems to be the case if there are predominantly non-zero observations.

I re-estimate the effects without weights and with simple weights that only ensure an equal distribution of days over the week. While the findings for the older groups are robust, there is a weaker positive association between education and the types of care in the youngest group. A look at the weighted data reveals that weighting increases the fraction of non-working mothers within this group. As discussed earlier this speaks for a case of endogenous sampling (Solon et al. 2013).

6 Comparable Estimates for the United States

As the analysis for Germany reveals some new patterns, these results shall finally be compared to the United States. In order to keep the observation period as similar as possible, the 2003 wave of the American Time Use Survey (ATUS), provided by the Bureau of Labor Statistics, is used to perform a similar analysis for the United States. The ATUS provides nationally representative estimates of how, where, and with whom Americans spend their time. ATUS data files can be linked to data files from the Current Population Survey (CPS). This is particularly important as the ATUS is not a multi-member survey. Consequently, it is not possible to observe the time use of a couple in the same household. It is only possible to analyse a mother in one household and a father in another household. For clarification the two groups will be called mothers and fathers (not partners). With the CPS data, however, it is possible to link each of these persons to the information of his or her partner’s education level.

A crucial difference between the ATUS and the GTUS is that in the ATUS people were interviewed by phone and had to recall the day. For each activity they were asked if their secondary task was childcare. Consequently, it is likely that in the ATUS people more often report childcare as their primary activity, because of the special attention this survey pays to childcare. However, the results of an analysis of the fraction of time with children used for several childcare activities should be comparable.

In the ATUS parents did not have to tick a box for the presence of a child that is not older than nine years, but reported directly which person was around. From this knowledge comparable measures can be calculated. TwC is the sum of all activities where the respondent stated that a child that was between 0 and 9 years old was around. *Care* includes all activities that were coded as childcare for which it was reported that a child in the relevant age group was around. Again only couple households are considered. All households were

a grandchild defines the age of the youngest child and all household with more than two generations are excluded as it was the case for Germany. The maximum number of children is restricted to four and the age of the oldest child to the maximum age in one of the education groups. The control variables are essentially the same. Instead of German nationality I control for being white. Region is controlled for by dummies for metropolitan status and the four cardinal directions.

Education in the United States is easier to rank. For the reason that the sample size is relatively small in the groups with older children, I only define three educational levels.²⁶ The educational reference group here consists of individuals without college degree, such that the maximum level of education in this group is high-school graduate. The highest level is bachelor's degree, master's degree or beyond, followed by associate degree or some college.

The subcategories are calculated such that they are comparable to the German categories: *Basic Care*²⁷, *Physically Stimulating Care*²⁸, *Verbally Stimulating Care*²⁹, *Instructional Time*³⁰ and *Appointment Time*³¹. Only care for own household children is considered and, as for Germany, only those times when a child younger than 10 years was around. Home schooling is not considered because this activity is not comparable to parents in countries where home schooling is not allowed. Parents with ill children are again not included. There are certainly differences. For example, the ATUS has no category of cuddling, but separates playing into more subcategories. Giving instructions and homework is coded separately. Still, if there is a pattern across these categories it may be comparable to the findings for Germany.

The analysis of the educational differences in *TwC* and *Care*, given in table 6, reveals that in the US as opposed to Germany there is a strong positive effect of education on *TwC* and *Care* for mothers in the youngest child-age group. This is, however, not an effect of her education, but the partner's high education. If the father is college educated with bachelor's degree or beyond his wife devotes on average 49.53 minutes more to *Care* than the reference group. If the partner has an associate degree or at least some college the difference is 26.58 minutes. For fathers the difference is 25.79 minutes if he has an associate degree or some college and about 13 minutes if his education is even higher. The last difference is, however, not significantly different from zero. For older children there is no positive effect of education.

It should not be surprising that the association between education and childcare seems to be relatively weak compared to previous research for the United States. This can partly be explained by differences in the control variables, in terms of household structure. Secondly, I use the earliest wave of the ATUS, while other research combines several waves. Ramey and Ramey (2010), however, were able to show that there was an increase in the education gradient in childcare in the United States over time. I also do not include

²⁶The sample size is relatively small, because with the three year threshold relatively many families belong to the first group. Secondly, the share of couple parents seems to decrease with child age.

²⁷(Physical care (t030101), Organization and planning (t030108), Looking for children (t030109), Other (t030199))

²⁸Playing, no sports (t030103), Arts and crafts (t030104), Sports (t030105)

²⁹Reading to/with (030102), Talking/Listening (t030106)

³⁰Helping/Teaching, no education (t030107), Homework (t030201)

³¹Attending events (t030110), Waiting (t030111), Meetings at school (t030202), Medical appointments (t030402)

some activities that have been shown to drive strongly the positive education effect, because these are not activities that are mainly spent with the child. Organization time, which is to a large part performed without the child and travel related to child care, which is neither considered here, have been found to explain a large part of the difference for older children (Ramey and Ramey 2010; Kalil et al. 2012).

It is remarkably that in the US, in particular in the youngest group the positive association between education and maternal childcare is driven by his education and not the mother's education. If it was not controlled for the partner's education this effect would partly be assigned to the mother's education, because of assortative mating. There is neither a strong substitution behavior between higher educated parents as it is the case for Germany. How can one interpret this finding? The estimated effects are relative difference of behavior within a country. While in Germany parents receive relatively strong financial support, this is not the case in the United States. If income plays a role, this may partly explain why the partner's education has this strong impact on childcare, because his income potential lifts financial pressure and as such allows the mother to care for the children. This suggests that education itself is not the driving force, but assortative mating that leads to a higher level of available income, which in turn allows the mother to allocate more time to childcare. A similar pattern was found by the early U.S. studies, which approximate the mother's socio-economic status by her husbands income or occupation (Leibowitz 1974a; Hill and Stafford 1980; Leibowitz 1975).

In the analysis of the distribution of *TwC* to the subcategories of childcare a very familiar picture occurs. In the youngest group his and her high education increases the share of *TwC* devoted to *Care*. A mother in the highest education group, as it is defined here, on average allocates 4.0 percentage points more *TwC* to *Care*. This suggests that the mother's education plays a role by assigning higher importance to childcare activities. If her partner is in the highest educational group as well it is another 5.1 percentage points. If he is in the second highest group the difference is still 3.7 percentage points. The mother's own education mainly increases *Basic Care* (2.8 percentage points). Her partner's high education on the other hand increases the share of *TwC* spent on activities that are most likely to provide "process benefits", as *Physically Stimulating Care* (3.7 percentage points) and *Verbally Stimulating Care* (1.8 percentage points). Fathers with young children devote a larger share of *TwC* to *Basic Care* and *Appointment Time* if the mother has a bachelor degree or even higher education (7.9 and 3.6 percentage points). His own high education raises the share of *Verbally Stimulating Care* by 2.4 and 3.9 percentage points, respectively.

If the youngest child in the household is between four and six years old, the mother's education clearly increases the share of *TwC* devoted to *Verbally Stimulating Care* (2.2 and 2.1 percentage points). His high education reduces the difference but does not offset the effect. His high education leads to a relatively larger share of *Appointment Time* for the mother (4.3 and 2.9 percentage points). In this case her education slightly reduces the effect. Only mothers with a partner who has an associate degree or some college spent a significantly larger share of *TwC* on *Basic Care*, but a smaller fraction on *Physically Stimulating Care*.

Fathers with bachelor's degree or beyond devote a 7.7 percentage point larger share to *Basic Care* activities and a 2.8 percentage point larger share to *Verbally Stimulating Care*. The same educational level on the part of the mother is associated with a larger share of *TwC* he spends on *Appointment Time* (4.5 percentage points).

In the oldest group mothers with the highest educational level devote a larger share of *TwC Instructional Time* (3.7 percentage points), but allocate relatively less time to *Physically Stimulating Care* (-2.4 percentage points). Having a partner with an associate degree or some college strongly changes the composition of *TwC* from more stimulating activities to *Basic Care*. Fathers with bachelor's degree or beyond focus more strongly on *Physically Stimulating Care* and *Instructional Time* (5.1 and 3.7 percentage points). Compared to Germany higher educated fathers in the U.S. seem to contribute a larger importance to sports and play. The mother's high education decreases the difference in the father's *Instructional Time* by 2.7 percentage points. If he is in the second highest educational group he allocates a much larger fraction of 6.9 percentage points to *Physically Stimulating Care*, but reduces *Verbally Stimulating Care* by 3.4 percentage points. If his wife is in the second highest educational group there seems to be a clear redistribution from *Physically Stimulating Care* to *Basic Care*, compared to the lowest educational group.

Table 6: *TwC*: Time with child youngest 10 years United States (min. per day) - OLS

	Age Youngest 0-3		Age Youngest 4-6		Age Youngest 7-9	
	<i>TwC</i> Mother	<i>TwC</i> Father	<i>TwC</i> Mother	<i>TwC</i> Father	<i>TwC</i> Mother	<i>TwC</i> Father
Self: Bachelor's degree and beyond	-29.66 (25.05)	14.37 (25.67)	-60.17* (32.25)	-20.88 (26.53)	15.22 (31.06)	9.36 (33.46)
Self: Associate or Some College	-26.04 (25.79)	-11.28 (23.83)	-10.31 (29.56)	-6.16 (25.24)	-37.35 (27.42)	-23.46 (24.05)
Partner: Bachelor's degree and beyond	68.74*** (25.68)	-27.58 (27.15)	12.19 (34.75)	-43.99 (28.43)	-24.48 (29.37)	-34.14 (35.62)
Partner: Associate or Some College	18.27 (23.53)	40.95* (24.70)	3.58 (28.95)	-69.70*** (24.55)	-81.48*** (28.74)	-27.27 (26.02)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	985	900	460	457	442	384
Mean	506.20	284.13	420.94	255.26	346.13	234.94

Robust standard errors in parentheses correct for clustering at the individual level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Controls variables: Number of children dummies (age groups 0-1 till 19 plus), age youngest child dummies, age mother (quadratic), age partner (quadratic), weekday dummy, quarter of year dummies, city dummy, white race dummy, geographic direction dummies.

Reference group: No College

Data is weighted. Weights provided by the Bureau of Labor Statistics.

Table 7: Care: Care with child youngest 10 years United States (min. per day) - OLS

	Age Youngest 0-3		Age Youngest 4-6		Age Youngest 7-9	
	Care Mother	Care Father	Care Mother	Care Father	Care Mother	Care Father
Self: Bachelor's degree and beyond	-0.90 (15.78)	4.96 (11.36)	-8.20 (13.15)	7.80 (9.28)	5.54 (10.77)	11.06 (8.82)
Self: Associate or Some College	1.13 (16.15)	8.42 (12.29)	-4.87 (10.28)	6.09 (8.02)	9.95 (9.79)	2.94 (7.69)
Partner: Bachelor's degree and beyond	49.53*** (15.57)	13.04 (11.22)	3.61 (11.90)	-1.88 (9.69)	-0.87 (11.02)	-16.12* (8.25)
Partner: Associate or Some College	26.58* (14.40)	25.79** (11.24)	-4.89 (11.38)	4.74 (8.64)	-19.80** (9.68)	-7.89 (7.93)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	985	900	460	457	442	384
Mean	163.77	69.12	86.07	45.01	60.56	28.62

Robust standard errors in parentheses correct for clustering at the individual level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
 Controls variables: Number of children dummies (age groups 0-1 till 19 plus), age youngest child dummies, age mother (quadratic), age partner (quadratic), weekday dummy, quarter of year dummies, city dummy, white race dummy, geographic direction dummies.
 Reference group: No College.
 Data is weighted. Weights provided by the Bureau of Labor Statistics.

Table 8: Average Marginal Effects: Percentage of TwC United States- F-Logit - Mother

	Care/TwC	Basic/TwC	Physical/TwC	Verbal/TwC	Instruct/TwC	Appoint/TwC
<i>Age Youngest 0-3 (n=959)</i>						
Self: Bachelor's degree and beyond	0.040* (0.024)	0.028* (0.016)	-0.009 (0.017)	0.005 (0.005)	0.002 (0.003)	0.007 (0.004)
Self: Associate or Some College	0.017 (0.023)	0.001 (0.016)	0.004 (0.016)	0.011* (0.006)	0.001 (0.003)	0.001 (0.003)
Partner: Bachelor's degree and beyond	0.051** (0.023)	0.001 (0.016)	0.037** (0.016)	0.014** (0.006)	0.004 (0.003)	0.001 (0.003)
Partner: Associate or Some College	0.037* (0.022)	0.013 (0.015)	0.021 (0.017)	0.009 (0.006)	0.000 (0.003)	-0.000 (0.003)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean	0.239	0.131	0.034	0.031	0.027	0.015
Non-zero observations	886	852	417	224	74	72
<i>Age Youngest 4-6 (n=437)</i>						
Self: Bachelor's degree and beyond	0.051 (0.033)	-0.005 (0.019)	0.024 (0.019)	0.023** (0.012)	0.005 (0.010)	-0.027** (0.013)
Self: Associate or Some College	-0.013 (0.028)	-0.019 (0.016)	0.021 (0.018)	0.021* (0.012)	-0.016*** (0.006)	-0.013 (0.009)
Partner: Bachelor's degree and beyond	-0.020 (0.031)	0.008 (0.019)	-0.023 (0.014)	-0.016* (0.009)	-0.006 (0.012)	0.043** (0.020)
Partner: Associate or Some College	-0.002 (0.028)	0.036** (0.018)	-0.030*** (0.011)	-0.015* (0.008)	-0.003 (0.008)	0.029* (0.017)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean	0.239	0.131	0.034	0.031	0.027	0.015
Non-zero observations	355	324	82	116	80	48
<i>Age Youngest 7-9 (n=425)</i>						
Self: Bachelor's degree and beyond	0.028 (0.039)	-0.010 (0.026)	-0.024** (0.009)	0.003 (0.011)	0.037* (0.021)	0.011 (0.011)
Self: Associate or Some College	0.064* (0.039)	0.018 (0.025)	0.007 (0.011)	0.019 (0.012)	0.027 (0.018)	-0.007 (0.009)
Partner: Bachelor's degree and beyond	0.005 (0.037)	0.009 (0.026)	0.008 (0.012)	0.014 (0.012)	-0.022 (0.015)	-0.002 (0.009)
Partner: Associate or Some College	0.037 (0.041)	0.069** (0.032)	-0.018** (0.009)	0.001 (0.010)	-0.021* (0.012)	0.003 (0.009)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean	0.246	0.140	0.015	0.024	0.052	0.015
Non-zero observations	310	254	31	69	107	34

Robust standard errors in parentheses correct for clustering at the individual level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
 Controls variables: Number of children dummies (age groups 0-1 till 19 plus), age youngest child dummies, age mother (quadratic), age partner (quadratic), weekday dummy, quarter of year dummies, city dummy, white race dummy, geographic direction dummies.
 Reference group: No College.
 Data is weighted. Weights provided by the Bureau of Labor Statistics.

Table 9: Average Marginal Effects: Percentage of TwC United States- *F-Logit* - Father

	Care/TwC	Basic/TwC	Physical/TwC	Verbal/TwC	Instruct/TwC	Appoint/TwC
<i>Age Youngest 0-3 (n=816)</i>						
Self: Bachelor's degree and beyond	0.017 (0.032)	0.021 (0.021)	-0.012 (0.023)	0.024** (0.009)	-0.008 (0.007)	-0.008 (0.008)
Self: Associate or Some College	0.039 (0.033)	0.035 (0.023)	-0.002 (0.022)	0.039** (0.018)	-0.011*** (0.004)	-0.009* (0.005)
Mother: Bachelor's degree and beyond	0.056 (0.037)	0.079*** (0.025)	0.017 (0.027)	-0.006 (0.009)	0.010 (0.009)	0.036* (0.021)
Mother: Associate or Some College	-0.012 (0.032)	0.013 (0.022)	0.019 (0.027)	-0.000 (0.009)	-0.005 (0.005)	0.062 (0.038)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean	0.163	0.106	0.026	0.025	0.031	0.014
Non-zero observations	584	485	281	92	40	13
<i>Age Youngest 4-6 (n=410)</i>						
Self: Bachelor's degree and beyond	0.084* (0.045)	0.076*** (0.023)	-0.018 (0.024)	0.028** (0.013)	0.015 (0.014)	0.005 (0.014)
Self: Associate or Some College	0.052 (0.042)	0.028 (0.023)	-0.003 (0.027)	-0.001 (0.011)	0.006 (0.012)	-0.015 (0.009)
Partner: Bachelor's degree and beyond	0.001 (0.039)	0.021 (0.023)	-0.007 (0.027)	-0.008 (0.016)	-0.015 (0.011)	0.045* (0.024)
Partner: Associate or Some College	0.059 (0.038)	0.013 (0.019)	0.063* (0.033)	0.024 (0.019)	-0.016* (0.008)	0.027 (0.026)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean	0.229	0.096	0.072	0.022	0.027	0.010
Non-zero observations	256	187	85	49	42	20
<i>Age Youngest 7-9 (n=328)</i>						
Self: Bachelor's degree and beyond	0.046 (0.038)	-0.020 (0.021)	0.051** (0.021)	0.019 (0.018)	0.032* (0.019)	0.018 (0.021)
Self: Associate or Some College	0.013 (0.036)	-0.030 (0.020)	0.062** (0.028)	-0.034*** (0.011)	0.014 (0.013)	0.023 (0.016)
Partner: Bachelor's degree and beyond	-0.042 (0.037)	0.038 (0.031)	-0.026 (0.018)	-0.036 (0.025)	-0.027** (0.012)	-0.004 (0.014)
Partner: Associate or Some College	0.003 (0.037)	0.058* (0.032)	-0.058*** (0.012)	0.002 (0.021)	-0.007 (0.011)	0.010 (0.014)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean	0.163	0.066	0.026	0.026	0.316	0.014
Non-zero observations	161	99	37	34	30	24

Robust standard errors in parentheses correct for clustering at the individual level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
 Controls variables: Number of children dummies (age groups 0-1 till 19 plus), age youngest child dummies, age mother (quadratic), age partner (quadratic), weekday dummy, quarter of year dummies, city dummy, white race dummy, geographic direction dummies.
 Reference group: No College.
 Data is weighted. Weights provided by the Bureau of Labor Statistics.

7 Discussion and Conclusion

This paper focuses on the association between parental education and parental childcare time investments in Germany. The analysis is based on the latest wave of the German Time Use Survey that was collected in the years 2001 and 2002. Special emphasis is paid to the partner's interaction, by exploring the association between both partners' educational level and their childcare investments. Childcare is the most obvious time use to influence child development, even though there are many other activities parents perform with their children. By dividing the sample into three age groups (0-3, 4-6 and 7-9) the effect of parental education is allowed to vary with the child's maturity. The stages in a child's life are associated with varying receptiveness for certain kinds of time inputs and changes in the availability of institutional substitutes for parental care.

The focus is on two main questions. Firstly, I analyse how education changes the allocation of total time to time with children and caring time in total. Secondly, I explore the educational pattern in the choice of the type of childcare for a given amount of parent-child shared time. A higher share of the time with children devoted to specific childcare activities can than interpreted as an expression of favoritism for this type of care.

Different to other studies on childcare using time use data, I find no clear positive effect of either the mother's or the father's education on their caring times. There is some outstanding behavior of university educated parents, but it is not appropriate to speak of a continuously increasing education gradient in caring time. In the group of households with a youngest child in the age between zero and three there is a hump-shaped effect of the mother's education in her time with children and caring time. Her education, on the other hand, strongly increases her partner's caring time and his time with children. In this group there seems to be stronger substitution between the mother's and the father's time in families with higher educated mothers. This is in line with predictions of economics models of the household. In the groups with older children there is only a positive trend for childcare in families with a university educated mother. However, if the youngest child is between seven and nine years old, his higher education leads to more time with children for both parents. This observation could be interpreted in terms of a stronger family preference of these fathers or the reduction of income restrictions that force lower educated parents to spend more hours on market and other non-market activities.

The analysis of the allocation of time with children to specific types of care reveals that higher educated mothers focus more strongly on caring activities that can be assumed to foster child development. In the youngest group the pattern is strongest for *Physically Stimulating Care*, in the middle group it is *Verbally Stimulating Care* and in the oldest group *Instructional* and *Appointment Time*. Partners focus more strongly on *Basic Care* in the two younger groups, but here his education is the crucial element. In the youngest group his high education leads to a larger share of *Verbally Stimulating Care* and *Appointment Time*, but less

Physically Stimulating Care. In the oldest child-age group her education again becomes the crucial element, such that partners of higher educated mothers focus more strongly on *Basic Care* and *Instructional Time*.

Estimations based on the American Time Use Data reveal a very different picture for the effect of education on the total amount of time with children and caring time. The strongest positive effect of high education is found in the youngest group, but the partner's education has a much stronger effect than the mother's own education. There is no pattern of substitution. Related to the types of care the pattern shows similarities. The strongest high education effect for mothers in the youngest education group is on *Physically Stimulating Care*, in the middle group on *Verbally Stimulating Care* and *Appointment Time* and for older children on *Instructional Time*. For fathers it is also *Basic Care* and *Verbally Stimulating Care* in the two younger groups and *Instructional Time* and *Physically Stimulating Care* in the oldest child-age group.

This paper does not confirm that higher educated parents unambiguously allocate more time to childcare in Germany, but the findings have some important implications of the intergenerational transmission of human capital. Not childcare quantity, but the chosen type of care, could be the crucial element in explaining differences in the transmission of skills from one generation to another by time investments. Distinctive family policies and norms have the potential to explain cross-country difference in the educational patterns for total childcare quantity. However, for Germany and the United States it was possible to show that the effect of education on the dominantly chosen way of spending time with children is comparable. Only recently Gimenez-Nadal and Molina (2013) show that there exists a similar pattern in educational care time in Spain and the United Kingdom. Observing differences in childcare behavior is certainly only the first step. If policy makers aim to influence the behavior we need data that allows to determine the role of parental time preferences and caring skills in shaping these education effects.

The results emphasize the importance of child-age and the interplay between partners for the allocation of time to childcare activities. Parents seem to adapt their behavior to the child's needs, but higher educated, in particular university educated parents, show considerably stronger adjustment. In Germany, fathers actually seem to substitute for the mother's time, at least when the children are relatively young. If fathers were actually willing to contribute more to childcare when the circumstances allow them to, this would be a crucial insight for policy makers. Parents would in this case prefer policies that support a more equal distribution of responsibilities within the family.

References

- APPS, P. (2003): "Gender, Time Use and Models of the Household," *IZA Discussion Paper No. 796*.
- APPS, P. AND R. REES (2009): *Public Economics and the Household*, Cambridge University Press.
- AUTORENGRUPPE BILDUNGSBERICHTERSTATTUNG (2012): *Bildung in Deutschland 2012 - Ein indikatorengestützter Bericht mit einer Analyse zur kulturellen Bildung im Lebenslauf*, Bildungsministerium fuer Bildung und Forschung, <http://www.bildungsbericht.de/index.html>.
- BECKER, G. (1965): "A Theory of the Allocation of Time," *The Economic Journal*, 75, 493–517.
- (1981): *A Treatise on the Family*, Harvard University Press.
- BECKER, G. S. AND N. TOMES (1976): "Child Endowments and the Quantity and Quality of Children," *The Journal of Political Economy*, 84, S143–S162.
- BEHRMAN, J. R., R. A. POLLAK, AND P. TAUBMAN (1995): *From Parent to Child: Intrahousehold allocations and intergenerational relations in the United States*, University of Chicago Press.
- BELOTTI, F. AND P. DEB (2013): "tpm: Stata module to estimate two-part cross-sectional models," *Statistical Software Components*.
- BERGHAMMER, C. (2013): "Keine Zeit für Kinder? Veränderungen in der Kinderbetreuungszeit von Eltern in Deutschland und Österreich," *Zeitschrift für Soziologie*, 42, 52–73.
- BIANCHI, S. (2000): "Maternal Employment and Time with Children: Dramatic Change or Surprising Continuity?" *Demography*, 37, 401–414.
- BITTMAN, M., L. CRAIG, AND N. FOLBRE (2004): "Packaging Care," in *Family Time: The Social Organization of Care*, ed. by N. Folbre and M. Bittman, Routledge.
- BLOSSFELD, H.-P. AND A. TIMM (2003): *Who Marries Whom?: Educational Systems as Marriage Markets in Modern Societies*, vol. 12, Springer.
- BONKE, J. (2005): "Paid Work and Unpaid Work: Diary Information Versus Questionnaire Information," *Social Indicators Research*, 70, 349–368.
- BRYANT, W. AND C. ZICK (1996): "An Examination of Parent-Child Shared Time," *Journal of Marriage and the Family*, 227–237.
- CAMERON, A. C. AND P. K. TRIVEDI (2010): "Microeconometrics Using Stata," *Stata Press books*.

- CARDOSO, A. R., E. FONTAINHA, AND C. MONFARDINI (2010): “Children’s and Parents’ Time Use: Empirical Evidence on Investment in Human Capital in France, Germany and Italy,” *Review of Economics of the Household*, 8, 479–504.
- CARNEIRO, P. AND J. HECKMAN (2003): “Human capital policy,” in *Inequality in America : What Role for Human Capital Policy?*, ed. by J. Heckman and A. Krueger, Cambridge, Mass.:MIT Press.
- CARNEIRO, P. AND M. RODRIGUES (2009): “Evaluating the Effect of Maternal Time on Child Development Using the Generalized Propensity Score,” *Institute for the Study of Labor, 12th IZA European Summer School in Labor Economics*.
- CHIAPPORI, P. (1992): “Collective Labor Supply and Welfare,” *Journal of Political Economy*, 100, 437–467.
- COLEMAN, J. S. (1988): “Social Capital in the Creation of Human Capital,” *American journal of sociology*, 95–120.
- CRAGG, J. (1971): “Some statistical models for limited dependent variables with application to the demand for durable goods,” *Econometrica*, 29, 829–844.
- CRAIG, L. (2006): “Parental Education, Time in Paid Work and Time with Children: An Australian time-diary Analysis,” *The British Journal of Sociology*, 57, 553–575.
- CUNHA, F. AND J. HECKMAN (2007): “The Technology of Skill Formation,” *American Economic Review*, 97, 31–47.
- CUNHA, F. AND J. J. HECKMAN (2009): “The economics and psychology of inequality and human development,” *Journal of the European Economic Association*, 7, 320–364.
- DESTATIS (2007): *Kinderbetreuung regional 2006*, Statistisches Bundesamt, Wiesbaden.
- (2012): *Kinderbetreuung regional 2011*, Statistisches Bundesamt, Wiesbaden.
- DEUTSCHES JUGENDINSTITUT (2008): *Zahlenspiegel 2007 Kindertagesbetreuung im Spiegel der Statistik*, Forschungsverbund DJI, München.
- ERMISCH, J., M. JÄNTTI, AND T. M. SMEEDING, eds. (2012): *From Parents to Children - The Intergenerational Transmission of Advantage*, Russell Sage Foundation.
- FEINSTEIN, L. (2003): “Inequality in the early cognitive development of British children in the 1970 cohort,” *Economica*, 70, 73–97.
- FELFE, C. AND A. HSIN (2012): “Maternal Work Conditions and Child Development,” *Economics of Education Review*, 31, 1037–1057.

- FOLBRE, N. (2004): "A Theory of the Misallocation of Time," in *Family time: The Social Organization of Care*, ed. by N. Folbre and M. Bittman, Routledge.
- FOLBRE, N. AND M. BITTMAN (2004): *Family time: The Social Organization of Care*, Routledge.
- FOLBRE, N. AND J. YOON (2007): "What is Child Care? Lessons from Time-Use Surveys of major English-speaking countries," *Review of Economics of the Household*, 5, 223–248.
- FORTIN, N. M. (2005): "Gender role attitudes and the labour-market outcomes of women across OECD countries," *Oxford Review of Economic Policy*, 21, 416–438.
- FRAZIS, H. AND J. STEWART (2012): "The Quality of Diaries: How to Think about Time-Use Data: What Inferences Can We Make about Long-and Short-Run Time Use from Time Diaries?" *Annales d'Economie et de Statistique*, 231–246.
- GAUTHIER, A., T. SMEEDING, AND F. FURSTENBERG (2004): "Are Parents Investing Less Time in Children? Trends in Selected Industrialized Countries," *Population and Development Review*, 30, 647–672.
- GIMENEZ-NADAL, J. I. AND J. A. MOLINA (2013): "Parents' education as a determinant of educational childcare time," *Journal of Population Economics*, 26, 719–749.
- GRACIA, P. (2014): "Fathers' Child Care Involvement and Children's Age in Spain: A Time Use Study on Differences by Education and Mothers' Employment," *European Sociological Review*, 30, 137–150.
- GRACIA, P., J. GHYSELS, AND K. VERCAMMEN (2011): "Parental Care Time in four European countries: Comparing Types and Contexts," *DemoSoc Working Papers 2011-41*.
- GRAHAM, J. W. AND C. A. GREEN (1984): "Estimating the Parameters of a Household Production Function with Joint Products," *The Review of Economics and Statistics*, 277–282.
- GRONAU, R. (1977): "Leisure, Home Production, and Work - The Theory of the Allocation of Time Revisited," *The Journal of Political Economy*, 85, 1099–1123.
- GRONAU, R. AND D. HAMERMESH (2006): "Time vs. Goods: The Value of Measuring Household Production Technologies," *Review of Income and Wealth*, 52, 1–16.
- GROSSMAN, M. (2006): *Education and Nonmarket Outcomes*, Elsevier, 577–633.
- GURYAN, J., E. HURST, AND M. KEARNEY (2008): "Parental Education and Parental Time with Children," *Journal of Economic Perspectives*, 22, 23–46.
- GUTIÉRREZ-DOMENECH, M. (2010): "Parental Employment and Time with Children in Spain," *Review of Economics of the Household*, 8, 371–391.

- HALLBERG, D. AND A. KLEVMARKEN (2003): "Time for Children: A Study of Parent's Time Allocation," *Journal of Population Economics*, 16, 205–226.
- HANK, K., M. KREYENFELD, AND C. SPIESS (2004): "Kinderbetreuung und Fertilität in Deutschland," *Zeitschrift für Soziologie*, 33, 228–244.
- HAVEMAN, R. AND B. WOLFE (1995): "The Determinants of Children's Attainments: A Review of Methods and Findings," *Journal of economic literature*, 33, 1829–1878.
- HECKMAN, J. J., J. STIXRUD, AND S. URZUA (2006): "The Effects of Cognitive and Noncognitive Abilities on Labor Market Outcomes and Social Behavior," *Journal of Labor Economics*, 24, 411–482.
- HILL, C. AND F. STAFFORD (1974): "Allocation of time to preschool children and educational opportunity," *Journal of Human Resources*, 9, 323–341.
- (1980): "Parental Care of Children: Time Diary Estimates of Quantity, Predictability, and Variety," *Journal of Human Resources*, 15, 219–239.
- JOESCH, J. AND K. SPIESS (2006): "European Mothers' Time spent looking after Children -Differences and Similarities across nine Countries," *Electronic International Journal of Time Use Research*, 3, 1–27.
- KALIL, A., R. RYAN, AND M. COREY (2012): "Diverging Destinies: Maternal Education and the Developmental Gradient in Time with Children," *Demography*, 49, 1361–1383.
- KERKHOFS, M. AND P. KOOREMAN (2003): "Identification and estimation of a class of household production models," *Journal of Applied Econometrics*, 18, 337–369.
- KIMMEL, J. AND R. CONNELLY (2007): "Mothers' Time Choices Caregiving, Leisure, Home Production, and Paid Work," *Journal of Human Resources*, 42, 643–681.
- KOLVENBACH, F.-J. (2004): "Kindertagesbetreuung regional 2002. Krippen-, Kindergarten- und Hortplätze im Kreisvergleich," Statistische Ämter des Bundes und der Länder.
- KREYENFELD, M. (2002): "Time Squeeze, Partner Effect or Self-Selection?" *Demographic Research*, 7, 15–48.
- KREYENFELD, M. AND K. HANK (2000): "Does the Availability of Child Care Influence the Employment of Mothers? Findings from Western Germany," *Population Research and Policy Review*, 19, 317–337.
- LEIBOWITZ, A. (1974a): "Education and Home Production," *The American Economic Review*, 64, 243–250.
- (1974b): "Home Investments in Children," *NBER Chapters*, 432–456.

- (1975): “Education and the Allocation of Women’s Time,” *NBER Chapters*, 171–198.
- (1977): “Parental Inputs and Children’s Achievement,” *The Journal of Human Resources*, 12, 242–251.
- LEIBOWITZ, A. A., J. A. KLERMAN, AND L. J. WAITE (1992): “Employment of new Mothers and Child Care Choice: Differences by Children’s Age,” *Journal of Human Resources*, 112–133.
- LEIBOWITZ, A. A. (2003): “In-home Training and the Production of Children’s Human Capital,” *Review of Economics of the Household*, 1, 305–317.
- MICHAEL, R. T. (1973): “Education in Nonmarket Production,” *Journal of Political Economy*, 81, 306–27.
- MULLAHY, J. AND S. A. ROBERT (2010): “No Time to Lose: Time Constraints and Physical Activity in the Production of Health,” *Review of Economics of the Household*, 8, 409–432.
- NEUWIRTH, N. (2004): “Parents & time, allocated for child care?” .
- OECD FAMILY DATABASE (2012): “LMF2.2: The distribution of working hours among adults in couple families by age of youngest child and number of children,” OECD, [http://www.oecd.org/els/family/LMF2.2 Working hours distribution among couples-updated 200112.pdf](http://www.oecd.org/els/family/LMF2.2%20Working%20hours%20distribution%20among%20couples-updated%20200112.pdf).
- PAPKE, L. E. AND J. M. WOOLDRIDGE (1996): “Econometric Methods for Fractional Response Variables with an Application to 401 (K) Plan Participation Rates.” *Journal of Applied Econometrics*, 11, 619–632.
- PFEIFFER, F. AND K. REUSS (2008): “Age-Dependent Skill Formation and Returns to Education,” *Labour Economics*, 15, 631–646.
- RAMALHO, E. A., J. J. RAMALHO, AND J. M. MURTEIRA (2011): “Alternative Estimating and Testing Empirical Strategies for Fractional Regression Models,” *Journal of Economic Surveys*, 25, 19–68.
- RAMEY, G. AND V. RAMEY (2010): “The Rug Rat Race - Comments and Discussion,” *Brookings Papers on Economic Activity*, 129–176.
- RENZ, R. AND B. EGGEN (2004): “Frauen in Europa: Job? Kinder? Oder beides?” *Statistisches Monatsheft Baden-Württemberg*, 11–15.
- RUHM, C. J. (2008): “Maternal Employment and Adolescent Development,” *Labour Economics*, 15, 958–983.
- SAYER, L., S. BIANCHI, AND J. ROBINSON (2004a): “Are Parents Investing Less in Children? Trends in Mothers’ and Fathers’ Time with Children,” *American Journal of Sociology*, 110, 1–43.

- SAYER, L., A. GAUTHIER, AND F. FURSTENBERG JR (2004b): “Educational Differences in Parents’ Time with Children: Cross - National Variations,” *Journal of Marriage and Family*, 66, 1152–1169.
- SÉNÉCHAL, M. AND J.-A. LEFEVRE (2002): “Parental Involvement in the Sevelopment of Children’s Reading Skill: A five-year Longitudinal Study,” *Child development*, 73, 445–460.
- SOLON, G., S. J. HAIDER, AND J. WOOLDRIDGE (2013): “What are we Weighting for?” Tech. rep., National Bureau of Economic Research.
- STEWART, J. (2013): “Tobit or not Tobit?” *Journal of Economic and Social Measurement*, 38, 263–290.
- VERMEULEN, F. (2002): “Collective Household Models: Principles and Main Results,” *Journal of Economic Surveys*, 16, 533–564.
- VILLENA-ROLDÁN, B. AND C. RÍOS-AGUILAR (2012): “Causal Effects of Maternal Time-Investment on Children’s Cognitive Outcomes,” Tech. rep., Centro de Economía Aplicada, Universidad de Chile.
- WINSHIP, C. AND L. RADBILL (1994): “Sampling Weights and Regression Analysis,” *Sociological Methods & Research*, 23, 230–257.
- WOOLDRIDGE, J. (2001): *Econometric Analysis of Cross Section and Panel Data*, MIT press.
- ZELLNER, A. (1962): “An Efficient Method of Estimating Seemingly Unrelated Regressions and Tests for Aggregation Bias,” *Journal of the American statistical Association*, 57, 348–368.

A Literature

Table A1: Absolute Amount of Childcare Time

Study	Data/Country	Sample	Method	Findings
U.S.-American Studies				
Leibowitz (1974a) Leibowitz (1975)	Time Use Survey (TUS) United States (1960s)	All women, at least 1 child <18 years	Descriptive/ OLS	Maternal education has a significant positive impact on physical and other childcare. The husband's income has a positive effect on maternal childcare time. The husband's time input tends to increase maternal care time.
Hill and Stafford (1980)	TUS United States, Michigan(1965)	Married, at least 1 child <18 years	Descriptive /OLS	Women with higher socioeconomic status, defined according to the occupation of the husband, spend more time caring.
Hill and Stafford (1974)	TU.S. United States,Michigan (1965)	Married, at least 1 child <18 years	Descriptive /OLS	College educated mothers spend more caring time per child. The per-child-time does not decrease with the number of children in contrast to the per-child time of lower educated mothers. Higher educated mothers spend relatively more time with younger children and on quality time. College educated women reduce their childcare time relatively less when they are working compared to high school educated women with the same working hours.
Bryant and Zick (1996)	TU.S. United States (ESTU.S.)(1977/78)	Couples ,2 children, both <18 years	Tobit	Higher educated mother spends relatively more time caring for the younger child in a family, while higher educated fathers spend more time with the older child compared to lower educated fathers.
Kimmel and Connelly (2007)	ATUS United States (2004/05)	Mothers,at least 1 child <13 years	SUR-OLS/Logit	A women's predicted wage has an positive effect on maternal childcare time.
Guryan et al. (2008)	ATUS United States (2003-2006) + MTU.S. Data*	All individuals, at least 1 child <18 years	OLS	Defining 5 education groups (<12, 12, 13-15, 16 and 16+ years of education) they find a strong positive impact of education on childcare time for working and non-working mothers in the U.S.. At the same time the effect on market work is not significant. For men education is positively associated with childcare. The part on international data reveals that the positive education effect holds for most countries, however, the size and the significance of the effects varies.
International Studies				
Sayer et al. (2004b)	MTU.S. Data: Canada(1992) Germany(1991) Italy (1989) Norway(1990)	Married, at least 1 child <18 years	Tobit	Controlling for the employment status of wife and husband and the wife's occupation, they find a positive effect of high education. The effect for German mothers is much smaller, only the very low educated devote slightly less time to childcare. Fathers there is a small negative effect of low education, which is larger for Canadian and Italian than for German fathers but non-existing for Norwegian fathers. White collar occupation has only a positive effect on German mothers' childcare time.
Neuwirth (2004)	Austria (1992)	Couples, all children <16 years	OLS/2SLS	The correlation between of education and childcare time is positive for both parents given labor market participation.
Gracia et al. (2011)	TU.S. Denmark(2001) Flanders(2004/05) Spain(2002/03) United Kingdom(2000/01)	Couples, 1 child <16 years	OLS	Significant positive associations between education and childcare were only found for parents in Spain and mothers in the UK. Controlling for working time the effect becomes stronger. For fathers there is only a positive effect of education, given working time, on childcare time in Spain and Denmark, but it is the other way around in the UK and Flanders. Controlling for working time college-educated mothers spent significantly more time caring than the group of lower educated mothers with the same working hours. Fathers spend more time with their children when the mother has a college degree.

*Austria (1992), Canada(1998/99), Chile(1999), Estonia(1999/2000), Italy (2002/03), France(1998/99), Netherlands(2000), Norway(1990/91), Palestine(1999/2000) Slovenia(2000/01), South Africa(2000), United Kingdom(2000/01)

Table A2: Allocation of Time to Specific Types of Care

Study	Data/Country	Sample	Method	Findings
Craig (2006)	TU.S. Australia (1997)	Couples, 1 child <12 years	OLS	Higher education, in terms of training is associated with more childcare time. However, the effect is not linearly increasing. There are also difference in the effect of education on the type of childcare. The strongest positive effect of a high university degree can be found in development care, while those with a lower educational degree spend more time on passive care. For fathers those with a higher university degree spend more time in overall childcare, but not much more on physical care.
Gutiérrez-Domenech (2010)	TU.S. Spain (2002/03)	Couples, 1 child <17 years	OLS	Mothers with tertiary education, but not those with university degree spend relatively more time on basic primary childcare. Fathers with university degree spend significantly more time with their children. Working mothers focus on educational care.
Kalil et al. (2012)	ATUS 2003-2007	Married women, 1 child <13 years, only biological children, 3 age groups, (0-2, 3-5, 6-13)	Tobit	Using interaction between education and the child-age groups they reveal large positive gaps by maternal education for basic care and playing in the youngest group, which decreases strongly with child age. For teaching activities the difference is largest in the middle group, while the education gradient for management time steadily increases with the child's age.
Gimenez-Nadal and Molina (2013)	TUS Spain (2002/03) and UK (2000)	Couples, 1 child <18 years	SUR-Tobit	The mother's education is associated with an increase in the educational childcare time provided by fathers in both Spain and the UK. It also raises the time devoted to educational childcare by mothers in Spain. The father's education has no effect on the time devoted to educational childcare time by either parent.
Gracia (2014)	TUS Spain (2002/03)	Fathers, children age 0-11, 3 child-age groups (0-2, 3-5, 6-13)	OLS/Logit	The father's education is positively associated with physical care time in the groups with a child in one of the younger two groups. The father's education increases the time devoted to interactive care in the group with a youngest child aged 3-5. The mother's education is positively correlated with the father's physical care activity in the youngest group. All estimates are conditional on mother's and father's employment status.

B Distribution of Caring Time

Figure A1: *Time with Children and Care Youngest 0-3*

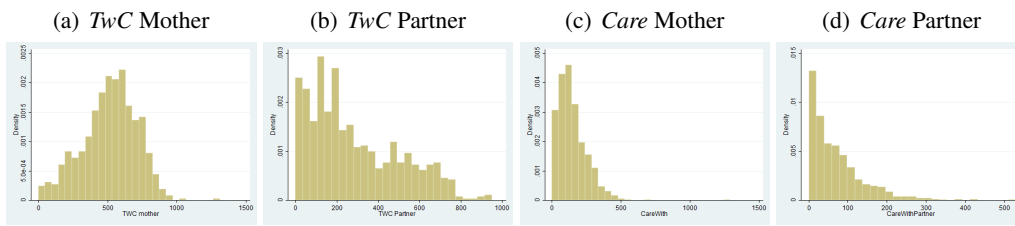


Figure A2: *Time with Children and Care Youngest 4-6*

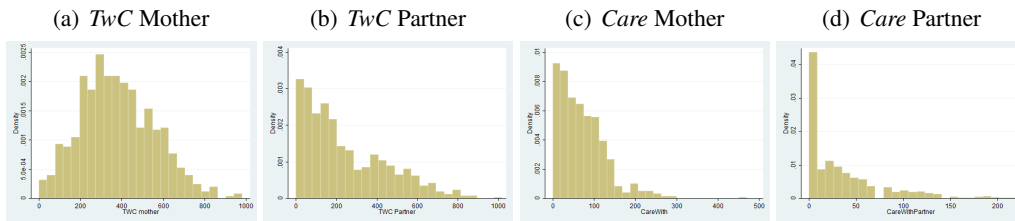
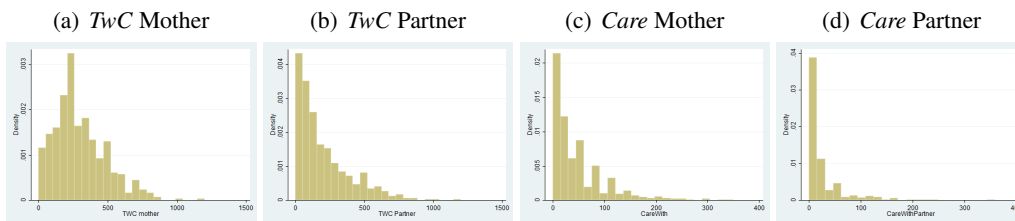


Figure A3: *Time with Children and Care Youngest 7-9*



C Summary statistics

Table A3: Summary statistic by Mother's Education - Youngest 0-3

	University		Techn. College		13/12 + Vocational		Lower	
	Mean	(Max.)	Mean	(Max.)	Mean	(Max.)	Mean	(Max.)
Number of Children	1.62	(4)	1.99	(5)	2.24	(5)	2.12	(6)
Age Youngest Child	1.54	(3)	1.19	(3)	1.39	(3)	1.72	(3)
Age Oldest Child	3.53	(13)	4.05	(13)	5.35	(15)	5.59	(21)
Married	0.82	(1)	0.92	(1)	1.00	(1)	0.97	(1)
Age Mother	33.84	(47)	34.06	(42)	34.14	(40)	33.46	(50)
Age Partner	34.91	(55)	37.80	(46)	36.79	(53)	36.10	(51)
Adult in HH needs Care	0.01	(1)	0.00	(0)	0.01	(1)	0.02	(1)
Provision of Care outside HH	0.06	(1)	0.09	(1)	0.01	(1)	0.05	(1)
Ill Child	2.76	(90)	0.00	(0)	0.78	(200)	0.38	(100)
German Nationality Mother	0.97	(1)	0.88	(1)	1.00	(1)	0.96	(1)
German Nationality Partner	0.93	(1)	0.97	(1)	0.98	(1)	0.97	(1)
Weekday	0.61	(1)	0.68	(1)	0.68	(1)	0.67	(1)
Monday	0.18	(1)	0.10	(1)	0.12	(1)	0.12	(1)
Tuesday	0.11	(1)	0.14	(1)	0.19	(1)	0.14	(1)
Wednesday	0.12	(1)	0.14	(1)	0.11	(1)	0.17	(1)
Thursday	0.09	(1)	0.16	(1)	0.11	(1)	0.12	(1)
Friday	0.11	(1)	0.14	(1)	0.14	(1)	0.12	(1)
Saturday	0.13	(1)	0.10	(1)	0.13	(1)	0.14	(1)
Sunday	0.26	(1)	0.22	(1)	0.19	(1)	0.19	(1)
1st Quarter	0.22	(1)	0.30	(1)	0.31	(1)	0.25	(1)
2nd Quarter	0.44	(1)	0.16	(1)	0.22	(1)	0.27	(1)
3rd Quarter	0.22	(1)	0.23	(1)	0.26	(1)	0.26	(1)
4th Quarter	0.12	(1)	0.31	(1)	0.21	(1)	0.22	(1)
Cinema by foot	0.18	(1)	0.33	(1)	0.34	(1)	0.24	(1)
Physician by foot	0.46	(1)	0.65	(1)	0.84	(1)	0.73	(1)
High School by foot	0.22	(1)	0.45	(1)	0.60	(1)	0.48	(1)
Observations	81		87		177		363	

Source: GTUS 2001/02, own calculations. Data is weighted.

Table A4: Summary statistic by Mother's Education - Youngest 4-6

	University		Techn. College		13/12 + Vocational		Lower	
	Mean	(Max.)	Mean	(Max.)	Mean	(Max.)	Mean	(Max.)
Number of Children	2.25	(4)	2.03	(6)	2.05	(4)	2.27	(4)
Age Youngest Child	4.51	(6)	4.93	(6)	5.08	(6)	5.05	(6)
Age Oldest Child	8.04	(20)	8.94	(20)	8.93	(16)	9.79	(21)
Married	1.00	(1)	1.00	(1)	1.00	(1)	0.97	(1)
Age Mother	38.20	(44)	37.80	(45)	36.55	(44)	36.33	(48)
Age Partner	40.85	(54)	40.82	(56)	38.38	(50)	39.05	(51)
Adult in HH needs Care	0.07	(1)	0.00	(0)	0.06	(1)	0.01	(1)
Provision of Care outside HH	0.00	(0)	0.00	(0)	0.03	(1)	0.06	(1)
Ill Child	0.24	(30)	0.39	(60)	3.96	(100)	9.60	(760)
German Nationality Mother	1.00	(1)	1.00	(1)	1.00	(1)	0.97	(1)
German Nationality Partner	1.00	(1)	1.00	(1)	1.00	(1)	0.94	(1)
Weekday	0.68	(1)	0.68	(1)	0.67	(1)	0.66	(1)
Monday	0.19	(1)	0.13	(1)	0.15	(1)	0.11	(1)
Tuesday	0.17	(1)	0.17	(1)	0.17	(1)	0.14	(1)
Wednesday	0.11	(1)	0.12	(1)	0.12	(1)	0.13	(1)
Thursday	0.09	(1)	0.15	(1)	0.10	(1)	0.14	(1)
Friday	0.11	(1)	0.11	(1)	0.13	(1)	0.15	(1)
Saturday	0.15	(1)	0.11	(1)	0.19	(1)	0.13	(1)
Sunday	0.17	(1)	0.21	(1)	0.14	(1)	0.21	(1)
1st Quarter	0.35	(1)	0.46	(1)	0.28	(1)	0.14	(1)
2nd Quarter	0.38	(1)	0.13	(1)	0.15	(1)	0.22	(1)
3rd Quarter	0.11	(1)	0.02	(1)	0.20	(1)	0.28	(1)
4th Quarter	0.15	(1)	0.38	(1)	0.38	(1)	0.35	(1)
Cinema by foot	0.27	(1)	0.34	(1)	0.24	(1)	0.33	(1)
Physician by foot	0.91	(1)	0.94	(1)	0.77	(1)	0.77	(1)
High School by foot	0.60	(1)	0.45	(1)	0.59	(1)	0.54	(1)
Observations	63		69		143		369	

Source: GTUS 2001/02, own calculations. Data is weighted.

Table A5: Summary statistic by Mother's Education - Youngest 7-9

	University		Techn. College		13/12 + Vocational		Lower	
	Mean	(Max.)	Mean	(Max.)	Mean	(Max.)	Mean	(Max.)
Number of Children	1.72	(4)	1.79	(4)	2.23	(4)	2.06	(5)
Age Youngest Child	7.70	(9)	7.57	(9)	8.03	(9)	7.77	(9)
Age Oldest Child	9.63	(14)	9.29	(15)	11.45	(19)	11.43	(23)
Married	0.95	(1)	1.00	(1)	0.97	(1)	0.93	(1)
Age Mother	39.55	(48)	35.25	(49)	39.09	(49)	38.23	(51)
Age Partner	43.09	(55)	36.46	(51)	41.41	(60)	41.10	(59)
Adult in HH needs Care	0.10	(1)	0.00	(0)	0.02	(1)	0.01	(1)
Provision of Care outside HH	0.05	(1)	0.01	(1)	0.05	(1)	0.03	(1)
Ill Child	0.00	(0)	0.00	(0)	0.00	(0)	0.36	(70)
German Nationality Mother	1.00	(1)	1.00	(1)	0.98	(1)	0.94	(1)
German Nationality Partner	0.75	(1)	1.00	(1)	0.96	(1)	0.92	(1)
Weekday	0.67	(1)	0.70	(1)	0.69	(1)	0.68	(1)
Monday	0.17	(1)	0.20	(1)	0.19	(1)	0.12	(1)
Tuesday	0.22	(1)	0.15	(1)	0.18	(1)	0.13	(1)
Wednesday	0.07	(1)	0.14	(1)	0.12	(1)	0.09	(1)
Thursday	0.09	(1)	0.12	(1)	0.10	(1)	0.17	(1)
Friday	0.12	(1)	0.09	(1)	0.10	(1)	0.16	(1)
Saturday	0.14	(1)	0.25	(1)	0.21	(1)	0.16	(1)
Sunday	0.19	(1)	0.05	(1)	0.10	(1)	0.17	(1)
1st Quarter	0.34	(1)	0.48	(1)	0.48	(1)	0.32	(1)
2nd Quarter	0.12	(1)	0.42	(1)	0.11	(1)	0.26	(1)
3rd Quarter	0.47	(1)	0.07	(1)	0.12	(1)	0.15	(1)
4th Quarter	0.07	(1)	0.03	(1)	0.30	(1)	0.28	(1)
Cinema by foot	0.31	(1)	0.13	(1)	0.26	(1)	0.30	(1)
Physician by foot	0.91	(1)	0.74	(1)	0.82	(1)	0.83	(1)
High School by foot	0.82	(1)	0.57	(1)	0.46	(1)	0.58	(1)
Observations	54		48		132		377	

Source: GTUS 2001/02, own calculations. Data is weighted.

D Partner Constellations

Table A6: Assortative Mating- Age Youngest 0-3

<i>Mother/Partner</i>	Uni	Techn	13/12+Voc.	Lower	Total
Uni	37	10	4	17	69
Techn	16	17	31	31	95
13/12+Voc.	23	28	33	80	164
Lower	29	25	33	328	415
Total	106	80	100	456	743

Source: GTUS 2001/02, own calculations. Data is weighted.

Table A7: Assortative Mating- Age Youngest 4-6

<i>Mother/Partner</i>	Uni	Techn	13/12+Voc.	Lower	Total
Uni	30	5	6	13	54
Techn	15	10	5	12	42
13/12+Voc.	25	24	10	60	119
Lower	21	11	66	320	418
Total	91	50	87	405	633

Source: GTUS, own calculations. Data is weighted.

Table A8: Assortative Mating- Age Youngest 7-9

<i>Mother/Partner</i>	Uni	Techn	13/12+Voc.	Lower	Total
Uni	36	3	2	10	50
Techn	9	9	13	15	46
13/12+Voc.	18	22	12	59	110
Lower	31	34	28	261	355
Total	93	68	55	345	561

Source: GTUS 2001/02, own calculations. Data is weighted.

E Weekdays, Other Time Use and Other Care

Table A9: *Care* Weekday vs. Weekend (min. per day) - SUR-OLS

	Age Youngest 0-3		Age Youngest 4-6		Age Youngest 7-9	
	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
Mother's Time						
Mother: University	-46.47** (19.10)	32.53 (22.24)	34.49** (15.98)	-10.08 (15.61)	22.60* (12.17)	20.45 (14.16)
Mother: Techn. College	14.31 (31.75)	28.37 (28.31)	6.77 (19.79)	3.06 (17.25)	20.55 (13.43)	13.87 (16.72)
Mother: 13/12 years plus Voc.	23.95 (15.15)	25.56 (16.35)	16.24 (11.73)	-16.06* (9.39)	-11.53 (7.09)	30.70*** (11.55)
Partner: University	15.38 (19.38)	-4.13 (19.62)	-24.86* (13.51)	27.20** (12.23)	-13.57 (10.59)	-12.88 (8.80)
Partner: Techn. College	2.71 (21.27)	-0.87 (24.17)	-35.32** (17.83)	12.07 (12.68)	-7.84 (9.72)	-5.70 (15.21)
Partner: 13/12 years plus Voc.	0.08 (16.85)	-28.96 (20.66)	-48.40*** (16.02)	-28.84*** (9.59)	0.88 (9.18)	19.23 (13.84)
Partner's Time						
Mother: University	47.21*** (14.99)	1.59 (22.28)	6.64 (7.88)	-22.36 (13.77)	18.53*** (6.96)	1.68 (12.18)
Mother: Techn. College	39.82 (24.38)	16.62 (26.54)	-9.30 (7.02)	-3.42 (13.98)	20.90** (8.15)	-15.67 (10.94)
Mother: 13/12 years plus Voc.	-1.34 (8.68)	-1.63 (17.58)	-8.16 (5.67)	-3.38 (10.95)	0.29 (3.72)	17.15** (8.66)
Partner: University	-14.74 (14.02)	29.64* (16.32)	-7.89 (6.05)	10.62 (13.52)	-8.76** (4.05)	1.77 (10.13)
Partner: Techn. College	-15.18 (12.94)	-3.69 (25.64)	5.24 (10.02)	-6.76 (13.66)	10.34 (8.26)	5.60 (12.99)
Partner: 13/12 years plus Voc.	-9.10 (14.46)	18.12 (24.27)	-4.27 (6.49)	-5.44 (8.60)	4.34 (7.15)	0.04 (8.66)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	398	223	359	202	347	198

Robust standard errors in parentheses correct for clustering at the individual level.

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

Controls variables: Number of children dummies (age groups 0-1 till 19 plus), age of youngest child dummies, age mother (quadratic), age partner (quadratic), weekday dummy, quarter of year dummies, dummy indicating adult in need in household, dummy indicating the provision of adult care outside household, dummies indicating cinema, physician or high school reachable by foot.

Reference group: Less than 12 years of schooling plus vocational training and no training.

Data is weighted. Weights are provided by the Federal Statistical Office.

Table A10: Differences in Education for Other Time Use (min. per day) - SUR-OLS

	Job		Household		Personal+Leisure	
	Mother	Partner	Mother	Partner	Mother	Partner
Age Youngest 0-3 (n=648)						
Mother: University	89.00*** (30.41)	-65.01 (40.66)	-18.68 (22.86)	36.32 (28.15)	-49.66 (30.75)	-2.26 (28.93)
Mother: Techn. College	47.08** (23.76)	-22.28 (39.39)	-4.01 (21.50)	-3.39 (21.67)	-59.58 (38.29)	-6.51 (30.25)
Mother: 13/12 years plus Voc.	-6.20 (16.44)	18.32 (27.84)	36.31** (18.13)	-13.62 (22.57)	-49.23** (19.55)	-2.95 (24.15)
Partner: University	-24.89 (19.79)	-18.67 (34.56)	-28.40 (18.67)	-11.63 (21.09)	52.61** (25.24)	31.29 (28.62)
Partner: Techn. College	-3.89 (22.62)	10.17 (36.13)	-12.72 (16.99)	-3.85 (34.38)	14.48 (22.86)	-0.66 (26.95)
Partner: 13/12 years plus Voc.	22.65 (27.41)	-9.31 (39.25)	-31.19 (26.92)	9.07 (26.18)	12.76 (28.70)	-1.76 (30.96)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Age Youngest 4-6 (n=586)						
Mother: University	84.71*** (30.87)	53.77 (35.43)	-89.51*** (24.57)	25.84 (18.13)	-15.63 (36.73)	-72.82** (32.95)
Mother: Techn. College	47.81 (40.08)	48.40 (40.94)	-18.25 (20.61)	7.29 (22.39)	-34.52 (38.23)	-51.59 (40.09)
Mother: 13/12 years plus Voc.	-9.43 (19.49)	36.92 (24.62)	-12.06 (18.19)	-18.23 (14.79)	15.65 (21.27)	-10.65 (21.71)
Partner: University	-4.26 (31.99)	72.98* (41.26)	22.72 (20.98)	-69.90*** (18.24)	-12.73 (34.86)	-2.63 (38.11)
Partner: Techn. College	0.16 (31.46)	-46.67 (40.18)	15.49 (32.68)	-41.71* (24.62)	11.21 (29.27)	88.81** (39.75)
Partner: 13/12 years plus Voc.	17.78 (35.73)	-38.48 (48.13)	-18.46 (28.36)	9.43 (24.64)	47.71 (52.86)	36.70 (33.24)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Age Youngest 7-9 (n=513)						
Mother: University	47.47 (38.29)	104.68*** (38.83)	-11.28 (27.45)	6.25 (19.16)	-88.47** (38.95)	-128.56*** (48.37)
Mother: Techn. College	-81.16** (32.12)	15.10 (61.99)	34.83 (32.62)	18.48 (16.14)	35.53 (39.07)	-40.31 (63.11)
Mother: 13/12 years plus Voc.	19.84 (25.94)	27.13 (32.81)	-11.29 (20.42)	-6.91 (13.68)	14.15 (27.21)	-16.94 (32.01)
Partner: University	-33.38 (24.37)	-44.84 (38.03)	-17.78 (28.80)	-22.99* (13.58)	64.77* (34.39)	69.21* (39.95)
Partner: Techn. College	-5.72 (33.53)	-31.41 (46.34)	-14.29 (26.42)	7.90 (20.65)	23.24 (25.72)	13.85 (38.78)
Partner: 13/12 years plus Voc.	14.88 (36.26)	-55.29 (56.55)	-41.31 (30.02)	-41.06*** (14.01)	25.47 (37.87)	98.90* (56.70)
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses correct for clustering at the individual level.

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

Controls variables: Number of children dummies (age groups 0-1 till 19 plus), age of youngest child dummies, age mother (quadratic), age partner (quadratic), weekday dummy, quarter of year dummies, dummy indicating adult in need in household, dummy indicating the provision of adult care outside household, dummies indicating cinema, physician or high school reachable by foot. Reference group: Less than 12 years of schooling plus vocational training and no training.

Data is weighted. Weights are provided by the Federal Statistical Office.

Table A11: Formal and Informal Care Usage - Average Marginal Effects of Probit Estimation

	Age Youngest 0-3		Age Youngest 4-6		Age Youngest 7-9	
	Formal	Informal	Formal	Informal	Formal	Informal
Mother: University	0.31*** (0.12)	0.17 (0.12)	0.08 (0.07)	0.28*** (0.10)	0.14 (0.09)	0.08 (0.16)
Mother: Techn. College	-0.10 (0.09)	-0.14 (0.12)	0.04 (0.08)	0.06 (0.14)	0.04 (0.07)	0.23 (0.15)
Mother: 13/12 years plus Voc.	-0.12 (0.09)	0.03 (0.09)	0.02 (0.06)	0.10 (0.08)	0.00 (0.06)	0.01 (0.08)
Partner: University	0.02 (0.10)	0.13 (0.09)	-0.10 (0.08)	0.00 (0.12)	0.03 (0.06)	0.04 (0.10)
Partner: 13/12 years plus Voc.	0.10 (0.10)	0.04 (0.11)	-0.04 (0.10)	-0.13 (0.12)	-0.03 (0.05)	0.10 (0.09)
Partner: 13/12 years plus Voc.	-0.03 (0.11)	0.14 (0.10)	0.13** (0.06)	0.16* (0.09)	0.12 (0.09)	0.36*** (0.12)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	418	636	558	568	484	478

Robust standard errors in parentheses correct for clustering at the individual level.

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

Controls variables: Number of children dummies (age groups 0-1 till 19 plus), age of youngest child dummies, age mother (quadratic), age partner (quadratic), weekday dummy, quarter of year dummies, dummy indicating adult in need in household, dummy indicating the provision of adult care outside household, dummies indicating cinema, physician or high school reachable by foot.

Reference group: Less than 12 years of schooling plus vocational training and no training.

Data is weighted. Weights are provided by the Federal Statistical Office.

F Two-Part Model - Coefficients

Table A12: Coefficients Two-Part Model (*F-Logit*) Mother - Age Youngest 0-3

	Care/ <i>TwC</i>	Basic/ <i>TwC</i>	Physical/ <i>TwC</i>	Verbal/ <i>TwC</i>	Instruct/ <i>TwC</i>	Appoint/ <i>TwC</i>
Probit						
Mother: University	0.90* (0.52)	1.17** (0.51)	0.03 (0.24)	0.09 (0.25)	-1.59*** (0.44)	-0.41 (0.29)
Mother: Techn. College	-0.28 (0.50)	-0.36 (0.50)	-0.11 (0.23)	0.10 (0.23)	-0.52 (0.36)	-0.30 (0.26)
Mother: 13/12 years plus Voc.	0.73* (0.38)	-0.03 (0.31)	0.17 (0.20)	0.25 (0.19)	-0.83*** (0.30)	-0.06 (0.20)
Partner: University	0.01 (0.39)	-0.03 (0.31)	0.48** (0.24)	-0.00 (0.22)	-0.03 (0.37)	-0.18 (0.24)
Partner: Techn. College	0.24 (0.42)	0.63 (0.41)	0.57** (0.24)	0.07 (0.26)	0.24 (0.33)	-0.23 (0.25)
Partner: 13/12 years plus Voc.	-0.63 (0.49)	-0.36 (0.39)	-0.10 (0.20)	0.05 (0.24)	0.15 (0.43)	-0.43 (0.32)
Glm						
Mother: University	-0.01 (0.15)	-0.24 (0.18)	0.49** (0.21)	0.12 (0.25)	0.66 (0.48)	-0.32 (0.55)
Mother: Techn. College	0.13 (0.15)	0.04 (0.18)	0.34* (0.18)	0.12 (0.28)	-0.08 (0.36)	-0.73 (0.44)
Mother: 13/12 years plus Voc.	0.08 (0.11)	0.03 (0.12)	0.27* (0.16)	-0.00 (0.18)	0.24 (0.27)	0.34 (0.32)
Partner: University	0.05 (0.14)	0.07 (0.15)	-0.23 (0.16)	0.14 (0.20)	-0.21 (0.26)	-0.08 (0.43)
Partner: Techn. College	0.04 (0.15)	-0.13 (0.13)	0.00 (0.21)	-0.05 (0.21)	0.18 (0.31)	-0.32 (0.35)
Partner: 13/12 years plus Voc.	0.25** (0.12)	0.30** (0.13)	0.15 (0.18)	0.60*** (0.19)	-0.10 (0.24)	0.11 (0.36)
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses correct for clustering at the individual level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
 Controls variables: Number of children dummies (age groups 0-1 till 19 plus), age of youngest child dummies, age mother (quadratic), age partner (quadratic), weekday dummy, quarter of year dummies, dummy indicating adult in need in household, dummy indicating the provision of adult care outside household, dummies indicating cinema, physician or high school reachable by foot.
 Reference group: Less than 12 years of schooling plus vocational training and no training.
 Data is weighted. Weights are provided by the Federal Statistical Office.

Table A13: Coefficients Two-Part Model (*F-Logit*) Mother - Age Youngest 4-6

	Care/ <i>TwC</i>	Basic/ <i>TwC</i>	Physical/ <i>TwC</i>	Verbal/ <i>TwC</i>	Instruct/ <i>TwC</i>	Appoint/ <i>TwC</i>
Probit						
Mother: University	0.72 (0.49)	0.64* (0.33)	0.57* (0.30)	0.73** (0.35)	0.29 (0.26)	0.09 (0.42)
Mother: Techn. College	-0.14 (0.39)	0.06 (0.38)	0.45* (0.25)	0.28 (0.29)	-0.05 (0.33)	0.07 (0.34)
Mother: 13/12 years plus Voc.	0.06 (0.22)	0.07 (0.21)	0.05 (0.17)	0.32* (0.18)	0.08 (0.23)	0.37 (0.23)
Partner: University	0.31 (0.29)	0.45 (0.29)	-0.59*** (0.22)	-0.03 (0.24)	0.35 (0.24)	-0.17 (0.36)
Partner: Techn. College	0.37 (0.32)	0.80** (0.32)	-0.12 (0.26)	-0.66** (0.31)	-0.07 (0.37)	-0.24 (0.32)
Partner: 13/12 years plus Voc.	-0.07 (0.31)	0.01 (0.27)	-0.50** (0.22)	-0.45* (0.23)	-0.56 (0.37)	-0.22 (0.29)
Glm						
Mother: University	0.46*** (0.17)	0.09 (0.19)	-0.03 (0.29)	0.38 (0.25)	-0.17 (0.28)	-0.13 (0.70)
Mother: Techn. College	0.53** (0.22)	0.27 (0.21)	0.26 (0.25)	0.37* (0.19)	0.08 (0.36)	-0.20 (0.54)
Mother: 13/12 years plus Voc.	0.17 (0.11)	-0.09 (0.13)	-0.02 (0.14)	0.34** (0.15)	-0.16 (0.25)	-0.08 (0.23)
Partner: University	-0.25* (0.14)	-0.03 (0.15)	-0.28 (0.25)	0.32* (0.17)	-0.16 (0.32)	-1.16** (0.50)
Partner: Techn. College	-0.46* (0.24)	-0.17 (0.21)	-0.42 (0.27)	-0.17 (0.24)	-0.02 (0.35)	-0.78* (0.46)
Partner: 13/12 years plus Voc.	-0.48*** (0.14)	-0.06 (0.16)	-0.34 (0.31)	0.09 (0.26)	-0.69** (0.30)	-1.45*** (0.23)
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses correct for clustering at the individual level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Controls variables: Number of children dummies (age groups 0-1 till 19 plus), age of youngest child dummies, age mother (quadratic), age partner (quadratic), weekday dummy, quarter of year dummies, dummy indicating adult in need in household, dummy indicating the provision of adult care outside household, dummies indicating cinema, physician or high school reachable by foot.

Reference group: Less than 12 years of schooling plus vocational training and no training.

Data is weighted. Weights are provided by the Federal Statistical Office.

Table A14: Coefficients Two-Part Model (*F-Logit*) Mother - Age Youngest 7-9

	Care/TwC	Basic/TwC	Physical/TwC	Verbal/TwC	Instruct/TwC	Appoint/TwC
Probit						
Mother: University	1.02** (0.41)	0.53 (0.34)	0.65 (0.42)	0.38 (0.34)	0.86** (0.34)	0.72** (0.31)
Mother: Techn. College	0.11 (0.39)	0.75** (0.33)	0.73** (0.29)	0.47 (0.32)	-0.08 (0.31)	0.20 (0.45)
Mother: 13/12 years plus Voc.	0.05 (0.25)	0.22 (0.22)	0.26 (0.22)	0.03 (0.22)	-0.19 (0.20)	0.27 (0.26)
Partner: University	-0.40 (0.32)	-0.32 (0.27)	-0.34 (0.31)	-0.17 (0.26)	-0.25 (0.28)	-0.52* (0.29)
Partner: Techn. College	0.06 (0.28)	0.09 (0.25)	0.15 (0.28)	-0.01 (0.25)	-0.40 (0.26)	0.75*** (0.25)
Partner: 13/12 years plus Voc.	0.13 (0.31)	0.03 (0.28)	0.09 (0.29)	0.34 (0.28)	-0.53** (0.25)	0.02 (0.40)
Glm						
Mother: University	0.31 (0.23)	0.14 (0.27)	-1.21*** (0.31)	0.75** (0.38)	0.52 (0.41)	0.68 (0.49)
Mother: Techn. College	0.07 (0.22)	0.54*** (0.15)	-0.17 (0.31)	-0.30 (0.36)	-0.16 (0.28)	-0.51 (1.23)
Mother: 13/12 years plus Voc.	-0.07 (0.15)	-0.25* (0.14)	0.28 (0.39)	-0.41 (0.28)	0.09 (0.24)	-1.47*** (0.54)
Partner: University	-0.19 (0.19)	0.13 (0.15)	1.46*** (0.36)	-0.43* (0.25)	-0.18 (0.30)	-0.96* (0.58)
Partner: Techn. College	-0.06 (0.21)	-0.48*** (0.14)	0.15 (0.39)	-0.19 (0.29)	-0.01 (0.20)	-1.07 (0.69)
Partner: 13/12 years plus Voc.	0.02 (0.18)	-0.28* (0.17)	1.10*** (0.37)	0.17 (0.32)	-0.70* (0.38)	1.25** (0.60)
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses correct for clustering at the individual level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Controls variables: Number of children dummies (age groups 0-1 till 19 plus), age of youngest child dummies, age mother (quadratic), age partner (quadratic), weekday dummy, quarter of year dummies, dummy indicating adult in need in household, dummy indicating the provision of adult care outside household, dummies indicating cinema, physician or high school reachable by foot.

Reference group: Less than 12 years of schooling plus vocational training and no training.

Data is weighted. Weights are provided by the Federal Statistical Office.

Table A15: Coefficients Two-Part Model (*F-Logit*) Partner - Age Youngest 0-3

	Care/TwC	Basic/TwC	Physical/TwC	Verbal/TwC	Instruct/TwC	Appoint/TwC
Probit						
Mother: University	0.17 (0.30)	0.80*** (0.29)	0.19 (0.26)	0.11 (0.28)	0.95* (0.57)	-0.08 (0.42)
Mother: Techn. College	0.09 (0.39)	0.31 (0.27)	0.59** (0.25)	-0.48* (0.28)	0.67 (0.52)	-1.13** (0.46)
Mother: 13/12 years plus Voc.	-0.27 (0.21)	-0.10 (0.19)	-0.18 (0.20)	-0.51** (0.24)	-0.40 (0.44)	-0.38 (0.32)
Partner: University	0.12 (0.24)	0.06 (0.22)	-0.47** (0.22)	0.47* (0.26)	-2.19*** (0.58)	0.95*** (0.35)
Partner: Techn. College	0.43 (0.28)	0.09 (0.25)	-0.19 (0.23)	0.11 (0.31)	-1.24** (0.48)	0.76* (0.44)
Partner: 13/12 years plus Voc.	0.34 (0.27)	-0.04 (0.23)	0.05 (0.26)	0.11 (0.27)	-1.52*** (0.41)	1.66*** (0.51)
Glm						
Mother: University	-0.12 (0.18)	-0.11 (0.17)	-0.24 (0.27)	-0.30 (0.36)	1.41*** (0.00)	32.64*** (0.00)
Mother: Techn. College	0.01 (0.19)	0.00 (0.16)	0.00 (0.22)	-0.30 (0.31)	-0.91*** (0.00)	-3.26*** (0.00)
Mother: 13/12 years plus Voc.	-0.13 (0.16)	-0.01 (0.16)	0.25 (0.17)	-0.05 (0.27)	1.58*** (0.00)	-23.04*** (0.00)
Partner: University	0.40** (0.19)	0.80*** (0.21)	-0.03 (0.21)	0.88*** (0.27)	-2.31*** (0.00)	15.45*** (0.00)
Partner: Techn. College	-0.06 (0.17)	0.26* (0.15)	-0.33 (0.20)	0.70* (0.39)	-2.57*** (0.00)	53.27*** (0.00)
Partner: 13/12 years plus Voc.	0.23 (0.18)	0.43** (0.18)	-0.17 (0.22)	1.26*** (0.34)	- (0.00)	12.23*** (0.00)
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses correct for clustering at the individual level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Controls variables: Number of children dummies (age groups 0-1 till 19 plus), age of youngest child dummies, age mother (quadratic), age partner (quadratic), weekday dummy, quarter of year dummies, dummy indicating adult in need in household, dummy indicating the provision of adult care outside household, dummies indicating cinema, physician or high school reachable by foot.

Reference group: Less than 12 years of schooling plus vocational training and no training.

Data is weighted. Weights are provided by the Federal Statistical Office.

Table A16: Coefficients Two-Part Model (*F-Logit*) Partner - Age Youngest 4-6

	Care/ <i>TwC</i>	Basic/ <i>TwC</i>	Physical/ <i>TwC</i>	Verbal/ <i>TwC</i>	Instruct/ <i>TwC</i>	Appoint/ <i>TwC</i>
Probit						
Mother: University	-0.02 (0.30)	0.13 (0.29)	0.01 (0.28)	0.12 (0.34)	-3.99*** (0.41)	0.51 (0.41)
Mother: Techn. College	-0.25 (0.29)	-0.10 (0.26)	0.19 (0.25)	-0.12 (0.39)	0.05 (0.46)	-0.07 (0.44)
Mother: 13/12 years plus Voc.	-0.12 (0.19)	-0.08 (0.21)	0.35* (0.20)	-0.28 (0.24)	-0.52* (0.31)	-0.15 (0.34)
Partner: University	-0.26 (0.27)	0.24 (0.23)	-0.44* (0.25)	0.19 (0.28)	-0.37 (0.61)	-0.34 (0.38)
Partner: Techn. College	-0.25 (0.36)	0.04 (0.31)	0.04 (0.28)	0.18 (0.38)	0.74* (0.44)	-0.07 (0.42)
Partner: 13/12 years plus Voc.	-0.31 (0.20)	-0.16 (0.25)	-0.14 (0.23)	0.06 (0.28)	-0.41 (0.40)	-0.01 (0.28)
Glm						
Mother: University	0.30 (0.21)	-0.31 (0.29)	0.54* (0.29)	0.80* (0.44)	— —	-5.35*** (0.00)
Mother: Techn. College	0.07 (0.23)	-0.07 (0.21)	0.21 (0.27)	-0.26 (0.32)	-1.04*** (0.00)	0.74*** (0.00)
Mother: 13/12 years plus Voc.	-0.02 (0.14)	0.02 (0.19)	0.04 (0.18)	0.01 (0.29)	-1.10*** (0.00)	-0.55*** (0.00)
Partner: University	0.31 (0.21)	0.43* (0.26)	0.06 (0.21)	-0.05 (0.31)	-0.56*** (0.00)	-0.14*** (0.00)
Partner: Techn. College	0.12 (0.19)	-0.18 (0.29)	0.11 (0.22)	-0.57 (0.38)	-2.25*** (0.00)	-4.40*** (0.00)
Partner: 13/12 years plus Voc.	-0.33* (0.18)	-0.43** (0.20)	0.34 (0.23)	0.54* (0.32)	-0.88*** (0.00)	0.60*** (0.00)
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses correct for clustering at the individual level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
 Controls variables: Number of children dummies (age groups 0-1 till 19 plus), age of youngest child dummies, age mother (quadratic), age partner (quadratic), weekday dummy, quarter of year dummies, dummy indicating adult in need in household, dummy indicating the provision of adult care outside household, dummies indicating cinema, physician or high school reachable by foot.
 Reference group: Less than 12 years of schooling plus vocational training and no training.
 Data is weighted. Weights are provided by the Federal Statistical Office.

Table A17: Coefficients Two-Part Model (*F-Logit*) Partner - Age Youngest 7-9

	Care/ <i>TwC</i>	Basic/ <i>TwC</i>	Physical/ <i>TwC</i>	Verbal/ <i>TwC</i>	Instruct/ <i>TwC</i>	Appoint/ <i>TwC</i>
Probit						
Mother: University	1.22*** (0.39)	0.95*** (0.33)	0.21 (0.40)	0.61* (0.35)	1.21*** (0.37)	0.85** (0.39)
Mother: Techn. College	0.85** (0.37)	1.25*** (0.41)	0.12 (0.28)	-0.14 (0.42)	-0.28 (0.48)	0.00 (0.48)
Mother: 13/12 years plus Voc.	0.26 (0.22)	0.23 (0.24)	0.36 (0.22)	-0.27 (0.25)	-0.01 (0.36)	0.50** (0.23)
Partner: University	-0.49* (0.27)	-0.32 (0.29)	0.05 (0.28)	-0.53* (0.31)	-0.53 (0.35)	-0.58* (0.30)
Partner: Techn. College	0.04 (0.25)	0.28 (0.29)	0.14 (0.24)	-0.30 (0.29)	0.12 (0.32)	0.23 (0.29)
Partner: 13/12 years plus Voc.	-0.31 (0.32)	-0.13 (0.37)	0.33 (0.29)	-0.53 (0.36)	-0.25 (0.50)	-0.28 (0.52)
Glm						
Mother: University	0.25 (0.22)	0.04 (0.30)	0.46 (0.43)	0.07 (0.34)	2.68*** (0.35)	-4.24*** (0.66)
Mother: Techn. College	-0.08 (0.20)	0.15 (0.27)	-0.19 (0.46)	0.30 (0.65)	3.67*** (0.47)	-0.00 (0.34)
Mother: 13/12 years plus Voc.	-0.08 (0.16)	-0.11 (0.21)	0.48 (0.41)	-0.21 (0.65)	0.05 (0.15)	-0.71*** (0.11)
Partner: University	-0.02 (0.18)	0.03 (0.28)	-0.19 (0.39)	-0.59 (0.71)	3.04*** (0.70)	- -
Partner: Techn. College	0.01 (0.21)	-0.59*** (0.21)	0.03 (0.36)	-0.22 (0.52)	2.75*** (0.43)	-0.18*** (0.04)
Partner: 13/12 years plus Voc.	-0.05 (0.20)	0.36* (0.22)	0.10 (0.47)	-1.95** (0.90)	4.45*** (0.68)	-0.11 (0.13)
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses correct for clustering at the individual level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Controls variables: Number of children dummies (age groups 0-1 till 19 plus), age of youngest child dummies, age mother (quadratic), age partner (quadratic), weekday dummy, quarter of year dummies, dummy indicating adult in need in household, dummy indicating the provision of adult care outside household, dummies indicating cinema, physician or high school reachable by foot.

Reference group: Less than 12 years of schooling plus vocational training and no training.

Data is weighted. Weights are provided by the Federal Statistical Office.