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Double advantage or disadvantage? – Parental education and children's developmental stages in Italy

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Abstract

How do couples with different educational backgrounds alter their child care practices according to child development stages? In order to answer, I analyse the 2002 and 2008 waves of the Italian Time Use Survey. The subsample for this paper consists of heterosexual Italian couples with at least one child from age 0 to 13 years living at home (N=19,988). I differentiate between physical care, play, and teaching which are all key activities fostering child development at various developmental stages. An education gradient characterises the child care of two parents with tertiary education, emerging for physical care during workdays as well as for physical care and play during week-ends. A developmental gradient is evident in the child care of parents with tertiary and secondary education who have greater probability to invest time in physical care and play when children are below age 5 compared to two parents with less than secondary education. In educationally heterogamous couples, the parent with higher educational attainment spends more time in primary childcare than he/she would do in an educationally homogamous partnership. Having more than one child in family brings along a trade off between play and teaching. A son increases the probability of physical care, and play. Families where mother is not employed spend slightly more time in primary child care compared to families where mothers work. If small children attend pre-school care centres, they receive no less parental child care during workdays than children who stay at home.

JEL-Codes: I24, Z13

Keywords: parental education, parental involvement, child development, inequality

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1 Introduction

Many scholars have raised concerns about the diverging destinies of the next generation (McLanahan 2004). One reason for this concern comes from time use surveys that show that highly educated mothers and fathers have increased their child care time more than less educated parents during the last decades.

Previous research has documented that highly educated parents spend more time in active childcare than less educated parents which is known as the "education gradient" in child care. The child care gap between highly and lowly educated parents has risen over the last decades (Chalasani 2007). Moreover, there is evidence that highly educated mothers also alter the composition of their child rearing time for children of different ages to optimize children´s development. For instance, Kalil et al. (2012) show that while at age 0 to 2 highly educated mothers spend significantly more time on basic care and play than less educated mothers. When children are aged from 3 to 5, highly educated mothers spend more time on teaching, and while at age 6 to 13 highly educated mothers spend more time on child management, e.g. driving children to different activities, and accompanying children. A complementary study illustrates that a "developmental gradient" also exists for fathers´ child care time, however only for selected activities and for smaller children (Ryan, Kalil & Corey 2011). A study on Spanish fathers reveals that when children are aged from 0 to 5, father´s education has a positive effect on physical care, and when the youngest child is aged from 3 to 5, highly educated fathers provide more interactive care, especially teaching (Gracia 2014).

This paper tests the developmental gradient hypothesis, i.e. it tests whether highly educated parents tailor their child-rearing time to children's developmental needs more than less educated parents for the Italian case. It makes three main contributions. **First**, very high quality data from two Italian Time Use Surveys 2008-2009 and 2002-2003 are used to scrutinize the question whether highly educated mothers and fathers spend more time in developmentally enriching roles than less educated parents in Italy at different ages of the child. This is the first time when the developmental gradient hypothesis is tested for a non-Anglo-Saxon country and culture.

Second, the analysis is done separately for weekdays, and week-ends. The majority of past research has analysed parental practices on either week-end days or for an average weekday. The analysis of child-care in week-end days is theoretically and substantively reviling because parental options are less time constrained by market work on Saturdays and Sundays. In other words, parental preferences in terms of child-care activities can be expressed more freely in week-end days.

Third, and most importantly, the current paper takes into account the level of education of both parents within the same family. Previous analyses of the relationship between parental education and time use have usually been restricted to either mothers or, in some cases, to fathers. By considering different types of educationally homogamous and heterogamous fami-

lies this study provides a broader and more precise account of parents´ time use with small children.

2 Theoretical background

2.1 Developmental Framework for Parental Time Investments

Developmental theory assumes that in order to assess parents´ time investments in child development, finer distinctions between different types of parenting activities should be made because different activities foster child development in unique ways. According to developmental theory, children at different developmental stages need different types of parental investments. Certain investments such as warmth, nourishment and adequate monitoring remain constant throughout childhood. "Sensitivity" is the hallmark of effective parenting, i.e. responding contingently to children´s needs (Adamson & Bakeman 1984, Bornstein 2002, Carew 1980, Waldfogel 2006). Sensitivity in parents´ time investments means tailoring childcare time to the specific challenges that dominate each developmental period in a child´s life. For example, an hour spent playing with a toddler and an hour spent helping with homework a school age child both bring developmentally positive outcomes. However, an hour spent with a toddler in formal teaching or an hour spent playing with a school age child do not bring along equal developmental benefits. Parents may increase different kinds of activities for their children of different sex: playing for sons and teaching for daughters which may partially explain boy-girl differences in preschool reading and math scores (Baker & Milligan 2013).

Kalil, Ryan and Corey (2012) conceptualise children´s life stages as a central unit of analysis, and distinguish between four different categories of active parenting that are best suited for a particular developmental period. These are: (1) basic care which consists of routine tasks such as feeding, putting asleep, bathing, changing clothes, changing a diaper; (2) play which refers to playing games, pretending, doing art projects, outdoors physical games; (3) teaching which means helping with homework or reading to a child; (4) management which includes organizing and monitoring a child´s life outside home. According to the developmental psychology framework, these activities are best suited for the following periods: (1) infancy - from 0 to 12 months; (2) toddlerhood – from 12 to 35 months; (3) the preschool period – ages 3 to 5 years; and (4) middle childhood – ages 6 to 13 years.

The greatest challenges of infancy (from 0 to 12 months) are establishing regular sleeping and eating routines. Therefore, the most important parental activities with children are basic caregiving tasks such as feeding, putting to sleep, comforting, bathing, which are all very time-consuming (Bornstein 2002). According to attachment theory, warm, consistent and sensitive responses to baby´s emotional and physical needs create bonds between parents and infants which serve as the child´s mental model for future relationships. Moreover, these bonds form the basis of the child´s socio-emotional development (Ainsworth et al. 1978, Bowlby 1969). Both the quality and quantity of basic care that parents offer their infants shape mother-infant and father-infant attachments. In terms of cognitive development, the basis of language learn-

ing is laid during the first year. A greater quantity of time that parents spend with their infants increases opportunities to demonstrate and practice responsiveness as well as sensitive parenting.

During toddlerhood (from 12 to 35 months) children acquire the capacity for representational thought and begin to engage in "symbolic" or pretend play (Piaget 1952). Engaging in pretend play promotes children's cognitive and social skills, including attention, memory, logical reasoning, vocabulary, creativity, and emotional regulation (Bergen & Mauer 2000, Berk 2001, Elias & Berk 2002, Lindsey & Mize 2000, Ruff & Cappozoli 2003). Sociocultural theory posits that play is most beneficial to toddlers when a grown-up structures their activities (Keren et al. 2005, Rogoff 2003) so that children learn to explore their environment, learn concepts, express curiosity, and gain competence motivation (Hubley & Trevarthen 1979, Sigel 1986). When parents actively guide children´s play, they also foster compliance (Parpal & Maccoby 1985), teach numbers and sizes, and foster language development (Duckworth 1972). In sum, the best developmental activity that parents can do with their toddlers is to engage in child-directed play.

During the preschool period (ages 3 to 5) children´s language and attention skills develop and they will start to appreciate didactic activities such as book reading, problem solving and doing puzzles (Hoff 2006). Such didactic activities develop children's cognitive skills which influence early academic outcomes like recognizing letters, numbers and words (Snow 2006). The frequency of early teaching activities influences language and literacy development (Bus et al. 1995, Roberts et al. 2005) as well as early math and reading scores (Bradley et al. 1988). Moreover, Heckman et al. (2013) found that a real driver for success in life are various soft skills developed at age 3 to 5 that have even greater impact on life outcomes than IQ. Both parents and kindergartens can develop academic motivation and help to deal with negative externalizing behaviour. Parents´ efforts in teaching their children prior to school entry are particularly important in countries where entrance exams to the 1st grade or other types of pre-selection are used.

During middle childhood (ages 6 to 13) children´s social networks expand and the roles of friends, school, and extracurricular activities rise. Now, parents spend less time in direct interaction with children and more time on planning and monitoring children´s busy lives. This management ensures that children learn to form positive relationships, self-management, and responsibility (Collins et al. 2002). In the earlier period of middle childhood, management tasks involve arranging academic, extracurricular, recreational and social activities (Dryfoos et al. 1999, Vuchinich et al. 1992). In the later period of middle childhood, management also entails monitoring social networks to avoid delinquent behaviour and negative influence from peers (Dishion et al. 1999, Dubow et al. 1997). Middle childhood is an important stage when children learn what they are good at, and how to fit into society (Erikson 1968). The various extracurricular activities can help children to develop self-confidence which is needed to get through the difficult teenage years successfully. During this life stage, it is vital that children develop healthy attitudes and behaviours which will have lifelong consequences. Parents´

language use at home still has a direct effect on children's school performance (Hart & Risley 1995).

2.2 The Italian Context

Both childhood and parenthood are socially constructed. Therefore, what is a common practice in one country, may not hold in other countries. In Italy, the welfare system is less developed and families are expected to care for their own members. Day-care for children below age 3 is both rare and costly. Adding that the society is very gendered, and work-family reconciliation policies virtually non-existent, it is no surprising that Italy was one of the first countries in the world to reach "lowest-low" fertility (Tanturri 2012). Today, Italian women postpone motherhood and the fertility rate is just 1.40 births per women (World Bank 2014). Using 2002-03 time-use data, Tanturri (2012) shows that women dedicate 8 to 10 hours to unpaid work each day if the family has three children, and the youngest is is less than 3 years old. Men devote 4 to 5 hours to unpaid work per day regardless of family circumstances. Although men increase their paid work hours after transition to fatherhood, parenthood affects the total daily workload of women more seriously (Tanturri 2012). The time cost of children falls as the age of the youngest child in family increases, however, the number of children in family does not alter much the total time cost of children (ISTAT 2012, Tanturri 2012). The share of Italian women who are dissatisfied with childcare and domestic duties is much greater than the share of dissatisfied men. As a result, more women than men are dissatisfied with life in general (ISTAT 2012).

The Italian children are very time intensive, and not only in the early years (Tanturri 2012). Italian children spend less hours at school than children in other countries. However, they have a large amount of homework for each day (Mencarini et al. 2014). Such a peculiarity presumes that one parent, usually mother stays at home and helps the child with homework.

Higher education is free of charge in Italy. Although sending a child to a university brings along additional costs, it is a smaller economic burden compared to the countries where tuition fees are a rule in tertiary education. In this respect higher education in Italy should be more open to the youth from different social backgrounds compared to Anglo-Saxon countries. Still, the proportion of population with tertiary education is smaller in Italy compared to the OECD average. "Only 15% of 25-64 year-old Italians have a university-level education, compared to the OECD average of 32%"(OECD 2013). When one looks at younger population, Italy stands out for its high proportion of 15-29 year-olds (23.2%) who are neither employed nor in education or training, also known as NEET youth. The OECD average of NEET young adults is 15.8% (OECD 2013).

In Italy, the absolute incidence of homogamous marriage has declined across cohorts, but an inversion of this trend is observed for the youngest cohort (Bernardi 2003). Persons with primary or no education have the highest propensity to homogamy: evidence of a social closure at the bottom. However, the rates of homogamy are increasing for subjects with higher education, raising concerns about the increasing polarisation of Italian society.

2.3 Hypotheses

2.3.1 Hypothesis 1: Developmental gradient

Based on previous findings from USA, one can also expect for the Italian case that highly educated parents tailor their childcare time to benefit children's developmental needs more than less educated parents. This means that highly educated parents spend more time in basic care when the child is aged below 1 year, more time in playing with children when the child is 1 to 3 years old, more time in teaching when the child is from 3 to 5 years old. The developmental gradient in childcare may co-exist with the education gradient in childcare, i.e. highly educated parents spend more time in all childcare activities compared to their less educated counterparts. As tertiary education is free and the proportion of population with university degree is relatively small, it is reasonable to expect that the developmental gradient in child care is less pronounced in Italy compared to USA.

2.3.2 Hypothesis 2: Educational homogamy and heterogamy

Simultaneous analysis of parents´ time use may reveal interesting patterns that have not been discovered before. In educationally heterogamous families, the more educated parent may tailor his/her childcare time more than is common for highly educated parents in homogamous couples in order to compensate for the lack of childcare knowledge from the spouse. This may mean that highly educated fathers/mothers married to less educated spouses may spend additional time in developmentally enriching activities with children in the evenings of workdays or during week-ends.

2.3.3 Hypothesis 3: Time constraints

From the time availability (Presser 1994) and demand/response capacity (Coverman 1985), hypotheses, fathers react positively to their partner´s job pressures, and increase their childcare inputs. Parents´ child care practices should respond to their partners´ as well as their own time constraints. Since there are less time constraints during week-ends, the educational and developmental gradients should be stronger for Saturdays and Sundays.

3 Data and method

3.1 Data

Time-budget surveys are considered to be the best statistical source for examining individuals' daily activities (Robinson 1985). Data for the current paper are drawn from two waves of Italian Multi-purpose Surveys on Families´ Time Use, merging high quality datasets from 2002-2003 and 2008-2009. It is a representative time-use survey of the Italian population, collected by Istituto Nazionale di Statistica (ISTAT). In the 2002 survey, the data was collected from April 1st 2002 until March 31st 2003. In 2002, the sample consist of 55,773 individuals belonging to 21,075 families. In the 2008 survey, the total sample consists of 44,606 individuals

in 18,250 families. The data collection period started on February 1st 2008 and lasted until January 31st 2009. In both surveys, each family member aged 3 or older completed a time-diary. The sample in each region of Italy was divided into three, and assigned either a random workday, Saturday or Sunday when the family should fill in a time-diary. All family members filled in their time-diaries during the same day. In my analysis, I distinguish between work-days and week-end days. For younger children the diary was completed by parents. Each episode is given by the interval of 10 minutes, and distinction is made between "main" and "secondary" activities. Only information on the main activities is used in this analysis as the face-to-face activities with children are considered far more beneficial for child development than secondary childcare activities. As the number of immigrants was quite small, only Italian citizens are considered. In order to avoid extreme cases, only parents from age 20 up to 55 have been taken into analysis. In the final analysis I use the age of the youngest child as a classification tool just as it has been done in past research (Kalil, Ryan & Corey 2012). The subsample for this article comprises of 19,988 married or cohabiting parents with at least one child up to 13 years of age living at home.

While comparing the parenting activity codes of Italy and the USA, the core categories are the same, however, they are compiled of different minor activity codes (Table 1). Differences in results can partially be driven by the differences in activity codes. While there are differences in all the categories, the most important difference between the ATUS and the ISTAT survey lies in the field of child management. The Italian Time Use Survey captures mainly driving to and picking up of children from school and kindergarten. The ATUS management category is far broader, including attending household children´s events, waiting for/with household children, activities related to household children's health, organization/planning for household children, and travel related to caring for/helping household children. As child management captures different activities in the two surveys, and only 11 per cent of Italian parents engage in child management, I exclude management as a separate variable in my analysis. The activities done under child management have been included under total childcare time along with other childcare activities. The comparison of parental activities between Italy and USA should be approached with caution. Summary statistics of the sample are presented in Table 2.

3.2 Measures

Four "dependent variables" of active parenting are used (Table 1). Basic care, i.e. feeding, bathing, putting children to bed, physically comforting, physically attending to health needs, counts the minutes that parents allocate to physical care of children. Play, for instance "pretend play", and using clay with a child, counts parents´ minutes of active play, both indoors and outdoors. Teaching activities include helping children to do homework, as well as reading and talking to children. All child care is a composite measure of primary child care time of both parents during the same day that records the amount of time spent in all of the primary developmental activities. As the key developmental activities have very low incidence, I use the probability of engaging in a given activity instead of minutes spent in each activity. Only

total childcare is measured in minutes per day. As child management is measured by very few sub-categories in the Italian data, and has very low incidence, these results are not presented.

Table 1
Activity Codes

Core Categories	American Time Use Survey	Italian Time Use Survey
Total care	Includes all time spent in child care as a "primary activity"; this time is divided entirely below into the four activity categories.	Includes all time spent in child care as a "primary activity"; this time is divided entirely below into the four activity categories.
Basic care	"Physical care for household children" "Looking after household children (as a primary activity)" "Caring for and helping household children (as a primary activity)"	"Physical child care for household children" "Looking after household children"
Play	"Playing with household children, not sports" "Arts and crafts with household children" "Playing sports with household children"	"Playing with household children"
Teaching	"Reading to/with household children" "Helping/teaching household children (not related to education)" "Activities related to household children's education" "Talking with/listening to household children"	"Reading to and talking with household children" "Helping household children with homework"
Management	"Attending household children's events" "Waiting for/with household children" "Picking up/dropping off household children" "Activities related to household children's health" "Organization/planning for household children" "Travel related to caring for/helping household children"	"Accompanying children to school or kindergarten" "Other specified activities related to the care of household children"

Source: Italian Time Use Surveys (ISTAT), American Time Use Surveys (ATUS), own descriptions.

My main "independent variable" is parental education. I use the combined education of both parents. The educational level of both parents is based on the highest educational degree attained. Three mutually exclusive levels of education are used: less than high school diploma (low), high school diploma (middle), and university degree (high). Presumably the education of both parents matters in the realm of child development. Therefore, nine combinations of mother´s and father´s combined education are used with mother´s education in the first place (as mother´s education is presumably more relevant for the early child development stages) and father´s education in the second place: high-high, high-medium, high-low, medium-high,

medium-medium (reference category), medium-low, low-high, low-medium, and low-low. The largest groups consist of educationally homogamous couples (high-high, medium-medium, low-low), and the overall homogamy rate in education is 67%. Due to the fact that some of the nine categories of household level education are relatively small, the two youngest age groups "below 1" and "from 1 to 2 years" are added together in the final analyses.

Table 2
Summary Statistics

Variables	Mean	Std. Dev.
Dependent variables		
Minutes in primary child care	135.18	141.33
Probability of basic child care	0.49	0.50
Probability of play	0.26	0.44
Probability of teaching	0.24	0.43
Independent variables		
high-high	0.07	0.26
high-medium	0.05	0.23
high-low	0.01	0.12
medium-high	0.05	0.21
medium-medium	0.27	0.45
medium-low	0.15	0.36
low-high	0.01	0.08
low-medium	0.09	0.29
low-low	0.29	0.46
Mother´s full-time job	0.35	-
Mother´s part-time job	0.19	-
Mother not employed	0.46	-
Youngest child aged 0	0.07	-
Youngest child aged from 1 to 2	0.17	-
Youngest child aged from 3 to 5	0.20	-
Youngest child aged from 6 to 13	0.56	-
Control variables		
Son aged from 0 to 13 in home	0.52	0.50
Number of children: One	0.33	-
Number of children: Two	0.52	-
Number of children: Three or more	0.15	-
Parent´s age	39.61	6.13
Pre-school childcare	0.15	0.36

N = 19,988
Source: 2002 and 2008 Italian Time Use Surveys (ISTAT), own calculations.

The "control variables" are chosen for theoretical and empirical reasons. Age of the youngest child matters most as younger children have more time-consuming needs. Parental age is con-

trolled for, and only parents aged from 20 to 55 are included. Number of children living at home is also controlled for as having more than one child should increase total child care time, age is limited to children from 0 to 13 years. Mother´s employment consists of three categories: full-time, part-time, and not employed. Mother´s labour force participation increases time constraints, and is therefore controlled for. As traditional gender norms are still quite prevalent in Italy, I control whether there is a son, aged from 0 to 13 years, living at home. I expect families, especially fathers to spend more time with sons. I also control for pre-school care. This variable unites children going to nurseries (below age 3) as well as children attending kindergartens (from age 3 to 6). Pre-school care should provide parents with more time free from child minding, however, it may increase time spent travelling with children. I have only included nuclear families in the sample. The analyses are done separately for workdays and week-ends. The reference categories are as follows: one for the number of children, 6-13 years for the youngest child´s age, and full-time for mother´s paid work.

3.3 Method

Ordinary least squared (OLS) regressions are used to regress time in each activity type as well as in the global measure of all childcare time on parental education and child age groups, controlling for parental age, age of the youngest child, number of children in household, mother´s employment, son in family, and pre-school care. I analyse the compound childcare time of both parents. Separate OLS models are presented for workdays and week-ends.

There is a long debate whether to use OLS or more adequate methods for censored data with time use datasets, for instance Heckman model or the Tobit model. Out of these options, Tobit models are more easily usable (Breen 1996). Tobit models estimate linear relationships between variables when there is extreme censoring on the dependent variable (Breen 1996, Greene 2003). Numerous 0-cases of time use data violate OLS assumption of normal distribution. However, several authors underline the robustness of results, and the possibility to use OLS with time-use data (Hook and Chalasani 2008). I have analysed the same ISTAT dataset with tobit, logistic regression, and OLS, and the results are robust. Tobit and logistic regression results are available upon request.

4 Results

4.1 Educationally homogamous coupes

The statistically significant regression coefficients of couples´ education reveal whether there is any proof of an education gradient at household level. Statistically significant interaction terms between couple´s education and child age groups show the developmental gradient at household level, i.e. whether couples where at least one parent has tertiary education tailor their time to children´s developmental needs more than couples with secondary education. Only statistically significant coefficients are referred to in the text. The results are presented in Table 3 for workdays, and in Table 4 for week-end days.

Table 3
OLS results for couples´ time spent in each activity on workdays

	Full childcare (minutes)	Basic care (%)	Play (%)	Teach (%)
High-High	7.17	0.09**	0.01	0.03
	(5.74)	(0.03)	(0.03)	(0.03)
High-Medium	-2.46	0.05	-0.06	0.05
	(8.05)	(0.05)	(0.04)	(0.04)
High-Low	30.85**	0.18*	0.08	0.06
	(12.01)	(0.07)	(0.06)	(0.07)
Medium-High	-1.09	-0.04	-0.03	0.06†
	(6.25)	(0.04)	(0.03)	(0.03)
Medium-Low	1.09	-0.01	-0.02	<-0.01
	(4.24)	(0.02)	(0.02)	(0.02)
Low-High	-17.89	-0.07	0.03	-0.16*
	(15.34)	(0.09)	(0.07)	(0.08)
Low-Medium	-2.60	-0.03	0.01	-0.02
	(4.89)	(0.03)	(0.02)	(0.03)
Low-Low	-0.73	-0.02	-0.01	-0.03†
	(3.40)	(0.02)	(0.02)	(0.02)
Youngest Child Aged 0-2	87.09***	0.32***	0.44***	-0.07**
	(4.36)	(0.03)	(0.02)	(0.02)
Youngest Child Aged 3-5	35.46***	0.22***	0.21***	0.03
	(5.02)	(0.03)	(0.02)	(0.03)
High-High x 0-2	5.04	-0.03	-0.01	0.01
	(9.39)	(0.05)	(0.04)	(0.05)
High-High x 3-5	-0.46	-0.06	0.01	-0.11†
	(10.57)	(0.06)	(0.05)	(0.06)
High-Medium x 0-2	2.32	-0.04	0.12*	-0.03
	(11.24)	(0.07)	(0.05)	(0.06)
High-Medium x 3-5	12.51	<-0.01	0.06	-0.04
	(13.65)	(0.08)	(0.06)	(0.07)
High-Low x 0-2	-11.44	-0.11	-0.05	<0.01
	(16.89)	(0.10)	(0.08)	(0.09)
High-Low x 3-5	-47.96*	-0.24†	0.05	-0.23†
	(22.85)	(0.13)	(0.11)	(0.12)

Table 3 (Cont.)

	Full childcare (minutes)	Basic care (%)	Play (%)	Teach (%)
Medium-High x 0-2	17.64	0.15*	<-0.01	-0.09
	(11.56)	(0.07)	(0.05)	(0.06)
Medium-High x 3-5	-3.88	-0.06	0.02	0.02
	(12.85)	(0.07)	(0.06)	(0.07)
Medium-Low x 0-2	0.94	-0.05	-0.02	-0.04
	(7.46)	(0.04)	(0.03)	(0.04)
Medium-Low x 3-5	-11.51	-0.05	-0.01	-0.04
	(7.88)	(0.05)	(0.04)	(0.04)
Low-High x 0-2	28.90	-0.12	0.36	-0.05
	(60.70)	(0.35)	(0.28)	(0.33)
Low-High x 3-5	43.41	0.44†	-0.47*	-0.13
	(40.37)	(0.23)	(0.19)	(0.22)
Low-Medium x 0-2	-29.46**	-0.05	-0.14***	-0.03
	(9.42)	(0.05)	(0.04)	(0.05)
Low-Medium x 3-5	-2.48	-0.01	0.04	-0.08
	(10.01)	(0.06)	(0.05)	(0.05)
Low-Low x 0-2	-22.74***	-0.15***	-0.06*	0.03
	(6.23)	(0.04)	(0.03)	(0.04)
Low-Low x 3-5	-23.12***	-0.17***	-0.06†	-0.11**
	(7.07)	(0.04)	(0.03)	(0.04)
Mother works part-time	3.61	0.03†	0.03*	0.01
	(2.82)	(0.02)	(0.01)	(0.02)
Mother not employed	10.70***	-0.03*	0.03*	0.02
	(2.30)	(0.01)	(0.01)	(0.01)
N Child: Two	5.38*	0.03*	-0.07***	0.07***
	(2.21)	(0.01)	(0.01)	(0.01)
N Child: Three or more	-0.61	0.02	-0.09***	0.09***
	(3.11)	(0.02)	(0.01)	(0.02)
Boy in family	2.26	0.03**	0.01	<0.01
	(1.94)	(0.01)	(0.01)	(0.01)
Pre-school care	2.80	0.04*	0.10***	-0.05**
	(3.10)	(0.02)	(0.01)	(0.02)
Constant	33.95	0.37***	0.13***	0.26***
	(3.31)	(0.02)	(0.02)	(0.02)
Adj R-squared	0.15	0.08	0.23	0.02

N = 7,433 ; Standard errors are displayed in parentheses below marginal effects.
† p < .10, * p < .05, ** p < .01, *** p < .001
Source: 2002 and 2008 Italian Time Use Surveys (ISTAT), own calculations.

Table 4
OLS results for couples´ time spent in each activity on week-ends

	Full childcare (minutes)	Basic care (%)	Play (%)	Teach (%)
High-High	4.37	0.08***	0.04†	0.02
	(4.39)	(0.03)	(0.02)	(0.02)
High-Medium	-0.75	0.03	0.04	0.01
	(5.02)	(0.03)	(0.02)	(0.03)
High-Low	27.46**	0.05	0.17***	-0.02
	(10.71)	(0.06)	(0.05)	(0.05)
Medium-High	11.88*	0.05†	0.01	0.08***
	(4.80)	(0.03)	(0.02)	(0.02)
Medium-Low	1.60	-0.03	0.02	0.01
	(3.23)	(0.02)	(0.02)	(0.02)
Low-High	-15.62	-0.13*	0.06	-0.19***
	(10.98)	(0.06)	(0.05)	(0.06)
Low-Medium	-2.20	0.02	-0.02	-0.04*
	(3.59)	(0.02)	(0.02)	(0.02)
Low-Low	-11.05***	-0.04*	-0.03**	-0.07***
	(2.58)	(0.01)	(0.01)	(0.01)
Youngest Child Aged 0-2	96.57***	0.40***	0.44***	-0.04*
	(3.39)	(0.02)	(0.02)	(0.02)
Youngest Child Aged 3-5	39.08***	0.25***	0.28***	<-0.01
	(3.71)	(0.02)	(0.02)	(0.02)
High-High x 0-2	20.56**	-0.04	0.01	-0.03
	(7.00)	(0.04)	(0.03)	(0.04)
High-High x 3-5	5.86	-0.07	-0.05	0.04
	(8.24)	(0.05)	(0.04)	(0.04)
High-Medium x 0-2	14.34†	<0.01	-0.04	0.02
	(7.71)	(0.04)	(0.04)	(0.04)
High-Medium x 3-5	14.84†	0.04	0.02	0.05
	(8.03)	(0.05)	(0.04)	(0.04)
High-Low x 0-2	-18.46	-0.12	-0.13†	-0.05
	(16.38)	(0.10)	(0.08)	(0.08)
High-Low x 3-5	-0.94	-0.02	-0.22**	0.18*
	(16.23)	(0.09)	(0.08)	(0.08)
Medium-High x 0-2	-14.80	-0.08	-0.05	<0.01
	(9.47)	(0.06)	(0.05)	(0.05)
Medium-High x 3-5	-10.31	-0.13*	0.09*	-0.05
	(9.58)	(0.06)	(0.05)	(0.05)

Table 4 (Cont.)

	Full childcare (minutes)	Basic care (%)	Play (%)	Teach (%)
Medium-Low x 0-2	1.61	-0.03	<0.01	-0.03
	(5.55)	(0.03)	(0.03)	(0.03)
Medium-Low x 3-5	-10.85†	0.01	-0.10***	<-0.01
	(6.04)	(0.04)	(0.03)	(0.03)
Low-High x 0-2	28.41	0.28*	0.25*	-0.01
	(20.32)	(0.12)	(0.10)	(0.10)
Low-High x 3-5	48.10†	0.01	0.15	0.48***
	(25.99)	(0.15)	(0.13)	(0.13)
Low-Medium x 0-2	-5.29	-0.07†	-0.04	-0.02
	(7.01)	(0.04)	(0.04)	(0.04)
Low-Medium x 3-5	-15.19*	-0.11*	-0.08*	-0.02
	(7.19)	(0.04)	(0.03)	(0.04)
Low-Low x 0-2	-19.20***	-0.14***	-0.09***	0.03
	(4.94)	(0.03)	(0.03)	(0.03)
Low-Low x 3-5	-1.29	-0.10***	-0.05†	0.01
	(5.00)	(0.03)	(0.02)	(0.03)
Mother works part-time	5.21*	0.05***	0.03**	0.02*
	(2.08)	(0.01)	(0.01)	(0.01)
Mother not employed	5.61***	<-0.01	0.02*	<-0.01
	(1.75)	(0.01)	(0.01)	(0.01)
N Child: Two	3.38*	0.03**	-0.07***	0.04***
	(1.67)	(0.01)	(0.01)	(0.01)
N Child: Three or more	1.24	0.02†	-0.10***	0.06***
	(2.32)	(0.01)	(0.01)	(0.01)
Boy in family	5.32***	0.02**	0.03***	0.01
	(1.45)	(0.01)	(0.01)	(0.01)
Pre-school care	10.46***	0.05***	0.09***	-0.04**
	(2.34)	(0.01)	(0.01)	(0.01)
Constant	31.71***	0.32***	0.12***	0.21***
	(2.52)	(0.01)	(0.01)	(0.01)
Adj R-squared	0.21	0.12	0.22	0.02

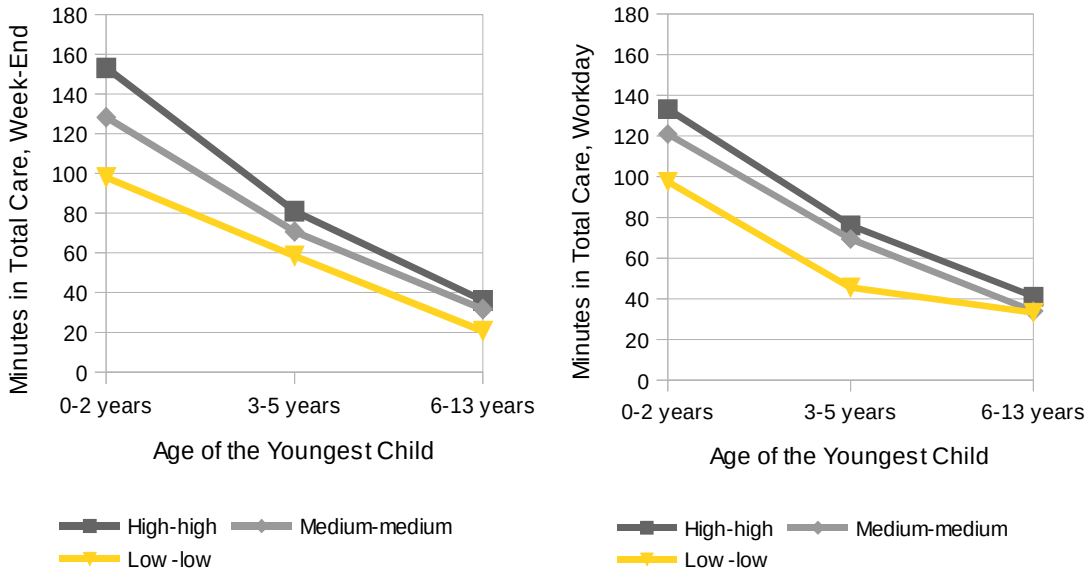
N = 12,515 ; Standard errors are displayed in parentheses below marginal effects.
† p < .10, * p < .05, ** p < .01, *** p < .001
Source: 2002 and 2008 Italian Time Use Surveys (ISTAT), own calculations.

In order to make the main findings more easily interpretable, figure 1 shows the predicted mean minutes that educationally homogamous couples spend on total child care, and figures 2 to 4 illustrate the probabilities of engaging in various childcare tasks on workdays and week-

ends by child´s age and parental education. All regression coefficients have been included in the computations for the figures.

An "education gradient" exists so that university-educated couples (high-high) have a higher probability to engage in basic care tasks during workdays, and in basic care and play during week-ends. Moreover, there exist a "developmental gradient" in total child care time of highly educated homogamous couples when the youngest child is aged from 0 to 2 years during week-ends. The differences between couples are greatest during week-ends when the youngest child is less than 2 year old (Figure 1). The gap between university-educated couples and high school-educated couples in total care time is over 20 minutes per week-end day when youngest children are aged below 2. Families with two lowly educated parents spend about 30 minutes less than couples with secondary education with their children below age 2 during week-end days.

Figure 1
Predicted mean minutes that couples spend in total child care by the age of youngest child and parental education

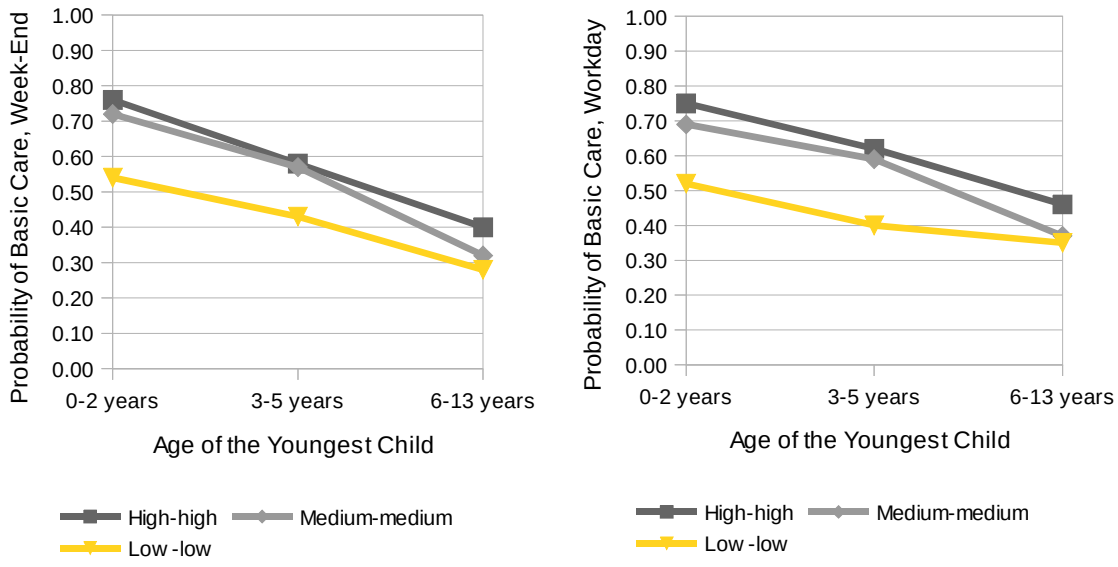


Source: 2002 and 2008 Italian Time Use Surveys (ISTAT), own illustrations.

For couples´ propensity to engage in basic care, significant negative interactions emerge for low-medium and low-low couples and youngest child age groups that suggest a "developmental gradient" in couple´s time in basic care. The "education gradient" of basic care is on average 9 per cent greater for high-high couples during workdays, and 8 per cent greater during week-ends when compared to medium-medium couple. Compared to couples with secondary education, couples with less than secondary education provide basic care to their 0 to 2-year-old children 18 per cent less often during week-end days, and 15 per cent less often during workdays. Quite similar pattern emerges for play. As Figure 3 illustrates, highly educated couples have more or less the same probability of playing with a child as couples with high school education, and lowly educated couples have a lower probability of playing with children on all days of the week. The education gradient is statistically significant only during

week-ends when highly educated couples have a 4 per cent greater probability of playing with children than couples with medium education (see Table 4).

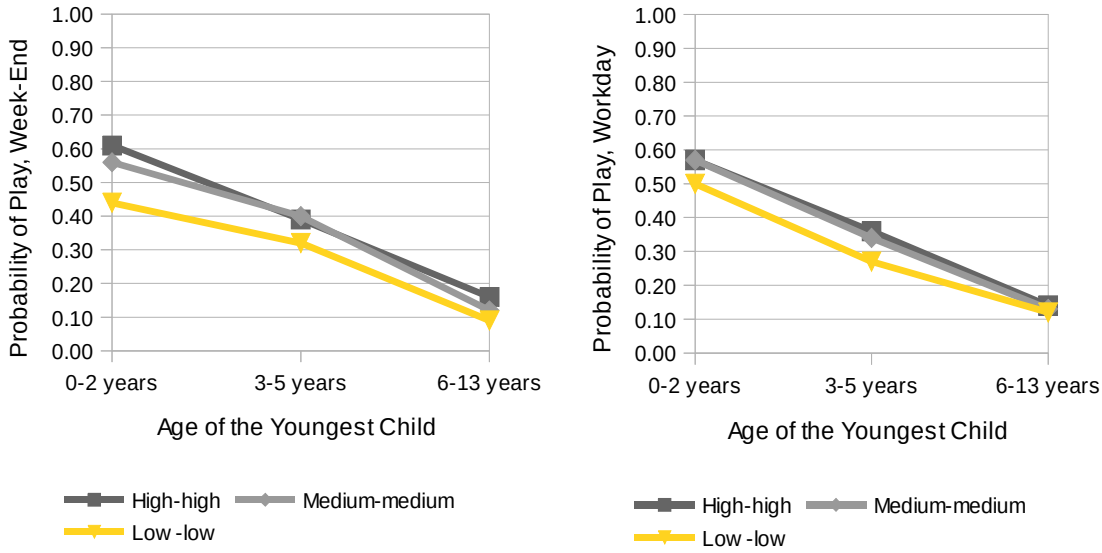
Figure 2
The probability of basic care by the age of youngest child and parental education



Source: 2002 and 2008 Italian Time Use Surveys (ISTAT), own illustrations.

There is no statistical proof of a developmental gradient in the probability of play between couples with tertiary and secondary education.

Figure 3
The probability of play by the age of youngest child and parental education



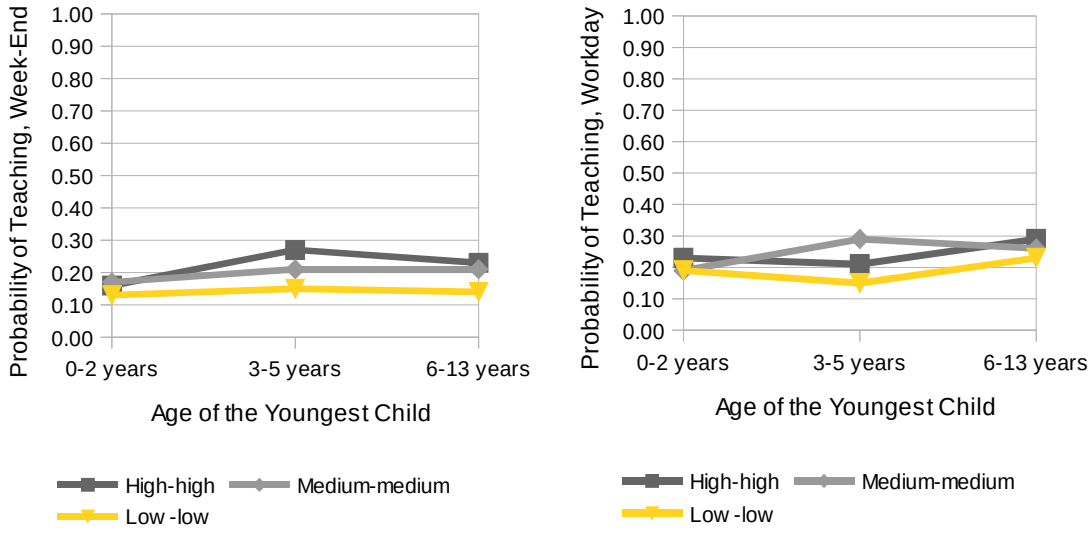
Source: 2002 and 2008 Italian Time Use Surveys (ISTAT), own illustrations.

However, couples with less than secondary education have a 9 per cent lower probability to play with their children aged below age 2 when compared to couples with secondary education. In the case of play, statistically significant difference exists between lowly educated couples and couples who have at least secondary education.

According to child development literature, the key age for teaching children is from 3 to 5 years of age. We can see from figure 4 that highly educated couples have the highest probability of teaching 3 to 5 year old children during week-ends, and teaching 6 to 13-year-olds during workdays. An education gradient in teaching emerges only during week-ends when couples with a lowly educated mother (low-high, low-medium, and low-low couples) show a smaller probability to teach a child than couples with more educated mothers. The only statistical evidence of a developmental gradient comes when comparing couples with medium and low educational backgrounds. During workdays, lowly educated couples with 3 to 5-year-old children engage 11 per cent less often in teaching activities than couples with medium education (Table 3).

Unfortunately it is not possible to distinguish how many children receive parental care simultaneously. As the average number of children is greatest in families with less than secondary education (2.04 children in low-low families compared to 1.76 children in high-high and medium-medium families), it is plausible that the results are biased downwards. A complementary data analysis with one-child families (available upon request) reveals that the results about the "education gradient" and "developmental gradient" remain the same.

Figure 4
The probability of teaching by the age of youngest child and parental education



Source: 2002 and 2008 Italian Time Use Surveys (ISTAT), own illustrations.

4.2 Educationally heterogamous couples

For couples where the wife has university diploma and the husband less than high school degree (high-low), the coefficients for full childcare, and basic care are significant and greater than for a couple with medium education during workdays. However, the interaction terms for

full care, basic care, and teaching are negative. When both coefficients and interaction terms are taken into account, a 0 to 2 year-old child with a highly educated mother and a lowly educated father, receives about 7 extra child care minutes during workdays, and 21 extra child care minutes during week-end days compared to a child with two highly educated parents.

In couples where the husband has university education, and the wife has less than high school degree (low-high), 0 to 2 year-old children receive as much child care time than children with two highly educated parents during workdays. During week-end days, 0 to 2 year-old children in low-high families receive less active childcare time than their counterparts in high-high families, but still about 13 minutes more than children in medium-medium families. For example, 0 to 2 year-olds in low-high families have 15 per cent higher probability of receiving basic care, and 3 to 5 year-olds have 29 per cent higher probability of receiving teaching care during week-ends compared to children of the same age in medium-medium families (Table 4 in Appendix). Low-high families tailor the composition of their their childcare time according to child development literature during week-ends.

5 Discussion

In order to understand the complex dynamics of parental child care, both mothers´, and fathers´ time should be considered and a distinction be made between workdays and week-ends. The present study shows how both parents´ education influence not only the amount of time they spend with children (which may not be related to efficiency in a linear fashion) but also the composition of that time with their children at different ages. The "education gradient" in parental childcare is found in most cases: highly educated mothers and fathers have a higher probability to engage in basic care, and play than less educated parents. During week-ends when parents are expected to be more free to spend time with their children, children with two highly educated parents receive additional basic care, play, and teaching time from parents which results in higher amount of full childcare time by both mothers and fathers during week-ends when compared to children with two parents with secondary education.

Although highly educated Italian parents do not seem to tailor their time as much as US mothers do (Kalil et al. 2012), education gaps in parental child care time remain statistically and substantially significant with all the control variables. A separate analysis with mothers reveals that Italian children receive more primary childcare from their mothers than children in USA. Devoting more time to children at all developmental stages may reduce the pressure to tailor childcare time. While holding all other variables constant, and taking into account only statistically significant regression coefficients, 0 to 2 year-olds with two university-educated parents receive, on average, 41 extra childcare minutes per week, while 0 to 2 year-olds with two lowly educated parents receive, on average, 152 childcare minutes less per week, when compared to children of the same age growing in families with two parents with secondary education. This net difference masks important variations in basic care, play, and teaching which are all more pro child development in families with highly educated parents.

5.1 Developmental gradient

According to hypotheses 1, highly educated parents are expected to spend more time in basic care when the child is aged below 1 year, more time in playing with children when the child is 1 to 3 years old, and more time in teaching when the child is from 3 to 5 years old. Hypotheses 1 is only partially correct in the Italian case. A "developmental gradient" is present in full care during week-ends. One can see that in the Italian case, the high-high and medium-medium families are not that different from each other in tailoring their time according to child development stages. Indeed, low-low families act quite differently when compared to medium-medium families (Tables 3 and 4).

When comparing the results from Italy to those of USA, we have to be aware of the fact that activity codes inside each broad activity category differ from each other (Table 1). Another major difference concerns teaching children. While the peak teaching age in USA is from age 3 to 5 (preschool period), in Italy the teaching gap between highly and lowly educated parents widens further at early school age from age 6 to 13 yeas. This may be due to the peculiarity of the Italian school system which puts more emphasis on homework than other school systems (Mencarini et al. 2014). These differences do not neccessarily mean that Italian parents are less aware of child development compared to the parents in the USA. The differences may well be contextual.

In a nutshell, both the "education gradient" and the "developmental gradient" exist in Italian families with two university-educated parents. The general pattern echoes the findings reported by Ramey and Ramey (2010), who describe a "rugrat race" among highly educated parents, meaning that such parents spend an ever increasing amount of time in childcare in order to increase the chances that their children would gain access into a good college. In Italy, the education gradient appears in households with the youngest children, which may mean that parents have adopted the mantra, present in academic research (e.g. Heckman et al. 2013) and popular press, that parental investments in the earliest years are the key ingredients for children´s lifelong success.

5.2 Educational homogamy and heterogamy

Analysing both mother´s and father´s time use simultaneously provides a deeper insight into the everyday decisions, and "rugrat race" in child care. According to hypothesis 2: In educationally heterogamous families, the more educated parent tailors his/her childcare time more than is common for highly educated parents in homogamous couples in order to compensate for the lack of childcare knowledge from the spouse. The most extreme cases of educational heterogamy are those where one spouse has university education and the other less than high school education. The results indicate that when a highly-educated mother is married to a lowly educated husband, their children receive no less parental care than children with two highly educated parents. This finding is mainly driven by highly educated mothers doing additional childcare tasks. It may partially be driven by the greater bargaining power of women in these families which may increase childcare inputs from the lowly educated husband.

A different case of extreme educational heterogamy happens when a university-educated man marries a woman with less than high school diploma. In such families, children do not receive less childcare than in high-high families. During week-ends, these children receive more parental childcare than children with two parents with secondary education. Highly educated fathers in educationally heterogamous families also compensate for the lack of childcare knowledge and involvement from their lowly educated wives. Longitudinal data with child outcomes is needed in order to answer the question whether the children in educationally heterogamous families turn out like their highly educated or lowly educated parent. At the moment I can just conclude that in educationally heterogamous families the parent with higher education is more involved in child raising than is common for highly educated parents in educationally homogamous couples.

Children in educationally heterogamous families with one highly educated and one lowly educated parent receive more direct parental childcare than children with two parents with medium education, and in some cases even more total child care time than children with two highly educated parents. There are several explanations for this finding. First, the highly educated parent in educationally heterogamous families may try to make up the relative disadvantage that their children face, and do more childcare than highly educated parents in educationally homogamous families do. Second, the lowly educated parent in educationally heterogamous families may try to invest more in children than lowly educated parents in educationally homogamous families for knowing more about child development from the more educated spouse, or in order to gain approval from the highly educated spouse (bargaining). Third, "high-low" and "low-high" families are small in number and the lowly educated men and women who marry highly educated women and men are highly selected people.

In his latest book, Esping-Andersen (2009) warns about increasing social polarisation based on the educational homogamy of couples. It happens because people tend to marry a partner with similar values, interests and a world-view. Bernardi (2003) has found that educational homogamy has started to increase for the youngest cohort in Italy. In my nationally representative sample, approximately two thirds of couples with children aged from 0 to 13 years have an educationally homogamous marriage. The results indicate that university-educated parents, parents with high school diploma, and parents with less than high school diploma all have statistically and substantially significant differences in childrearing activities.

5.3 Time constraints

"Time famine" or "time squeeze" is an increasingly common part of contemporary family life. Time constraints are greatest for dual-earning couples with small children. As mother´s higher education increases her chances to work, the highly educated couples should face more time constraints than couples with high school education or less where one parent is often working part-time or is at home with children. Fathers and mothers with high school education may surpass parents with university education in total childcare at some child development levels during workdays. However, during week-ends, university-educated parents surpass less educated parents in their combined childcare time at all child development levels.

Moreover, they tend to tailor their time more than less educated parents in order to foster child development at different stages. Although mothers who are employed full-time, spend less time in childcare than mothers who stay at home, the general findings on the education effect remain the same. Families with least education spend significantly less time in all primary child care tasks during week-ends compared to families with secondary education or more. The third hypothesis: The educational gradient is stronger for Saturdays and Sundays in general and in particular for fathers, finds empirical support.

6 Conclusion

In Italy, the education gradient in childcare is less pronounced compared to the USA. For example, during week-ends American mothers with university degree spend additional 82 minutes on all childcare when children are aged 0-2 compared to mothers with less than high school education (Kalil, Ryan & Corey 2012). In Italy, mothers of 0 to 2-year-olds with tertiary education spend around 51 extra minutes on primary child care tasks during a week-end day than mothers with less than secondary education. It is important to note that on average, Italian mothers spend more time in primary childcare at all child developmental stages regardless of their educational background than American mothers. This finding is important for child well-being scholarship, and may mean either that Italian mothers face less time constraints than American mothers with small children (if they face less time constraints, they may not need to tailor their childcare time that much), or that Italian mothers are more child-oriented, regardless of their educational background. This result is in line with Tanturri´s (2012) finding that Italian children are particularly time-intensive.

It is important to note three limitations of the current study. First, I have no data on child outcomes at various child development levels. Second, I have no longitudinal data on the same families with children. Due to these limitations I am unable to assess the impact of various child care activities during different child development stages on children's school outcomes, enrolment rates to universities, future work, salary, marriage, parenthood, health, and life expectancy. However, previous research (e.g. Heckman et al. 2013, Lareau 2011) implies that such future benefits exist for the “concerted cultivation” of children. Third, I do not know which child receives the childcare minutes reported by parents. It is plausible to presume that the youngest child in the family receives more attention than older children. Therefore, the analyses are done based on the age of the youngest child in family just like Kalil et al. (2012) have done. Moreover one third of Italian families in the sample have only one child. A complementary analysis done with only one-child families supports the findings on “education” and “developmental gradients” in the childcare of more educated Italian couples.

The main contribution of my study is the focus on how both mother´s and father´s child care time in the same family varies across families with different educational backgrounds, and children of different ages, during different week days. Scholars have rarely conceptualized children's life stages as a central unit of analysis, and no-one has done it while analysing the

full picture of parental childcare. The main results are: 1) both education gradient and developmental gradient exist in the childcare patterns of highly educated Italian parents, raising concerns about the diverging destinies of the children of university-educated parents and their less-advantaged peers, 2) child raising differs in educationally homogamous and heterogamous families, in the latter the more educated parent compensates for the deficit from the less-educated parent´s side 3) the education gradient is greater during week-ends showing that without work-related time constraints, the education gradient in childcare would be even greater in Italy.

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