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Children's Use of Time and Well-Being in Italy

Giovanni Busetta [1] · Maria Gabriella Campolo [1] (ORCID) ·
Antonino Di Pino [1]

Abstract Several studies indicate that the manner in which children spend their time affects their cognitive and social development. But, the time that a child dedicates to compulsory and extra-curricular activities depends on a set of key factors such as family demographic and economic characteristics, social and behavioral norms, and how parents allocate their time. Although these studies focus on the impact of parental investments (time and resources) on child cognitive development, minimal information regarding children's use of time is available. Our empirical approach is based on the assumption that attitudes and behavioral norms may be considered as latent factors related to how both mothers and children allocate their time. Therefore, focusing on the strict connection between time, parental and child resources and attitudes, we estimated in a Seemingly Unrelated Regression Estimation model how children and mothers spend their time. Data come from the National Time Use Survey 2008–2009 carried out by the Italian National Statistics Office. The use of a simultaneous-equation model to estimate all activities, taking into account the unobservable components included in the error terms, provides an innovative method for analyzing children's time allocation, by identifying the influence of latent variables common to mother and child's use of time. In particular, the estimated correlations between the error terms confirm that parental activities affect the children's allocation of time even through unobservable factors, such as subjective attitudes. The main results support the thesis that the mother's level of education plays an important role in the positive child outcomes. In addition, we found that the same trend that exists between Italian men and women also exists between boys and girls; and that girls spend more time in domestic activities and reading for pleasure and less time in leisure activities.

Keywords Children's well-being · Use of time · SURE model · Intergenerational transmission of attitudes

✉ Maria Gabriella Campolo
   mgcampolo@unime.it

[1]   Department of Economics, University of Messina, Via dei Verdi 61, 98122 Messina, Italy

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1 Introduction

Children are not completely free to choose how to allocate their time, especially in their early years. The influences of parental belief systems, parental time use, the propensity of children towards different activities, and economic resources may directly affect children's time use and their future behavior. The inputs from families or school systems, where children and adolescents spend most of their time during childhood, play significant roles in their cognitive, social, and behavioral outcomes (Heckman et al. 2006). Moreover, how mothers and fathers allocate their time in several activities (paid work, unpaid work and leisure time) can affect the present and future choices of their children regarding time alloca-tion (Álvarez and Miles-Touya 2012; Del Boca et al. 2012b; Farré and Vella 2013). In fact, while socio-economic status is related to access to societal resources, one of the most valuable inputs for children's development is the time spent with their parents, and in particular with their mother. Several studies of children's time use have generally focused on the quality and quantity of time spent together with their parents or alone. Among others, Carneiro and Heckman (2003) and Heiland and Liu (2006), show that frequent interactions in time use between parents and children have a positive effect on children's cognitive and behavioral development.

Therefore, considering the mother as the primary source of support during a child's early years and the importance of the intergenerational transmission of skills, values and behaviors, we focus our interest strictly on the time and input connections between mothers and children in Italy.

In this study, we focused on the relationship between the daily lives of children and the ways their time is allocated, which have important implications for their cognitive and social development (Harding 1997; Hofferth and Sandberg 2001b). In this context, time use data can provide an objective measure of children's activities (Bianchi and Robinson 1997, Ben-Arieh et al. 2001).

In brief, we attempt to understand the determinants of the differences in the time allocations of Italian children by focusing on the following three principle hypotheses.

> H1: We assume an intergenerational transmission of attitudes and preferences between the mother's allocation of time and the allocation of children's time (Farré and Vella 2013; Fan and Marini 2000).
> H2: The allocation of children's time is related to their allocation of time when they will become adults. The same-sex typing of tasks between Italian men and women (Anxo et al. 2011; Bloemen et al. 2010; Del Boca and Vuri 2007) is also present in the activities of boys and girls.
> H3: As stated by Bianchi and Robinson (1997) and Hofferth and Sandberg (2001b) for USA, we assume that also in Italy, the mother's education level is the most pervasive predictor of Italian children's well-being. Moreover, we assume that the allocation of children's time is related to a family's economic resources and family structure (Brown 2004).

Italy is a country in which traditional gender and familial ideology persists, and it exhibits a markedly gendered specialization of the family members in working

activities. National and international studies indicate that, compared to most European countries, Italy is characterized by a low rate of female participation in the labor market, especially of mothers with young children (Anxo et al. 2011; Bloemen et al. 2010; Mencarini and Tanturri 2004), and that men contribute minimally to housework and childcare and have more leisure time than women (Campolo 2012). Furthermore, gender discrimination exists in all stages of life (Del Boca et al. 2012a; Mencarini et al. 2012) and it is accentuated by transitions from one state to another, such as marriage, childbirth, and retirement (Anxo et al. 2011; Bloemen et al. 2010; Caltabiano et al. 2016; Campolo and Di Pino 2012; Del Boca and Vuri 2007).

Although in Italy there has been considerable research documenting the intra-household allocation of time between adult members and the determinants of well-being (e.g. Mencarini and Tanturri 2004; Anxo et al. 2011), there has no detailed studies about children's use of time and well-being. Children's well-being and their cognitive and social development are extensive concepts that can be measured using various methodologies. Ben-Arieh et al. (2001) indicate the following five domains of children's well-being: children's activities, children's economic resources and contribution, civic life skills, personal life skills, and safety and physical status. The authors suggest that, answering questions such as "What are children doing?" is necessary when studying children's well-being and their development. In this way we can focus on the "new" role of children in measuring and monitoring their own well-being (Ben-Arieh 2005). Moreover, the National Time Accounting (NTA) (Krueger 2009) proposed measuring a society's well-being based on time use and affective (emotional) experiences.[1]

Considering children as a primary source of information, this study aims to fill the research gap that exists for this topic in Italy. Moreover, the methodology applied is not limited to studying the child's time and the determinants influencing its allocation, but also considers the potential intergenerational transmission of attitudes as a latent factor.

Focusing on the connection between time and input resources for children and their mothers, we jointly estimate how mothers and children spend their time using a Seemingly Unrelated Regression Estimation (SURE) model. Specifying the allocation of time of both mother and child as a simultaneous equation model, we assume that the stochastic component of each equation is affected by latent factors including the parental transmission of attitudes. These latent factors may be transmitted by the imitation process and through other psychological and cultural aspects. The model is applied to Italian children (aged 3–13) using a dataset selected from the National Institute of Statistics (Istat)–Time Use Survey 2008–2009 (4223 children and their mothers). The methodology applied in our study represents a novelty in the international literature.

The remainder of the paper is organized as follow. In Section 2 we discuss some background literature. Section 3 describes the method and the data used. In Section 4 we present the results. Finally, Section 5 contains the conclusions.

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[1] "National Time Accounting is a set of methods for measuring, categorizing, comparing, and analyzing the way people spend their time, across countries, over historical time, or between groups of people within a country at a given time (Krueger 2009, p. 11).

2 Background

Many factors influence children's development. The family represents an environment where children construct their identities in their early years. Children's behavior is affected by their parents' behavior, which directly influences the formation of children's preferences via the transmission of certain values, social norms or cultural orientations (Hill and O'Neill 1994).

Time use studies clarify the process of socialization—in particular, gender socialization to promote well-being. Several studies suggest that the time spent by children on school and after-school activities may improve their chances of future success in the labor market, which suggests the importance of factors such as territorial and family contexts in children's well-being and development (Larson and Verma 1999; Hofferth and Sandberg 2001b).

However, performing activities together or separately requires an investment of resources and parental time; in general, parental investments have an important impact on children's cognitive and non-cognitive outcomes (Carneiro and Heckman 2003).

Several studies have demonstrated the association between family income and child development and well-being. Considering an investment perspective, income is used to purchase goods and services required for children's development and to foster their human capital. Children of lower-income families have limited access to resources that aid their development (Haveman and Wolfe 1995). Yeung et al. (2002) examine how two measures of family income (stability and level) were associated with preschool children's outcomes. The results revealed that children in families with higher incomes scored higher on cognitive tests and had fewer behavioral problems; however, the size of the income effect was modest. Votruba-Drzal et al. (2004) determined that children in low-income families experience less consistent caregiving and a less supportive and cognitively stimulating home environment. Income and parental time use, such as time spent with children, are dependent on two key factors: parental education and employment (Guryan et al. 2008; Sandberg and Hofferth 2001).

Mothers with a college education or greater education spend more time per week on childcare than mothers with a high school degree or less education (Kimmel and Connelly 2007; Guryan et al. 2008). Hofferth and Sandberg (2001a) examine how children's time use in America has changed between 1981 and 1997. Their results indicated an increase in time dedicated to structured activities (school, day care, sports, and art activities) and a decrease in the time spent in unstructured activities (play, television viewing, visiting, and passive leisure).

For Cardoso et al. (2010), reading and studying together are activities related to the acquisition of human capital as opposed to other types of leisure, which are defined as passive leisure, such as watching TV.

Other studies concerning children's time use have focused on family time and on examining the associations between family time and adolescents' well-being. Regarding children's well-being, the literature suggests answering two questions, the first based on quality time (Christensen 2002) and the second based on routine family time, such as mealtimes, household conversations or household work. Offer (2013) applied a hierarchical linear model to examine the

relationship between adolescents' emotional well-being and family time by means of four family activities (mealtime, productive time, maintenance time and leisure time).

Heiland and Liu (2006) analyzed the relationship between the family structure and young children's well-being. The behavioral outcomes indicated that positive activities, such as reading and frequent interactions, can stimulate children's positive development and result in fewer behavioral problems.

Vandewater et al. (2006) studied the relationship between the time spent viewing television (both with and without parents and siblings) and on other activities; they observed strong negative relations between watching TV and the time spent interacting with parents or siblings, the time dedicated to homework, and the time dedicated to creative play. Koolstra et al. (1996) demonstrated a negative association between time spent watching television and time dedicated to studying and reading.

Although many studies have focused on the impact of parental investments (time and resources) on child cognitive development, only minimal information is available regarding children's time investments. Recently, Del Boca et al. (2012b) studied the impact of children's time investments in their development, considering that information about how children use their time separately from their parents becomes important when children start to make decisions independently from them. In their early years, children spend, in most cases a substantial part of their days at home, at school, performing activities alone or with adult family members, or in other structured contexts—chosen by adults.

Also regarding the Italian context, Mencarini et al. (2014) model the impact of family structure on the child's investment in activities related to human capital accumulation. To do so, they consider the amount of time invested by each child in reading, studying, and doing homework. Their study shows that living in a single-parent household reduces the amount of time children spend reading and studying.

D'Agostino et al. (2018) analyze children's wellbeing from a gender perspective at the family level, grouping families to investigate the conjunction of gender and children's wellbeing. In this respect, the authors found that in three of the four countries analyzed (Portugal, Italy and partially in Greece, but not in Spain) children's gender is particularly relevant for discriminating children's capabilities, with females often more deprived than males. This result makes gender particularly relevant when implementing policies aimed at increasing children's wellbeing.

Mancini et al. (2017) used the last two waves of the Italian Time Use Survey to analyze the intergenerational transmission of reading habits by focusing on the intergenerational transmission of attitudes towards studying and reading. These activities are considered crucial in the accumulation of human capital, assuming that these attitudes can be explained by both cultural and educational transmission from parents to children and by a process that is based on the imitation of parents' behaviors.

Migliorini et al. (2018) studied the subjective well-being of 8-year-old Italian children and the related gender differences. The authors found the quality of the close relationships in a child's life to be one of most critical factors for measuring well-being.

We can conclude that, also in Italy, child development is the result of reciprocal interactions between children and multiple contexts that include the family and its social and economic resources. Social resources include parenting skills and education, cultural practices and approaches, intra-familial relations, and the health status of family members. Economic resources include wealth, occupational status and dwelling conditions. Parents transmit their behavior by serving as role models and within a social system. As the Italian context is characterized by a relevant level of gender gap, it seems to be quite important. Social and behavioral norms, parental time use, the propensity of children to engage in various activities, and the behavior imitation process must be considered in addition to other key factors, such as family demographic and economic characteristics (Larson and Verma 1999; Brown 2004).

3 Data and Methods

We directly model children's use of time (compulsory activities and activities that increase human capital, including time dedicated to socialization activities) and the allocation of time by mothers, considering several unobservable factors. In particular, we analyzed gender attitudes and the potential intergenerational transmission of attitudes and preferences between mothers and children to explain the factors that may influence the development and well-being of children. This study considers children as a primary information resource using the diary technique. Knowledge about the preferences of children and adolescents, their daily activities, the contexts in which they live, and their available economic resources are critical (Kooreman 2007). In this case, it is necessary to use the diary method to collect information. Understanding the flow of children's daily lives is important in understanding their available opportunities and constraints (Harvey 1993; Raley 2014). Robinson and Godbey (1997) defined the time diary as a social microscope useful for examining aspects of daily life that are otherwise unobservable. The diary method is an important instrument that enables an investigation of how people organize their days and the relationships among the different time allocations of members of the same family with an extremely high level of accuracy (Raley 2014).

In the next paragraph we describe the characteristic, and preliminary descriptive statistics, of the selected sample here adopted, drawn from the Italian Time Use Survey of 2008–2009. This survey was carried out by the Italian National Statistics Office (Istat) using the time diary method.

We go on to describe the methodology used to perform a simultaneous estimation of the time dedicated to different activities for both parents and children, by using a SURE approach. In doing this, we indicate statistics and parameters of interest to assess the relationship between the time allocation of parents and their children and intergenerational transmission of attitudes.

3.1 Sample and Descriptive Analysis

In the Istat Time Use Survey, the diary was self-administered, with fixed ten-minute intervals to be completed during randomly designated diary days, during

which the respondents recorded their activities. The 24 h of each day were divided into 144 intervals of ten minutes each, and the subjects note their primary activities in their diaries for each time interval and whether those activities were simultaneously performed with a secondary activity (e.g., listening to the radio while cooking). The subjects could also indicate other people with whom these activities were performed and where they were performed.

Researchers can use such diaries to jointly study a variety of aspects of daily life such as external work, domestic work, childcare, leisure time, and the use of mass-media. The target population of the Istat survey comprised household residents in Italy, consisting of 18,250 families and a total of 40,944 individuals who completed a daily diary; the total number of respondents was 44,606 individuals.

For the empirical analysis, we selected a sample of 4223 children aged 3–13 and their corresponding mothers (both Italian and foreign-born). This age range was selected because for this age range, children's time allocation is strictly dependent on the choices of adults, and can be influenced by both the intra-household allocations of parents and unobserved factors such as mothers' gender attitudes. The manner of time distribution may affect the social and cognitive development of children. The average age of the children was eight, and 47% of the children were girls.

Considering the mothers, 57% were employed, and the mean age was 39. The mean number of years in the education system was 11.42. Regarding Italian citizenship, 92% of the mothers were Italian, and 94% of the children were Italian.

Tables 1 and 2 provide the distributions of the time allocations of the mothers and the children, respectively; all sample statistical descriptions are listed in Table 5.

Generally, when studying adult time use, activities are grouped into the following three or four macro-areas: paid work, unpaid work, childcare and leisure time (Kimmel and Connelly 2007; Campolo 2012). In this case, we consider the following four macro-areas for mothers (Table 1):

Paid work includes principal and secondary work, breaks, and job searches. Domestic work includes housework and family care (washing, cooking, cleaning, gardening, pet care, shopping, care and support to adults in the family, repairs). Childcare refers to physical care, help with homework, play and accompaniment. Leisure time includes media leisure (TV, radio, reading books and magazines) and non-media leisure. Non-media leisure time, according to the distinction

Table 1 Average minutes spent per day on paid work, domestic activities, childcare, and leisure for women with children aged 3–13

Activities	Description	Mean	Std. Dev.
Paid work	Principal and secondary work	99.07	177.56
Unpaid work	Housework and family care	295.66	154.53
Childcare	Childcare Activities	88.01	93.42
Leisure time	Leisure Time	202.31	128.04

The means are calculated for all subjects, even subjects who did not perform a particular activity when they completed a daily diary

Table 2 Average minutes spent per day on 12 different activities for children aged 3–13

Activities	Description	Mean	Std. Dev.
Sleeping	Sleep and relax	639.75	107.82
Eating	Eating	122.59	47.50
Day care	Day care	53.16	30.75
Housework	Housework and family care	21.82	43.20
School	School	129.77	168.12
Studying	Homework and other courses	48.19	68.08
Church	Attending church and voluntary activities	10.79	31.02
Social Life	Social life, visiting	49.16	74.76
Sport	Sport	34.96	65.89
Play	Play, arts and Internet	156.73	123.71
Reading	Reading for pleasure	6.35	20.54
TV	Mass media: TV and radio	102.06	85.66

suggested by Robinson and Godbey (1997), includes both informal leisure activities (socializing, conversations, sports and hobbies), which facilitate an exchange of feelings and opinions, and formal activities (voluntary activities, help for other families, social and religious participation, adult education, cultural events), which facilitate individual cultural development. For this reason, we employed additional categories for children (reported in Table 2) that consider different impacts of the time spent in each of these categories on their development (Larson 2001).

To support our hypothesis on gender difference (Hypothesis 2) and the mother's educational level (Hypothesis 3), we use a Student-t test[2] to compare the average time spent in the different activities by boys and girls, respectively (Table 4), and to compare the average time spent by children whose mothers have a high educational level with the average time spent by children whose mothers have a low educational level (Table 3).

The mother's educational level was divided into a low educational level (high school degree or less) and a high educational level (college education or higher). The result of the t-test shows that a mother's educational level is one of the most important predictors of a child's wellbeing.

When their mother has a high education level, children spend more time in "Day Care" and in unstructured and structured activities that promote positive development, such as sports, playing and reading (e.g., Larson 2001).

Regarding gender, the differences in mean by gender and the relative test are reported in Table 4. The results of the t-test show that, even if there are not

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[2] In our work we perform a Student-t test for the comparison of two means, without any preconceived assumption about the direction of our findings. Therefore, the hypotheses for the comparison of the means in our t-test are: $H_0 : \mu_1 = \mu_2$ (the population means of the two groups are the same)

$H_a : \mu_1 \neq \mu_2$ (the population means of the two groups are different).

If the p-value is greater than 0.05, the decision would be that there is no significant difference between the two groups.

Table 3 *T*- test: Children's time by mother's educational level (daily minutes)

Main activity	Low mean	High mean	Difference	*P*-value
Mother's education level:				
Sleeping	639.349	640.133	−0.784	
Eating	123.639	121.614	2.025	
Day Care	52.145	54.108	−1.963	*
Housework	21.949	21.696	0.253	
School	129.344	130.174	−0.830	
Studying	50.661	45.873	4.788	*
Church	10.323	11.220	−0.896	
Social Life	48.79	49.500	−0.710	
Sport	32.664	37.111	−4.447	*
Play	152.111	161.045	−8.935	**
Reading	5.093	7.524	−2.431	***
TV	110.509	94.149	16.360	***

$H_0 : \mu_{1 \ low} = \mu_{2 \ high}$ (the mean time spent in an activity by different education level of the mother is the same); $H_a : \mu_{1 \ low} \neq \mu_{2 \ high}$ (the mean time spent in an activity by different education level of the mother is different). * $p < .05$; ** $p < .01$; *** $p < .001$

significant differences between boys and girls with respect to the compulsory activities, those differences become significant in leisure activities and housework. Indeed, girls spend more time than boys in day care, doing domestic work, studying, socializing, attending church and reading but spend less time watching TV and playing. Moreover, in Italy, studies concerning adults' time use (Anxo et al. 2011; Bloemen et al. 2010; Del Boca and Vuri 2007; Campolo 2012; Campolo and Di Pino 2012; Caltabiano et al. 2016) note that females and males allocate their time differently, emphasizing a distinct gender gap in time use at every stage of life. The time use report provided by Istat (2010, 2011) demonstrates gender differences in time allocation for students (minimum age of 15 years), workers and older people. Women spend more time on domestic work and less time on leisure activities than men at every age range. The same trend is observed for children: between boys and girls, the difference in mean in terms of time devoted to leisure is 22 min, favoring boys. Girls allot more time than boys to domestic activities (seven minutes, $p < 0.001$). Regarding leisure time, we observe that the allocation of time concerning different types of leisure time (formal and informal) follow the same gender trends as those in the Italian adult sample (Istat 2011). While significant differences favor boys with regard to "Sport," "Play" and "TV", girls spend more time than boys on reading for pleasure, attending church and voluntary activities and "Socializing". However, the difference is not significant in the latter case. The differences in means between boys and girls provide evidence that the same sex-typing of activities between Italian men and women is also present at younger ages in the activities of boys and girls. These results allow

Table 4 *T*-test: Children's time uses by gender (daily minutes)

Main activity	Boys mean	Girls mean	Difference	P-value
Sleeping	639.122	640.462	−1.340	
Eating	122.415	122.793	−0.378	
Day care	51.707	54.787	−3.080	***
Housework	18.329	25.731	−7.402	***
School	129.122	130.502	−1.380	
Studying	45.766	50.904	−5.138	**
Church	9.839	11.848	−2.010	*
Social life	48.356	50.055	−1.700	
Sport	38.284	31.236	7.048	***
Play	164.176	148.373	15.803	***
Reading	5.166	7.675	−2.509	***
TV	104.579	99.237	5.342	*

$H_0 : \mu_{1\,boys} = \mu_{2\,girls}$ (the mean time spent in an activity is the same for both genders); $H_a : \mu_{1\,boys} \neq \mu_{2\,girls}$ (the mean time spent in an activity differs for the two genders). * p < .05; ** p < .01; *** p < .001

us to support the assumption about the intergenerational transmission of attitudes and preferences and gender differences, made in Hypothesis 1 and Hypothesis 2, respectively. Moreover, the results of our study are also supported by other research indicating that differences between girls and boys are attributable to the notion that girls are more "people-oriented" and more engaged in relationship activities, whereas boys are more "things-oriented" (Galambos et al. 2009; Su et al. 2009).

3.1.1 Independent Variables

The demographic variables used in our analysis include age (*Age C*), gender (*Sex C*: 1 = girl; 0 = boy) and nationality of child (*Citizenship C*); age (*Age M*), education level (*Education M*), and nationality of mother (*Citizenship M*); a dummy variable that indicates whether a family lives in Southern Italy/or islands (*South*: 1 = yes, 0 = otherwise).

Family structure is analyzed by the following variables. For marital status, we consider the following three categories: cohabiting, married, and single, with the latter including divorced, widowed and never married. Therefore, we construct the corresponding three dummy variables: *Cohabiting*, *Married* and *Single* mothers (as a reference group). We also considered if there are other children in the family (*Siblings*), the number of children aged 0–5 (*Children 0–5*), and the number of children aged 6–13 (*Children 6–13*).

Several studies have indicated that the family's economic resources may impact children's development. Unfortunately, the Italian time use survey did not include information about the wages of adult members or family income. Therefore, as a proxy for these variables, we employ the mother's perception of

the family's economic resources (*Economic M*: 1 = insufficient, …, 4 = optimal), the mother's level of satisfaction with the family's economic situation (*Satisfaction M*: 1 = very or somewhat satisfied) and her work status (*Work M*: 1 = currently working full or part-time; 0 = otherwise). Moreover, we included several indicators regarding housing as follows: a *House Index* was constructed as the ratio between the number of rooms and the number of components. For the same number of rooms, an increase in the number of components causes a decrease in this index, which indicates increased hardship for the family; dummy variables indicate whether the family lives in a rented house (*Rent*: 1 = yes; 0 = no). We also consider the existence of an Internet connection in the house (*Internet*: 1 = yes; 0 = no). We include this variable, because studies suggest that people with higher levels of access to the Internet had greater access to education, income, and other resources that help people to improve both socially and economically (Hoffman and Novak 1998; Jackson et al. 2006).

To evaluate the relations with neighbors and the territorial context, we considered two dummy variables that indicate whether the mother is part of a relational network outside the family. More specifically, we consider the mother's degree of religiosity, which was captured using a dummy variable regarding the frequency of attending church or other place of worship (*Religiosity M*: 1 = if mother attends a church or other place of worship every day, more than once a week, once a week, or 0 otherwise), and another dummy variable regarding the frequency of contact with friends (*Friends M*: 1 if the mother meets her friends during free time every day, more than once a week, once a week, or 0 otherwise). *Stress M* is a dummy variable that takes a value of 1 if the mother is always or often stressed and 0 otherwise.

A change in the amount of time spent in several activities performed by children and mothers during the week should be considered for the weekdays and weekend diaries. Some studies separately estimate for these types of days (Bloemen et al. 2010), while other studies (e.g. Anxo et al. 2011) include a dummy variable that takes the value 1 for weekdays (Monday-Friday) and 0 for weekends (Saturday or Sunday). In our study, following the second approach, we control for the day of the diary using a control variable (*Day*: 1 = Monday-Friday, 0 = otherwise).

The descriptive statistics for these variables appear in the following table (Table 5).

3.2 The Model

In this study, focusing strictly on the connection between mothers and children in terms of time allocation and resources, we consider the potential intergenerational transmission of attitudes as a latent factor common to both parents and children, which influence their behavior in terms of time use. Therefore, specifying the allocation of time of both mother and child as a simultaneous equation model, we assume that the stochastic component of each equation (explaining the time devoted to a specific activity) is affected by latent factors including the parental transmission of attitudes. Namely, latent factors influenced by the parental transmission of attitudes can be assumed to be included in the error terms of the simultaneous equations explaining the time devoted to different

Table 5 Means or percentages and standard deviations for variables predicting children and mother's time use

Variables	Description	Mean or %	Std. Dev.	Min	Max
Sex C	Sex of child (Dummy: 1 = girl)	0.47		0	1
Age C	Child's age (in years)	8.04	3.13	3	13
Citizenship C	Child's citizenship (Dummy: 1 = Italian citizenship)	0.94		0	1
South	Geographical area (*Dummy:* 1 = Southern Italy and Islands, 0 = Northern and Central Italy)	0.39		0	1
Siblings	Siblings of child (Dummy: 1 = yes)	0.79		0	1
Age M	Mother's age	38.84	5.66	17	63
Education M	Education level of mother expressed in years	11.42	3.67	2	21
Work M	Working status of mother (Dummy: 1 = worker)	0.57		0	1
Single M	If mother is single (Reference)				
Married M	If mother is married (Dummy: 1 = yes)	0.86		0	1
Cohabiting M	If mother is cohabiting (Dummy: 1 = yes)	0.05		0	1
Citizenship M	Mother's citizenship (Dummy: 1 = Italian citizenship)	0.92		0	1
Stress M	Level of stress of mother (Dummy: 1 = if she is always or often stressed)	0.31		0	1
Satisfaction M	Mother's level of satisfaction regarding the economic situation (Dummy: 1 = very or somewhat satisfied)	0.51		0	1
Rent	If they live in a rented house (Dummy: 1 = yes)	0.17		0	1
Internet	If there is an Internet connection in the house (Dummy: 1 = yes)	0.62		0	1
House Index	Number of rooms/number of components	1.25	0.49	0.20	5
Economic M	How mother considers the economic resources of the family (1 = insufficient, …, 4 = optimal)	2.52	0.67	1	4
Religion M	If mother goes to a church/place of worship at least once a week (Dummy: 1 = yes)	0.36		0	1
Friends M	If mother meets her friends during free time at least once a week (Dummy: 1 = yes)	0.60		0	1
Day	The day of diary (Dummy: 1 = Monday-Friday)	0.37		0	1
Children 0–5	Number of children 0–5 years	0.56	0.70	0	3
Children 6–13	Number of children 6–13 years	1.19	0.76	0	6

Standard Deviation are not reported for Dummy Variables

activities of mother and child. As a consequence, we should take into account the influence of common latent factors in order to correct the model's estimation results for the effects of the endogenous relationship occurring between different uses of time. In doing this, we use a Seemingly Unrelated Regression Estimation (SURE) model (Zellner 1962).

The SURE model is based on the assumption that all the dependent variables of the simultaneous equation system (in this case, the amount of time spent by each subject on the various activities) are jointly related to factors that are usually not observable but are common to the other subjects (namely, the other

family members). In this manner, the time that the subject spends on each activity is influenced not only by the time that the subject dedicated to other activities but also by the time spent by other family members.

Our SURE model includes four dependent variables for mothers — *Paid Work*, *Unpaid Work*, *Child Care*, *Leisure Time* (see Table 1) — and twelve dependent variables for children - *Sleeping*, *Eating, Day care, Housework, School, Studying, Church, Social Life, Sport, Play, Reading, TV* (see Table 2).

By jointly considering these activities, the proposed model enables us to simultaneously estimate the time allocations for mothers and children, considering, *inter alia*, the influence of socio-demographic factors on the decisions by family members about the allocation of time. Following the SURE approach, the cross-correlations between the stochastic components of the simultaneous equations identify the influence of latent factors on the allocation of time in different activities. These cross-correlations can be specified by imposing restrictions on the covariances between the error terms of the simultaneous equations of children and their mothers. To this purpose, the adoption of a SURE- Generalized Least Squares (GLS) estimator allows us to estimate the covariance matrix between the errors of the simultaneous equations adopting a residual-based iterative procedure.

In particular, a three-stage procedure is implemented (Zellner and Theil 1962). At the first stage, both censored and uncensored equations are estimated equation-by-equation in a reduced form (that is, avoiding the use of the dependent variables as explanatory variables in the other equations). At this stage, an OLS estimator is used for the non-censored equations and a heteroscedastic Tobit for the censored equations (in this case, the equation explaining the time devoted to paid work, observed only on employed mothers). At the second stage, we estimate the variances and covariances of the error terms using the residuals obtained by the first-stage regressions. This allows us to incorporate the non-zero constraints on the estimated covariances between the error terms of all simultaneous equations and, consequently, on the estimated covariance matrix of the error terms. The "constrained" covariances are then used to correct the estimates of the simultaneous equations at a third stage, such as in a GLS procedure. This residuals-based correction of the estimates is iteratively replicated until the estimation of the simultaneous-equation coefficients converge.

We show below, as an example, one of the sixteen simultaneous equations of the SURE model:

$$RC_i = \sum_{j=1}^{11} \alpha_j x_{ij} + \sum_{s=1}^{4} \beta_s x_{is} + u_{ci} \tag{1}$$

where RC_i is the daily time (in minutes) spent in reading activity by the i-th child, explained by eleven values measuring the time spent in other activities, x_{ij}, and by four values of the time spent in four specific activities, x_{is}, (paid work, domestic work, child care and leisure) by the mother. In order to assess the influence of latent factors, we assume that the error terms of the simultaneous

equations, u, are distributed with zero mean, and that the covariances between the error terms of each equation are nonzero. Therefore, the covariance matrix, $\boldsymbol{\Omega}$ of the error terms of the sixteen simultaneous equations is specified as follows:

$$\boldsymbol{\Omega} = \overset{16 \times 16}{\Sigma} \otimes \overset{n \times n}{\mathbf{I}} \tag{2}$$

where $\overset{n \times n}{\mathbf{I}}$ is the identity matrix (n is the sample size) and $\overset{16 \times 16}{\Sigma}$ is a symmetrical matrix including variances of error terms of each equation in the diagonal and covariances between the equations elsewhere.

In order to incorporate specific constraints on the covariances between the error terms of the equations, we use, at the second stage, the residuals, $\hat{u}_i$, of the sixteen regressions that we run at a first stage. Then, at the second stage we obtain the "explained" residuals, $\tilde{u}_i$, by regressing the *OLS*-first-stage residuals, $\hat{u}_i$ on the first-stage residuals of the other equations. To better clarify this second stage of our estimation procedure, let's consider, as an example, the following Eq. (3), in which the dependent variable is given by the residuals of the Eq. (1):

$$\tilde{u}_{RCi} = \sum_{j=1}^{11} \tilde{\phi}_j \hat{u}_{ij} + \sum_{s=1}^{4} \tilde{\rho}_s \hat{u}_{is} \tag{3}$$

The coefficients indicated with the Greek letter ϕ measure the relationships of the dependent variable with the errors of the child's time-use equations, while coefficients indicated with the Greek letter ρ measure the relationships with the errors of the four time-use equations of the mother.

The estimated covariances between equations are incorporated in the estimated *OLS* coefficients $\tilde{\phi}$ and $\tilde{\rho}$ as in the well-known second-order moment relationships.

Then we use these second-stage estimated residuals - explained by the residuals of the other simultaneous equations - to compute the following dependent variable corrected for the endogenous influence of the unobservable latent factors:

$$\tilde{RC}_i = RC_i - \tilde{u}_{rci} \tag{4}$$

We replicate this procedure in order to correct the dependent variables of the sixteen equations.

At a third stage, we substitute the corrected dependent variable (4) into Eq. 1, and we run an *OLS* regression. To improve the efficiency of estimates, the residuals obtained at the third stage are used to iterate the procedure until the estimated coefficients converge.

Note that the coefficients estimated by running the regression between residuals at the second stage (see, above, Eq. (3)) can be considered as measures of the effect of latent factors on the allocation of time on different activities. In fact, specifying the equation system concerning the relationship between the errors,

we assume that the unobservable component of a dependent variable is related to the unobservable components of the other dependent variables.

In practice, the SURE estimation allows us to disentangle two distinct effects on the allocation of time: i) an effect due to observed covariates, given by the socio-demographic variables included as regressors in the simultaneous equation system, ii) an effect due to common latent factors included in the stochastic component of each equation, and specified by the second-stage equations of residuals. The joint effect of latent factors on the allocation of time of both mothers and children may be considered as being influenced, at least in part, by the parental transmission of attitudes.

4 Results

The estimated results of the SURE model for mothers and children are reported in the following tables (Tables 6 and 7, respectively).

The estimation results for mothers show that age and education play an important role (all coefficients are significant). In particular, with increasing age women spend more time in all activities except for childcare. Meanwhile, more highly educated women spend significantly more time on leisure, paid work and childcare activities and less in unpaid work. In general, women

Table 6 Estimation results sure model—MOTHER

Dependent variables		Paid work	Unpaid work	Childcare	Leisure time
		Coeff. p.	Coeff. p.	Coeff. p.	Coeff. p.
Constant		−8.27***	5.30***	2.12***	4.58***
Age M		0.05***	0.01***	−0.03***	0.01*
Edu M		0.07***	−0.01*	0.06***	0.03***
Work M		2.44***	−0.68***	−0.56***	−0.44***
Married	Ref. Single	−0.15	0.24***	0.03	−0.02
Cohabiting		0.91***	−0.06	0.10	0.15
Citizenship M		−1.08***	−0.03	0.37***	0.21**
Day		4.55***	−0.04	0.68***	−0.82***
Ch 0–5		−0.81***	0.01	0.99***	−0.1***
Ch 6–13		−0.10*	0.12***	0.44***	0.01
House Index		−0.25***	0.07*	0.18***	0.08*
Religion M		−0.96***	0.02	0.03	0.00
Friends M		−0.49***	−0.01	−0.02	0.16***
South		0.10	0.05	−0.12*	−0.13***
Economics M		0.28 ***	−0.06**	−0.01	0.01
R^2		0.74	0.17	0.23	0.15

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. The suffix M indicates the mother, while the suffix C indicates the child

Table 7 Estimation results of SURE model—CHILDREN

Dependent variables	Sleeping	Eating	Day care	Housework	School	Studying	Church	Social life	Sport	Play	Reading	TV
No. 4223	Coeff. p.	Coeff. p.	Coeff.p.	Coeff.p.	Coeff.p.	Coeff. p.	Coeff. p.	Coeff.p.	Coeff.p.	Coeff.p.	Coeff.p.	Coeff.p.
Constant	6.77***	4.98***	3.67***	-4.12***	-2.85***	-5.84***	-7.80***	1.03***	-4.78***	6.62***	-10.89***	4.25***
Sex C	0.00	-0.01	0.06*	0.49***	-0.01	0.41***	0.19***	0.21***	-0.11*	-0.27***	0.28***	-0.12*
Age C	-0.02***	-0.02***	0.00	0.25***	0.12***	0.53***	0.13***	-0.02*	0.17***	-0.24***	0.31***	0.06***
Citizenship C	-0.03**	-0.02	0.11	0.07	0.03	0.40**	0.01	-0.38*	0.05	-0.11	0.26**	0.04
South	-0.02***	0.01	0.07**	-0.69	0.61***	-0.30***	-1.03***	-0.22***	-0.38***	-0.52***	-0.40***	-0.05
Siblings	-0.01	-0.01	0.09**	-0.16**	-0.22***	-0.08	0.21***	-0.06	-0.19**	0.18**	-0.04	0.11
Age M	0.00	0.00	-0.01***	0.00	-0.01*	0.00	0.01***	0.01*	0.00	-0.01	0.00	0.01*
Edu M	0.00	0.00	0.02***	0.08***	0.01	0.06***	0.09***	0.01	0.09***	0.03***	0.06***	-0.03***
Work M	0.00	-0.01	0.02	0.31***	0.23***	-0.29***	-1.07***	0.38***	0.12*	0.07	0.51***	0.02
Cohabiting Ref. Single	0.04***	0.11**	0.06	0.33**	0.63***	0.33***	-0.26	0.66***	0.50***	-0.17*	-0.04	
Married	0.00	0.06**	0.01	0.18*	0.16**	-0.04	-0.27**	0.07	0.33***	0.06	-0.20*	
Citizenship M	-0.01	0.03	0.05	0.02	-1.08***	-0.11	0.66***	0.57***	0.26	0.24	0.37***	-0.60***
Stress M	0.00	0.00	0.06*	0.05	-0.13***	-0.04	0.00	0.18**	-0.12*	0.06	-0.05	0.09
Satisfaction M	0.01***	0.03*	-0.01	0.01	-0.35***	-0.20***	0.08*	0.07	0.12*	-0.02	0.00	0.22***
Rent	0.00	0.02	0.01	0.06	0.32***	0.02	-0.16***	-0.06	0.07	-0.03	-0.03	0.08
Internet	-0.01**	-0.01	-0.05	-0.02	0.20***	0.10*	-0.21***	-0.01	-0.03	0.05	-0.03	-0.07
House Index	-0.03***	-0.03	0.03	-0.02	-0.03	-0.15**	-0.19***	0.02	-0.10	-0.15**	-0.05	-0.02
Economics M	0.00	-0.02	0.03	0.16***	0.10***	0.18***	0.13***	0.01	0.18***	-0.06	0.14***	-0.09*
Religion M	-0.03***	-0.05***	-0.01	0.03	-0.69***	0.51***	0.77***	0.04	-0.07	-0.32***	0.56***	-0.13***
Friends M	-0.02***	0.01	-0.03	-0.23***	-0.16***	-0.15***	-0.12***	-0.08	0.10*	-0.19***	-0.03	-0.12*
Day	-0.13***	-0.24***	-0.21***	-0.62***	5.36***	1.45***	-3.23***	-1.50***	-0.95***	-0.71***	-0.45***	-0.34***
R^2	0.42	0.10	0.04	0.39	0.90	0.68	0.80	0.18	0.22	0.27	0.68	0.05

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. The suffix M indicates the mother, while the suffix C indicates the child

spending more time in unpaid work are married, not employed and have a negative perception of the family's economic resources. The presence of younger children (6–13 years old) positively influences positive the time dedicated to unpaid work and childcare while, in general, it is negatively related with the time spent in paid work and leisure.

Women spending more time in paid work suffer from a poor relational network outside the family. In particular, both the mother's degree of religiosity and the frequency of contact with friends impact negatively with the time spent by women in the labor market. On the contrary, such women have a positive perception of the family's economic resources. Finally, the time spent in childcare, unpaid work and leisure decrease for employed mothers.

The intensity of the different activities change if we consider the weekend and weekdays. These results show that while childcare and paid work increase during weekdays, leisure time decreases.

Regarding the estimation results for children, Table 7 shows that the age of the child plays an important role. As children grow older, their personal care (Sleeping and Eating) decline and they spend less time playing. Moreover, this is positively related to the time spent studying, housework, socializing, watching TV and reading for pleasure (e.g. Hofferth and Sandberg 2001a, b). As other studies showed, there exists a gender differentiation in the activities of children. Also in our analysis, the results show that gender is a relevant variable and that there is a gender role characterization in the allocation of time (Hypothesis 2). While girls spend more time in "Day Care", housework, studying, church and voluntary activities, in social life and reading, boys spend more time playing, playing sports and watching TV (see also Table 4). Similar results for girls were found by Ruiz (2017), except for the activity "watching TV or listening radio" where there are no differences between boys and girls.

In addition, we found significant differences regarding geographical residential area: children who live in Northern and Central Italy spend more time in extracurricular activities, and in particular structured activities (church, social life and sport), than children who live in Southern Italy and in the Islands. This latter result is very important, because, it indicates a territorial gap in the development opportunities and well-being of children. All activities except for "Playing" and "watching TV" are positively affected by family economic resources. On the one hand, if the mother works, children tend to contribute more time to housework and spend more time reading for pleasure and socializing. On the other hand, they spend less time studying and attending church and doing other voluntary activities. Children in cohabiting families seem to be more responsible at home and dedicate more time to sports and playing and eating.

While children's citizenship is not significant, we observe that the mother's citizenship is a relevant variable. Children with Italian mothers spend more time reading, attending church and socializing and less time watching TV and at school. Less time spent in school, particularly for preschool-age children, may indicate the existence of other informal childcare services that support mothers during the day such as grandparents. Several studies (Bianchi and Robinson 1997; among others) show that the mother's educational level is one of the

most pervasive predictors of children's well-being. According to these studies, our results show that the mother's educational level plays a significant role as a measure of social class and in determining how children allocate their time (Hypothesis 3). The higher the mother's level of education is, the more time their children spend on personal care, studying, reading (see, among others, Hofferth and Sandberg 2001a, 2001b; Timmer et al. 1985), doing sports, playing, attending church and voluntary activities and doing housework and the less time they spend watching television. This finding signals that a significant relationship occurs between the mother's education and the time spent by the child in activities considered as strongly related with his/her well-being. This result also supports our previous Hypothesis 1 on the parental transmission of attitudes and behavior.

A significant impact of the parental transmission of values on the time allocation of the child is also confirmed by the estimated relationships between the stochastic components of the simultaneous SURE equations. In Table 8 we show, as a result of the SURE estimation, that the allocation of the child's time among different activities, not depending on the covariates, can be explained by the residuals of the SURE equations assumed as proxies of the latent factors (see Table 10 in the Appendix). As reported in Table 8, a percentage of 68% of the time devoted to study is explained by the covariates (32.77 min in a day), while a percentage of 57% of the residual time not depending on covariates (equal to 8.79 min in a day) can be considered as explained by latent factors. Latent factors explain a percentage of 67% of the "residual" reading activity

Table 8 Children's use of time explained by covariates and by latent factors common to the simultaneous equations

Activity	Average time spent in a day (minutes)	Explained by covariates		Residual time	Explained by common latent factors	
		Minutes	in percentage		Minutes	in percentage
Sleeping	639.75	268.7	42%	371.06	70.5	19%
Eating	122.59	12.26	10%	110.33	4.41	4%
Day care	53.16	2.13	4%	51.03	1.53	3%
Housework	21.82	8.51	39%	13.31	6.12	46%
School	129.77	116.8	90%	12.98	9.73	75%
Studying	48.19	32.77	68%	15.42	8.79	57%
Church	10.79	8.63	80%	2.16	1.53	71%
Social life	49.16	8.85	18%	40.31	7.66	19%
Sport	34.96	7.69	22%	27.27	9.54	35%
Play	156.73	42.32	27%	114.41	8.01	7%
Reading	6.35	4.32	68%	2.03	1.36	67%
TV	102.06	5.1	5%	96.96	6.79	7%
Total	1375.32	518.06		857.26	135.98	

Table 9 Correlation (in percentage) between the SURE estimation residuals of child and mother's time-use equations

Child activities Mother activities	Sleeping	Eating	Day care	Housework	School	Studying	Church	Social Life	Sport	Play	Reading	TV
Paid work	−2%	−1%	1%	23%	41%	21%	−38%	−4%	4%	1%	21%	−2%
Unpaid work	−7%	−2%	−1%	9%	3%	9%	0%	−2%	1%	1%	4%	9%
Child care	−14%	−8%	11%	10%	15%	26%	−1%	0%	8%	7%	17%	−1%
Leisure time	9%	−5%	3%	2%	−9%	−5%	4%	6%	9%	4%	3%	4%

(not depending on covariates), and a percentage of 46% of the residual time devoted to housework.

In addition, the SURE procedure allows us to evaluate the intensity and the "sign" of the relationship between the activities of child and mother, given by the cross-correlation coefficients of the GLS-residuals reported in Table 9. In particular, the positive correlations between the mother's time devoted to care activity and child's time devoted to studying and reading (26 and 17%, respectively) indicate a positive impact of the mother's commitment in care duties on a child's activities, and this is strictly related to his/her well-being. A positive correlation is also observed between the time devoted to paid work by the mother and the time devoted by the child to schooling, studying and reading. The increase of the time spent at school by the child may be a consequence of the mother's need to reconcile work activity and time spent for the family; while the time spent in studying and reading may be influenced by the positive attitude of the mother, active in work and in professional activities, towards culture and education. On the contrary, mothers who devote more time to work reduce their commitment to volunteer activities and worship, which negatively influences their children's commitment to these same activities. This would explain the negative correlation between mother's paid-work time and child's time devoted to volunteer activities (−38%). In sum, the mother's commitment to work positively influences some of the child's activities related to his/her well-being, such as reading and studying, but negatively affects the time spent in volunteer activities and attending church, another highly educational activity for the child's intellectual growth and linked to positive health behaviors (Holden and Williamson 2014; Rew and Wong 2006). Analyzing the estimated relationship between the stochastic components of the mother and child's activities, we can confirm that latent factors, common to mother and child activities, influence a child's allocation of time. In addition, we observe how some specific correlations, occurring between paid-work and care activities of the mother and activities of the child, support our Hypothesis H1 regarding the influence of a parental transmission of attitudes.

5 Conclusions

By analyzing the use of time, we can investigate a variety of interconnected phenomena and explain how children spend their time, which has important implications for public policy. Knowing how children and adolescents allocate their time and preferences, the contexts in which they live and the economic resources available to them are of primary importance. "Children's everyday activities are diverse and varied, and can be characterized along a variety of dimensions of time use" (Ben-Arieh et al. 2001). Even if several activities are important in terms of child outcomes, little research has been conducted focusing on their daily activity and how this affects children's well-being. Considering children as a primary source of information and examining the time allocations of children and their mothers, this study aims to fill the research gap that exists for this topic.

Assuming that a close relationship exists between the time usage of mothers and that of children, and considering the influence of several factors (time and resources), we jointly estimated how mothers and children allocate their time using the SURE model. Performing a SURE model estimation, we assume that the potential intergenerational transmission of attitudes is included in the latent factors affecting both mothers and children's use of time. Using a single SURE model to estimate simultaneously all activities and specifying the unobservable factors as components of the error terms, we provide an innovative method for analyzing the allocations of children's time. Namely, the estimated coefficients measuring the effect of a mother's education on the activities of the child allow us to evaluate the impact of the parental transmission of attitudes and values on a child's allocation of time. Similarly, the estimated correlations between the error terms of the equations explaining the allocation of time of mother and child signal the intensity and the sign of the influence of latent factors common to mother and child time allocation. As a result, we observe that the time devoted by the mother to care activity positively influences the activities of the child strictly related to his/her well-being, such as reading and studying. The time devoted to paid work by the mother is also positively correlated with the child's reading and study activity. These positive correlations, in particular, may be interpreted as a consequence of the parental transmission of attitudes towards cultural and intellectual growth.

From a gender perspective, the estimation results indicate that the same trends observed between Italian women and men can also be observed between girls and boys. Compared with boys, girls generally tend to spend more time on domestic activities, day care and reading for pleasure and have less free time. As other studies have shown, also applied to Italy, the mother's educational level plays an important role. Economic resources and territorial context also impact on the use of time. In particular, children who live in Northern and Central Italy spend more time on extracurricular activities than children who live in Southern Italy and the Islands. This result indicates fewer opportunities for development and well-being in the latter areas then in the former. Economic policies aimed at a territorial ri-equilibrium may certainly positively affect the allocation of time and well-being of mother and their children in the Italian Southern Regions.

These results are very important for a country such as Italy, characterized by some relevant regional differences. Southern Italy is economically less developed. The double role of the mother as a caregiver and a worker plays an important role in children's development. Therefore, policymakers should simultaneously consider these two factors as starting points for future investment in children's development processes to facilitate women's participation in the labor market and to introduce policies which promote the reconciliation of work and family life.

This study highlights several directions for future research. In this study, only mothers were considered in the model. However, the importance of the intergenerational transmission of preferences and the apparent gender gap between children suggest the model should be replicated to include fathers, allowing us to explore the impact of different family structures on children's well-being and allocation of time.

Appendix

Table 10 Residual-based estimation of the influence of common latent factors on the allocation of time

Residuals of the first stage	Sleeping Coeff. p.	Eating Coeff. p.	Day care Coeff. p.	Housework Coeff. p.	School Coeff.p.	Studying Coeff.p.	Church Coeff.p.	Social life Coeff.p.
res_Eating	−0.01		0.05	0.03	0.26***	0.09	−0.01	−0.07
res_Day care	0.01 *	0.01		−0.09 ***	0.02	0.08 **	−0.01	−0.12 ***
res_Housework	0.00 *	0.00	−0.03 ***		0.08***	−0.41***	−0.22***	−0.24***
res_School	0.03***	0.05***	0.01	0.18***		−0.51***	0.76***	0.65***
res_Studying	0.01***	0.01	0.03**	−0.43***	−0.24***		−0.04**	0.06**
res_Church	0.00	0.00	−0.01	−0.43***	0.68***	−0.07**		−0.58***
res_Social life	0.01***	0.00	−0.02***	−0.13***	0.16***	0.03**	−0.16***	
res_Sport	0.00	0.00	−0.02**	−0.30***	0.13***	−0.20***	−0.22***	−0.10***
res_Playing	0.00	−0.01*	0.00	−0.04**	0.07***	0.00	−0.02	0.04*
res_Reading	0.00	0.01	−0.01	−1.02***	0.08***	−0.94***	−0.45***	−0.34***
res_TV	0.01***	0.01***	0.02**	−0.03**	0.03***	−0.04**	−0.01	0.08***
res_Paid work	0.00	0.00	0.00	−0.18***	−0.22***	−0.16***	0.21***	0.04*
res_Unpaid work	0.01***	0.01	0.01	−0.14***	−0.03*	−0.12***	0.00	0.04
res_Childcare	0.01***	0.02***	−0.06***	−0.08***	−0.09***	−0.21***	0.00	0.00
res_Leisure time	−0.01***	0.02**	−0.02	−0.02	0.08***	0.05**	−0.03**	−0.09***
res_Sleeping		−0.07	0.26*	0.42*	1.77***	1.20***	−0.01	1.25***
Constant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
R^2	0.19	0.04	0.03	0.46	0.75	0.57	0.71	0.19

Variable	Sport Coeff.p.	Playing Coeff.p.	Reading Coeff.p.	TV Coeff.p.	Paid Work Coeff.p.	Unpaid Work Coeff.p.	Childcare Coeff.p.	Leisure Time Coeff.p.
res_Eating	0.01	−0.12*	0.03	0.23***	0.04	0.05	0.30***	0.14**
res_Day are	−0.09**	0.01	−0.01	0.09**	−0.01	0.01	−0.23***	−0.04
res_Housework	−0.46***	−0.05**	−0.40***	−0.05**	−0.30***	−0.06***	−0.12***	−0.01
res_School	0.43***	0.20***	0.06***	0.09***	−0.77***	−0.03*	−0.27***	0.12***
res_Studying	−0.33***	0.00	−0.39***	−0.06**	−0.27***	−0.06***	−0.31***	0.04**
res_Church	−0.67***	−0.04	−0.34***	−0.03	0.68***	0.00	0.01	−0.05**
res_Social life	−0.08***	0.03*	−0.07***	0.07***	0.03*	0.01	0.00	−0.04***
res_Sport		0.04**	−0.27***	0.04*	−0.04*	0.00	−0.08***	−0.06***
res_Playing	0.05**		−0.03***	0.03	−0.01	−0.01	−0.07***	−0.03**
res_Reading	−1.06***	−0.12***		−0.06	−0.43***	−0.04**	−0.32***	−0.05*
res_TV	0.04*	0.03	−0.01		0.02	−0.05***	0.01	−0.03**
res_Paid work	−0.03*	−0.01	−0.10***	0.02		0.02*	−0.01	0.03**
res_Unpaid work	−0.01	−0.02	−0.04**	−0.16***	0.06*		−0.22***	−0.05**
res_Childcare	−0.08***	−0.07***	−0.09***	0.01	−0.01	−0.07***		0.02
res_Leisure time	−0.14***	−0.06**	−0.03*	−0.07**	0.06**	−0.03**	0.04	
res_Sleeping	−0.30	−0.39	0.00	1.27***	0.25	0.51***	1.83***	−0.88***
Constant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
R^2	0.35	0.07	0.67	0.07	0.35	0.04	0.12	0.04

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

References

Álvarez, B., & Miles-Touya, D. (2012). Exploring the relationship between parents' and children's housework time in Spain. *Review of Economics of the Household, 10*(2), 299–318.

Anxo, D., Mencarini, L., Pailhé, A., Solaz, A., Tanturi, M. L., & Flood, L. (2011). Gender differences in time-use over the life course: A comparative analysis of France, Italy, Sweden, and the United States. *Feminist Economics, 17*(3), 159–195.

Ben-Arieh, A. (2005). Where are the children? Children's role in measuring and monitoring their well-being. *Social Indicators Research, 74*(3), 573–596.

Ben-Arieh, A., Kaufman, N. H., Andrews, A. B., Goerge, R. M., Lee, B. J., & Aber, J. L. (2001). Possible indicators of children's well-being. In *Measuring and monitoring children's well-being. Social indicators research Series, vol 7*. Dordrecht: Springer.

Bianchi, S. M., & Robinson, J. (1997). What did you do today? use of time, family composition, and the acquisition of social capital. *Journal of Marriage and the Family, 59*, 332–344.

Bloemen, H. G., Pasqua, S., & Stancanelli, E. G. F. (2010). An empirical analysis of the time allocation of Italian couples: are they responsive? *Review of Economics of the Household, 8*, 345–369.

Brown, S. L. (2004). Family structure and child well-being: the significance of parental cohabitation. *Journal of Marriage and Family, 66*(2), 351–367.

Campolo, M. G. (2012). *L'allocazione del tempo lavorativo nelle famiglie italiane. Problemi di specificazione e di stima*. Roma: Aracne Editrice.

Campolo, M. G., & Di Pino, A. (2012). An empirical analysis of women's working time, and an estimation of female labour supply in Italy. *Statistica, 72*(2), 173–193.

Caltabiano, M., Campolo, M. G., & Di, P. A. (2016). Retirement and intra-household labour division of Italian couples: A new simultaneous equation approach. *Social Indicators Research, 128*(3), 1217–1238.

Carneiro, P., & Heckman, J. J. (2003). Human capital policy. In J. J. Heckman, A. B. Krueger, & B. M. Friedman (Eds.), *Inequality in America: What role for human capital policies?* (pp. 77–241). Cambridge: MIT Press.

Cardoso, A. R., Fontainha, E., & Monfardini, C. (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*(4), 479–504.

Christensen, P. H. (2002). Why more 'quality time' is not on the top of children's lists: the 'qualities of time' for children. *Children & Society, 16*(2), 77–88.

D'Agostino, A., Giusti, C., & Potsi, A. (2018). Gender and children's wellbeing: four mediterranean countries in perspective. *Child Indicators Research*. https://doi.org/10.1007/s12187-018-9526-7.

Del Boca, D., Mencarini, L., & Pasqua, S. (2012a). *Valorizzare le donne conviene. Ruoli di genere nell'economia italiana*. Bologna: Il Mulino.

Del Boca, D., Monfardini, C., & Nicoletti, C. (2012b). Children's and parent's time-use choices and cognitive development during adolescence. *Human Capital and Economic Opportunity: A Global Working Group, 6*, 1–23.

Del Boca, D., & Vuri, D. (2007). The mismatch between employment and childcare in Italy: the impact of rationing. *Journal of Population Economics, 20*(4), 805–832.

Fan, P. L., & Marini, M. M. (2000). Influences on gender-role attitudes during the transition to adulthood. *Social Science Research, 29*, 258–283.

Farré, L., & Vella, F. (2013). The intergenerational transmission of gender role attitudes and its implications for female labour force participation. *Economica, 80*(318), 219–247.

Galambos, N. L., Berenbaum, S. A., & McHale, S. M. (2009). Gender development in adolescence. In R. M. Lerner & L. Steinberg (Eds.), *Handbook of adolescent psychology: Vol. 1: Individual bases of adolescent development (3rd ed., pp. 305–357)*. Hoboken: Wiley.

Guryan, J., Hurst, E., & Kearney, M. (2008). Parental education and parental time with children. *The Journal of Economic Perspectives, 22*(3), 23–46.

Harding D. J. (1997). Measuring children's time use: a review of methodologies and findings. Center for Research on Child Wellbeing. Working paper #97-1. Princeton University: Bendheim-Thoman Center for Research on Child Wellbeing.

Harvey, A. S. (1993). Quality of life and the use of time theory and measurement. *Journal of Occupational Science, 1*(2), 27–30.

Haveman, R., & Wolfe, B. (1995). The determinants of children's attainments: A review of methods and findings. *Journal of Economic Literature, 33*, 1829–1878.

Heckman, J. J., Stixrud, J., & Urzua, S. (2006). The effects of cognitive and noncognitive abilities on labor market outcomes and social behavior. *Journal of Labor Economics, 24*(3), 411–482.

Heiland, F., & Liu, S. H. (2006). Family structure and wellbeing of out-of-wedlock children: The significance of the biological parents' relationship. *Demographic Research, 15*, 61–104.

Hill, M. A., & O'Neill, J. (1994). Family endowments and the achievement of young children with special reference to the underclass. *Journal of Human Resources, 29*(4), 1064–1100.

Hofferth, S. L., & Sandberg, J. F. (2001a). Changes in American children's time, 1981–1997. *Advances in Life Course Research, 6*, 193–229.

Hofferth, S. L., & Sandberg, J. F. (2001b). How American children spend their time. *Journal of Marriage and Family, 63*(2), 295–308.

Hoffman, D. L., & Novak, T. P. (1998). Bridging the racial divide on the internet. *Science, 280*(5362), 390–391.

Holden, G. W., & Williamson, P. A. (2014). Religion and child well-being. In *Handbook of child well-being* (pp. 1137–1169). Netherlands: Springer.

Istat. (2010). *La divisione dei ruoli nelle coppie. Anno 2008–2009*. Roma: Istat http://www3.istat.it/salastampa/comunicati/non_calendario/20101110_00/testointegrale20101110.pdf.

Istat (2011). Cambiamenti nei tempi di vita e attività del tempo libero. Anno 2008-2009. Report Istat. http://www.istat.it/it/archivio/47442.

Jackson, L. A., Von Eye, A., Biocca, F. A., Barbatsis, G., Zhao, Y., & Fitzgerald, H. E. (2006). Does home internet use influence the academic performance of low-income children? *Developmental Psychology, 42*(3), 429–435.

Kimmel, J., & Connelly, R. (2007). Mothers' time choices caregiving, leisure, home production, and paid work. *Journal of Human Resources, 42*(3), 643–681.

Koolstra, C. M., Van, T. H., & Voort, D. (1996). Longitudinal effects of television on children's leisure-time reading a test of three explanatory models. *Human Communication Research, 23*(1), 4–35.

Kooreman, P. (2007). Time, money, peers, and parents; some data and theories on teenage behavior. *Journal of Population Economics, 20*(1), 9–33.

Krueger, A. B. (2009). *Measuring the subjective well-being of nations: National accounts of time use and well-being*. Chicago: University of Chicago Press.

Larson, R. W. (2001). How US children and adolescents spend time: What it does (and doesn't) tell us about their development. *Current Directions in Psychological Science, 10*(5), 160–164.

Larson, R. W., & Verma, S. (1999). How children and adolescents spend time across the world: work, play, and developmental opportunities. *Psychological Bulletin, 125*(6), 701–736.

Mancini, A. L., Monfardini, C., & Pasqua, S. (2017). Is a good example the best sermon? Children's imitation of parental reading. *Review of Economics of the Household, 15*(3), 965–993.

Mencarini, L., Pasqua, S., & Romiti, A. (2014). Children's time use and family structure in Italy. *Working Paper Series Families and Societies, 21*, 1–32.

Mencarini, L., Romano, M. C., & Tanturri, M. L. (2012). *Uso del tempo e ruoli di genere*. Roma: Istat.

Mencarini, L., & Tanturri, M. L. (2004). Time use, family role-set and childbearing among Italian working women. *Genus, 60*(1), 111–137.

Migliorini, L., Tassara, T., & Rania, N. (2018). A study of subjective well-being and life satisfaction in italy: how are children doing at 8 years of age? *Child Indicators Research*. https://doi.org/10.1007/s12187-017-9514-3.

Offer, S. (2013). Family time activities and adolescents' emotional well-being. *Journal of Marriage and Family, 75*(1), 26–41.

Raley, S. (2014). Time use, inequality, and child well-being. In *Handbook of child well-being* (pp. 999–1031). Netherlands: Springer.

Rew, L., & Wong, Y. J. (2006). A systematic review of associations among religiosity/spirituality and adolescent health attitudes and behaviors. *Journal of Adolescent Health, 38*, 433–442.

Robinson, J. P., & Godbey, G. (1997). *Time for life: the surprising ways americans use their time*. University Park: Pennsylvania State University Press.

Ruiz, A. C. (2017). Adolescents' time use in Spain: does the parental human capital matter? *Child Indicators Research, 10*(1), 81–99.

Sandberg, J. F., & Hofferth, S. L. (2001). Changes in children's time with parents: United States, 1981–1997. *Demography, 38*(3), 423–436.

Su, R., Rounds, J., & Armstrong, P. I. (2009). Men and things, women and people: a meta-analysis of sex differences in interests. *Psychological Bulletin, 135*(6), 859–884.

Timmer, S. G., Eccles, J., & O'Brien, K. (1985). How children use time. In F. T. Juster & F. P. Stafford (Eds.), *Time, goods, and well-being* (pp. 353–382). Ann Arbor: Institute for Social Research, University of Michigan.

Vandewater, E. A., Bickham, D. S., & Lee, J. H. (2006). Time well spent? Relating television use to children's free-time activities. *Pediatrics, 117*(2), 181–191.

Votruba-Drzal, E., Coley, R. L., & Vhase-Lansdale, P. L. (2004). Child care and low-income children's development: direct and moderated effects. *Child Development, 75*(1), 296–312.

Yeung, W. J., Linver, M. R., & Brooks-Gunn, J. (2002). How money matters for young children's development: parental investment and family processes. *Child Development, 73*(6), 1861–1879.

Zellner, A. (1962). An efficient method of estimating seemingly unrelated regression equations and tests for aggregation bias. *Journal of the American Statistical Association, 57*(298), 348–368.

Zellner, A., & Theil, H. (1962). Three-stage least squares: simultaneous estimation of simultaneous equations. *Econometrica, 30*(1), 54–78.