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# Parental time investments and instantaneous well-being in the United States

Steven J. Bosworth[1] | José Ignacio Gimenez-Nadal[2] | Almudena Sevilla[3]

[1]University of Reading, Reading, UK

[2]Faculty of Economics and Business and IEDIS, University of Zaragoza, Zaragoza, Spain

[3]Department of Social Policy, London School of Economics, London, UK

**Correspondence**
José Ignacio Gimenez-Nadal, Faculty of Economics and Business, University of Zaragoza, C/Gran Via 2, 3rd floor, Zaragoza 50019, Spain.
Email: ngimenez@unizar.es

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## Abstract

This study investigates the relationship between maternal education, child-care time, and well-being in the United States, with a particular focus on the role of societal norms. Highly educated mothers spend more time on childcare compared to their less educated counterparts. Drawing on data from the American Time Use Survey's Well-Being Modules (2012, 2013, 2021), this research provides a comprehensive examination of maternal activities and well-being. Notably, educated mothers consistently experience reduced instantaneous happiness during childcare, across various caregiving tasks, despite investing greater time in them. To better understand this pattern, we introduce an identity economics model whose predictions are consonant with the empirical findings. Our model illustrates how societal gender roles differentially influence patterns of time allocation by mothers' education and impact their instantaneous and overall well-being.

KEYWORDS
helicopter parenting, identity, instantaneous well-being, maternal time use

JEL CLASSIFICATION
D13, I31, J13

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## 1 | INTRODUCTION

The time that parents invest in their children is a major determinant of human development (Francesconi & Heckman, 2016; Lundberg, 2015). Yet, in most developed countries more-educated mothers tend to do more childcare (Aguiar & Hurst, 2007; Dotti Sani & Treas, 2016; Gimenez-Nadal & Sevilla, 2012; Guryan et al., 2008; Ramey & Ramey, 2010). In this paper, we document that mothers with a higher educational attainment spend more time in childcare but report significantly lower levels of happiness during child-care activities.

The lower instantaneous well-being during child-care activities experienced by higher educated mothers cannot be explained by mothers' socio-economic characteristics or by their general overall life satisfaction. We offer an explanation centred around societal norms and social motivations shaping parenting behaviours. We introduce an economic identity model (Akerlof & Kranton, 2000) that explores how mothers, particularly those with higher social status, invest additional effort in parenting beyond their inherent concerns for their child's development. This elevated parenting behaviour becomes a social norm among high status individuals, subjecting mothers who conform to this norm to social pressure and scrutiny. In exchange for following this norm, they gain increased social prestige. The model's assumptions include the idea that better-educated mothers contribute to better human capital outcomes for their children, all parents can equally enhance their children's human capital, and mothers are concerned about others' opinions of their children, with this concern escalating based on the child's accomplishments. The model predicts that highly educated mothers devote comparatively more time to child-care activities, but in exchange they suffer a consequent decrease in their enjoyment of child-care activities, in comparison to their less educated counterparts.

We utilise the 2012, 2013, and 2021 Well-Being Modules (WBMs) of the American Time Use Survey, which provide data on instantaneous well-being measures across various activities. This enables us to establish a connection between the empirical and theoretical aspects of our study, with a specific emphasis on the influence of norms in shaping maternal child-care experiences. We select women between ages 21 and 55, with children under 13 in the household, who report instantaneous well-being scores during at least one child-related episode. We first analyse the time that mothers spend in child-care activities and find that highly educated mothers devote more time to child-care activities in comparison to their less educated counterparts, which is consistent with one of the predictions of our model. Second, we analyse the levels of happiness, meaning, sadness, stress, and pain during child-care activities of mothers according to their level of education, and we find that more-educated mothers report lower levels of happiness and more tiredness during these activities, and this pattern holds when controlling for baseline life satisfaction and a number of sociodemographic controls, including the number of children and their age. This lower instantaneous well-being during child-care activities experienced by higher educated mothers is consistent with our theoretical framework.

Our contribution lies in the introduction of an economic identity model of intensive mothering, which aligns with the phenomenon of highly educated mothers dedicating more time to child rearing while concurrently reporting lower momentary well-being during caregiving. This model serves to bridge the gap between the empirical and theoretical components of our study, with a particular emphasis on the influence of societal norms. Additionally, we expand upon the examination of momentary well-being during child-related activities by utilising time diary data, thereby building upon existing literature that explores well-being in relation to specific types of child-related tasks. Thus, this paper explores the role of education in shaping child-care practices. Furthermore, we contribute to previous research by investigating the impact of intensive mothering ideology on maternal well-being. In contrast to prior studies that predominantly focus on feelings about motherhood and time deficits with children, our research uniquely examines instantaneous feelings experienced by mothers during engagement in child-related activities.

Section 2 presents the data and several empirical insights, highlighting the disparities in child-care time and well-being among mothers of varying educational backgrounds. Section 3 presents the theoretical model, and Section 4 explains the econometric strategy. Section 5 presents the main empirical results and in Section 6 we conclude by synthesising the findings and their implications for family policies and societal norms.

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## 2 | THE DATA

Our analysis draws from the Well-Being Modules (WBMs) of the American Time Use Survey conducted in 2012, 2013, and 2021.[1] The American Time Use Survey, initiated by the Bureau of Labor Statistics in 2003, is a comprehensive, nationally representative survey focusing on family dynamics. It captures individuals' time utilisation during a specific day, employing a diary format. Participants, aged 15 or above, are selected from Current Population Survey (CPS) respondents within 2–5 months following their CPS participation. In the survey, respondents document their activities over a 24 h period, starting from 4:00 1instantaneousa.m. on a designated day and concluding at 4:00 a.m. the following day.

Notably, the use of time-use diaries minimises social desirability bias which could be a problem if highly educated mothers might over-report the time they spend on childcare to conform to social expectations of what is socially desirable. Unlike recall surveys, time-use diaries require participants to record their activities per small interval of time, which significantly reduces the potential for respondents to alter their answers based on perceived social expectations (Robinson, 2002). This method is preferred and validated in previous research (Bonke, 2005; Kan, 2008), and is regarded as the gold standard for analysing daily behaviours (Aguiar & Hurst, 2007; Gimenez-Nadal & Sevilla, 2012; Guryan et al., 2008; Ramey & Ramey, 2010). By utilising time-use diaries, our study ensures the accuracy and reliability of the data on the time mothers spend with their children, thereby directly addressing concerns about differential reporting across educational strata and enhancing the validity of our findings.[2]

The 2012, 2013, and 2021 American Time Use Surveys' diary data integrate a Well-Being Module (WBM). This module aims to capture individuals' feelings during their daily activities. Respondents are interviewed by phone and asked to provide details about the previous day, including their emotions during three randomly chosen diary episodes lasting at least 5 min. This approach aligns with the day reconstruction method (Kahneman & Krueger, 2006). Another method to gauge instantaneous happiness is the process benefits approach, which utilises Activity Enjoyment Ratings. Here, respondents rate their enjoyment of specific activities on a scale from 0 to 10 (Juster & Stafford, 1985). The experienced utility approach suggests the use of the experience sampling method as a more precise way to gather objective, immediate enjoyment data. However, there are more cost-effective methods, such as the conventional yesterday diary used in time-budget surveys (Szalai, 1972), and the Day Reconstruction Method (Kahneman et al., 2004). These methods collect information on how respondents experienced their activities during the previous day, as described in a time-use diary.

We take instantaneous utility scores from five questions: (1) How happy did you feel during this time? (2) How meaningful did you consider what you were doing? (3) How sad did you feel during this time? (4) How stressed did you feel during this time? (5) How tired did you feel during this time? Respondents rate these emotions on a scale from 0 (no experience of the emotion) to 6 (extremely strong emotion).

The research focuses on mothers aged 21–55, residing with children under 13, who reported at least one instantaneous utility score during a child-related activity. The final analysis includes 2877 primary child-care episodes involving 2132 mothers.[3] For these participants, we examine two dependent variables of interest. First, we

[1]The 2010 ATUS incorporates the Well-Being module as well. However, it lacks data on individuals' subjective well-being (i.e., well-being ladder), leading us to exclude it from our analysis. Furthermore, the inclusion of 2021 data may introduce bias due to COVID-related circumstances potentially affecting maternal well-being. We conducted supplementary analyses excluding data from 2021, and our main results remain robust. Additional details are available upon request.

[2]The analysis of educational disparities in child-care activities, as presented in this manuscript, benefits from a methodological approach utilising time-use diaries. These diaries offer a robust means of data collection, particularly for activities less susceptible to social desirability reporting bias. Routine care tasks, structured activities with defined schedules, public engagements, and activities requiring physical proximity are examples of such tasks. Our analysis focusing on these activities underscores a notable association between higher maternal education and increased childcare involvement, reinforcing the validity of our conclusions.

[3]Primary childcare refers to the activities that respondents consider as the main activities. We explore other definitions of childcare above.

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calculate the total time dedicated to primary child-care activities throughout the day by summing the durations of all primary child-care episodes, measured in hours. Second, the Well-Being Module (WBM) includes a specific variable aimed at assessing individuals' subjective well-being. Mothers' subjective well-being is gauged by asking them to position themselves on a scale from 0 to 10, where 10 represents the best possible life and 0 signifies the worst possible life.[4]

Following the categorisation used by Guryan et al. (2008), child-care activities are divided into basic, educational, recreational, and management categories. Maternal education is categorised as below high school (<12 years; reference category), high school (12 years), more than high school but below college (13–15 years), college (16 years), and more than college (16+ years).[5]

## 2.1 | Empirical evidence

Figure 1 shows the relationship between maternal education, on the one hand, and childcare, instantaneous utility, and subjective well-being, on the other. The red line shows the average hours per day devoted to primary child-care activities by mothers of different educational levels (see Table S3 for a description of the time devoted to child-care activities by educational level, and the educational differences). It can be observed that mothers engage in more childcare as their educational levels rise. In this sense, mothers with a college degree or more spend around 2.5 h per day in childcare, whereas mothers with less than a high school degree spend 2 h. In particular, mothers with fewer than 12 years of education devote 1.94 h on average per day to child-care activities, while mothers with 16 years and more than 16 years of education 2.51 and 2.42 h per day to child-care activities.

This difference is consistent with Ramey and Ramey (2010), who find that time spent in childcare by mothers began to rise in 1995, but after 1998 the upward movement was much sharper among college-educated mothers, following a pronounced S-shaped pattern. Similar trends are reported by Doepke and Zilibotti (2017), who show that in the 1970s there was little difference in the time devoted to childcare between parents with, at most, high school education and parents with a university degree. In the 2000s, educated parents spent significantly more effort (i.e., time) raising their children. Guryan et al. (2008) also report that women with less education than a high school degree spend an average of 12.1 h per week in childcare, while college-educated women and women with education beyond a college degree spend 16.5 and 17.0 h in childcare, respectively. Sayer et al. (2004) also find a positive association between maternal education and child-care time. Dotti Sani and Treas (2016) harmonise time-use data from 11 industrialised countries and find a positive association between maternal education and time spent with children in all countries. Our analysis also reflects[6] such differences, with highly educated mothers devoting more time to child-care activities.

Unlike the positive correlation observed between education and child-care time, Figure 1 (blue line) illustrates a negative correlation between education and instantaneous happiness during child-care activities.[7] The figure shows the average value of instantaneous utility on a 0-to-7 scale during child-care activities, by education. We observe a negative gradient between happiness and mothers' educational level. In particular,

[4]The following question is used: *"Please imagine a ladder with steps numbered from zero at the bottom to ten at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. If the top step is 10 and the bottom step is 0, on which step of the ladder do you feel you personally stand at the present time?"*

[5]Detailed activity codes for primary childcare are available in Appendix S1, Table S1, and educational variables are described in Table S2.

[6]Social Desirability Bias does not significantly affect our findings regarding instantaneous happiness. Our analysis addresses the concern of SDB potentially skewing the education gradient in well-being by comparing well-being outcomes across activities with varying susceptibility to SDB. We grouped activities into socially desirable (volunteering, regular exercise) and non-socially desirable (watching TV, playing video games) categories to ensure sufficient observations and analysed the same mothers from our sample. (Appendix S3): Table S2 shows no educational gradient in well-being for either type of activity. We used an OLS model instead of a random effects (RE) model due to insufficient observations for the latter.

[7]The overall values are calculated using the duration weights of the episodes included in the Well-Being Module of the ATUS.

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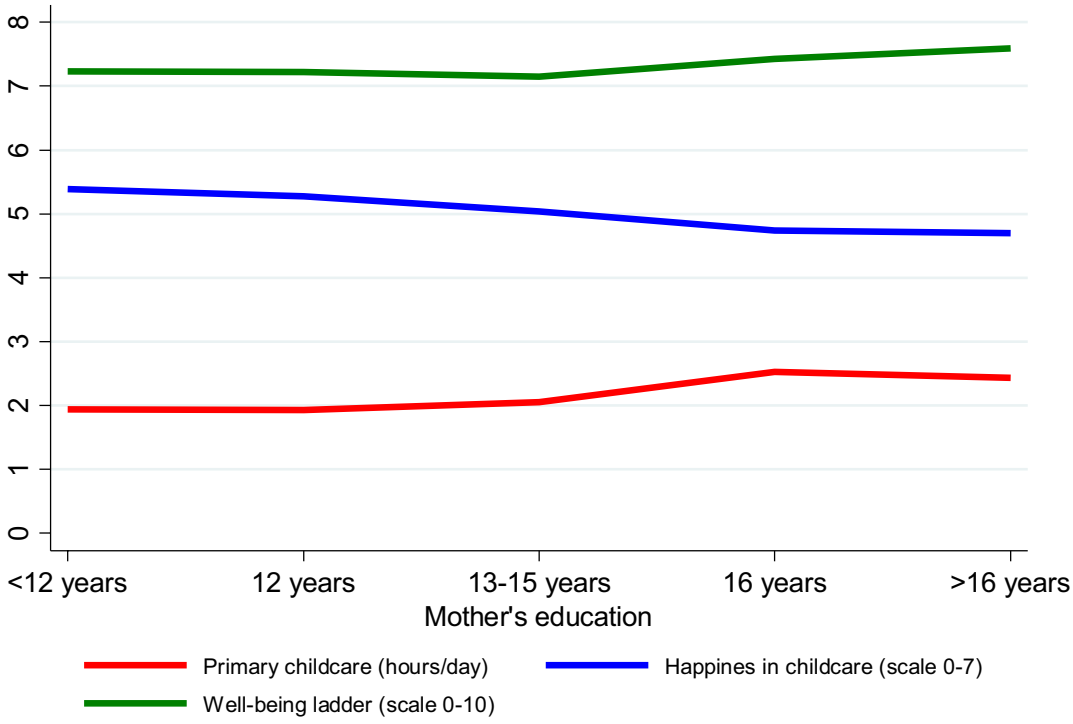


**FIGURE 1** Differences in mothers' time and happiness in child-care activities, and overall life satisfaction, by education. Data come from the 2012, 2013, and 2021 ATUS Well-Being Modules. Our sample consists of mothers between ages 21 and 55 with at least one child under 13, and with information on instantaneous utility for at least on primary child-care episodes. *Primary childcare* shows the average time in child-care activities as primary activity, measured in hours per week. *Happiness in childcare* shows the average value during primary child-care activities to the question "How happy did you feel during this time?" with possible answers based on a 0-7 scale. *Well-being ladder* shows the average value to the question "*Please imagine a ladder with steps numbered from zero at the bottom to ten at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. If the top step is 10 and the bottom step is 0, on which step of the ladder do you feel you personally stand at the present time?*" with possible answers based on a 0-10 scale. See Table S3 in Appendix for average values for each level of education.

mothers with fewer than 12 years of education report an average value in happiness of 5.391 during child-care episodes, mothers with 12 years of education report a value of 5.280, and mothers with between 13 and 16 years, 16 years, and more than 16 years report values of 5.042, 4.745, and 4.696 during these episodes. These differences are similar to those reported by Connelly and Kimmel (2015), Musick et al. (2016) and Kalil et al. (2023).

Finally, Figure 1 (green line) illustrates a positive correlation between education and mothers' overall subjective well-being (SWB) measure, as relatively highly educated mothers report higher values of subjective well-being—average value by education. In particular, mothers with fewer than 12 years of education report an average value in SWB of 7.24, mothers with 16 years, and more than 16 years report values of 7.42 and 7.59. The positive relationship between higher education and maternal happiness has been reported in previous studies (Nomaguchi & Milkie, 2023; Stevenson & Wolfers, 2008a, 2008b), and can be attributed to several factors. Financial stability, stemming from better job opportunities and income, reduces economic stress, providing security and contributing to happiness. Career fulfilment plays a role, as educated mothers often find satisfaction in their work, fostering a sense of purpose. Access to resources, social networks, and support systems enhances well-being. Education empowers women, enabling informed decisions about family planning and careers, fostering life satisfaction through

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control and autonomy. Social recognition from education positively impacts self-esteem and overall happiness. However, this link is complex and varies based on individual, cultural, and personal factors, as happiness is subjective and diverse.

## 3 | A MODEL OF STATUS-CONSCIOUS INTENSIVE PARENTING

In this section, we present a theoretical model grounded in identity considerations (Akerlof & Kranton, 2000) aiming to elucidate the phenomenon of highly educated mothers allocating more time to childcare yet reporting diminished instantaneous happiness. Our theoretical framework hinges on the assertion that conservative societal norms surrounding motherhood subject child-care activities to heightened social scrutiny. We hypothesise that highly educated mothers, facing increased social evaluation, respond by intensifying their child-care efforts, driven by the fear of potential loss in social standing if their parenting is judged unfavourably. Paradoxically, while these mothers invest additional time due to societal pressures, they ultimately experience a decline in instantaneous well-being as their actions are motivated by external influences rather than intrinsic satisfaction. Moreover, we anticipate that mothers with higher education levels may exhibit greater overall life satisfaction owing to various factors such as elevated earnings, improved health, and reduced life stressors associated with increased education. However, this satisfaction might be tempered by social networks linked to higher education that reinforce norms imposing excessive child-care responsibilities, potentially leading to adverse effects in specific domains such as child rearing. Nonetheless, despite the challenges posed by stringent standards within these networks, being part of highly educated circles may offer advantages despite the higher expectations they entail. In any case, the model's prediction regarding overall life satisfaction is that it may be either higher or lower for highly educated mothers in comparison to less educated mothers.

Incorporating an *intensive mothering identity* as a motivation for behaviour, whereby higher educated women subscribe to time-intensive prescriptions about mothering, can explain the relatively longer time devoted to primary child-related activities, relative to lower educated mothers, despite relatively lower levels of instantaneous well-being on the part of the higher educated. Identity considerations in the utility function may arise because mothers have identity-related payoffs from their own and others' actions. In this simple model, the utility function is based on a set of social categories $y$, which we classify into two for the sake of exposition: intensive ($y = 1$) and non-intensive mothers ($y = 0$). Each social category has a prescription for best mothering practices $e$, indicating the behaviour that is appropriate for intensive and non-intensive mothers. For a mother $i$, the utility function $u_i$ will depend on $i$'s *identity* as well as on the usual vector of $i$'s and others' actions, $e$. In the case of time use, actions include time devoted to leisure, housework, and parental time investments, so that $u_i = u_i(e_i, y_i)$. A mother $i$'s identity depends on $i$'s assigned ($\eta_i$, an exogeneous level of education) and chosen ($y_i$, her identity) social categories, the prescribed behaviour for that category, and her action $e_i$.

In this model, a higher educated mother loses face when her parental time investments fail to correspond to the maternal behaviours prescribed for those of her station. All mothers $i$ choose their time allocation $e_i$ to maximise utility, taking as given $y_i$ and its prescribed behaviour. Identity in this way affects which behaviour is individually optimal and therefore chosen. For mothers who have adopted an intensive parenting identity, the greater amount of time in child-related activities $e_I$ prescribed by that identity is chosen over a lower amount of time $e_{NI}$ because they are exposed to the scrutiny of other intensive mothers, and would suffer shame if they were not seen to put this time in. For mothers who have not adopted an intensive parenting identity, the lower amount of time $e_{NI}$ prescribed by that identity is chosen over the higher amount of time $e_I$ because they are not exposed to the extra scrutiny that intensive mothers are, and are therefore free to spend time in other activities which offer greater hedonic cost–benefit calculations. In this way non-intensive mothers enjoy greater instantaneous utility. Despite appearing to be detrimental to higher educated mothers, more time spent in child-related activities may bolster their sense of self or identity as mothers (Akerlof & Kranton, 2000). There is greater social prestige

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associated with being an intensive than non-intensive mother precisely because mothers with higher levels of education are more likely to select into it, as they are more able to withstand the associated scrutiny. This credible signal of status offsets the lower instantaneous utility.

We model identity choice and mothering intensity as a two-stage game with common priors. The players, "mothers," comprise a continuum of agents, each characterised by an exogenous level of education $\eta_i$ with commonly known distribution $H(\eta)$. In stage 1, each mother $i$ selects an identity $y_i \in \{0, 1\}$. The choice $y_i = 1$ corresponds to adopting the intensive mothering identity, whereas $y_i = 0$ represents adopting the non-intensive mothering identity. The intensive mothering identity prescribes an authoritative parenting style $e_I$, whereas the non-intensive mothering identity allows a less costly permissive or authoritarian parenting style $e_{NI}$. Choosing what one values so as to maximise utility is standard in the identity economics literature (Akerlof, 2017), and is best interpreted as a metaphor for more oblique socialisation and reinforcement processes.

In the second stage, each agent (mother) $i$ chooses effort $e_i \in \{e_{NI}, e_I\}$ with $e_I > e_{NI} > 0$ which produces child human capital $a_i = f(\eta_i, e_i)$. We assume $f'(\eta) > 0$ and $f'(e) > 0$, but make no assumptions about the sign of the cross-partial derivative $f_{\eta e}$. Hence, authoritative parenting ("$e_I$") is better suited to developing the child's human capital than either a permissive or authoritarian parenting style which require lower involvement ("$e_{NI}$") (Doepke & Zilibotti, 2017). Doepke and Zilibotti show that the authoritative parenting style promotes child success in environments characterised by high economic inequality and high returns to creativity.[8]

Utilities are defined by the function

$$u_i = \underbrace{b(a_i) - c(e_i)}_{\textit{instantaneous}} + \underbrace{\sigma \cdot E[a_i \mid e_i]}_{\textit{social prestige}} + \underbrace{\kappa \cdot y_i \int_{y_j=1} (a_i - a_j)\, dH(\eta_j)}_{\textit{social comparison}} \tag{1}$$

with $b'(a_i), c'(e) > 0, \sigma > 0$, and $\kappa > 0$.

In other words, mothers derive intrinsic *instantaneous* utility $b$ from their child's human capital production ($a$), which they can increase with effort $e$ but which comes at a cost $c$ which increases with effort. That is, mothers may find childcare enjoyable (reading to children, interactive play) but it incurs an opportunity cost of time, for example, shuttling children between activities.

Mothers also derive *social prestige* utility according to inferences made about their child's ability, as signalled through their choice of mothering intensity. This social prestige utility is weighted by the parameter $\sigma$. Since there are two possible levels of effort,[9] whichever level is associated with a higher average expected human capital product confers greater social prestige.

When a mother decides on the intensive mothering identity, in addition to taking on the group's social prestige, she also exposes herself to *social comparisons* within the group, weighted by the parameter $\kappa$. The greater the child's human capital, revealed through academic performance, relative to other intensively parented children, the greater is the social comparison utility.

Crucially, the human capital of mother $i$'s child is not observable for the purpose of gaining social prestige but is observable in individual interactions with other intensive mothers. The level of effort $e_i$ is observable, however, meaning that the choice of mothering effort generates social prestige through a halo effect. The social comparison utility is integrated across all intensive mothers—one can conceptualise this as all intensive mothers observing each others' second-stage effort choices. These assumptions are meant to model the condition that being in a

[8]The present-day United States satisfies these conditions well.

[9]We must assume that the space of possible effort choices is finite in order to ensure a signalling equilibrium in pure strategies. Having two effort choices is the most analytically tractable way to illustrate the point we wish to make.

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high-status reference group generates a high level of status anxiety but is nevertheless desirable due to the high prestige of being in that reference group.

We study a simple version of this model with a closed-form solution. Let $b(a_i) = \beta a_i$ and $c(e_i) = \gamma e_i$ with $\gamma > \beta\rho > 0$. Furthermore, let the realised product of human capital be

$$a_i(\eta_i, e_i) = \rho(\eta_i + e_i)$$

and the education variable $\eta$ be distributed uniformly on the unit interval $[0, 2\bar{\eta}]$ ($\eta \sim UNIF[0, 2\bar{\eta}]$). Thus the average level of education in the reference population is $\bar{\eta}$. The parameter $\rho$ represents the return to a child's human capital. As $\rho$ increases, the dispersion of children's outcomes (i.e., inequality) increases.

The utility of adopting the intensive mothering identity can therefore be expressed

$$u_i^I = \beta\rho(\eta_i + e_i) - \gamma e_i + \sigma(e_i + E[a_i \mid e_i]) + \kappa\left(\rho(\eta_i + e_i) - \int_{y_j = 1} \rho(\eta_j + e_j)\, dH(\eta_j)\right)$$

whereas the utility of adopting the non-intensive mothering identity is

$$u_i^{NI} = \beta\rho(\eta_i + e_i) - \gamma e_i + \sigma(e_i + E[a_i \mid e_i])$$

This means that in the subgame-perfect Nash equilibrium (see Appendix S2) mothers select into the intensive mothering identity only when they have a sufficiently high education ($\eta$). The marginal intensive mother, characterised by education $\eta^*$ may be found by solving the equation $u_i^I(\eta_i) - u_i^{NI}(\eta_i) = 0$ for the value $\eta^*$:

$$\eta^* = 2\bar{\eta}\left(1 - \frac{\sigma}{\kappa}\right) + 2\frac{(e_I - e_{NI})(\gamma - \rho(\beta + \sigma))}{\kappa\rho} \tag{2}$$

**Result 1**: *All mothers with education $\eta_i > \eta^*$ will select the intensive mothering identity $y_i = 1$, whereas those mothers with $\eta_i < \eta^*$ will opt out ($y_i = 0$).*[10]

**Result 2**: *Since mothers with the intensive mothering identity choose a higher input $e_I > e_{NI}$, their instantaneous utility is lower*:

$$u_{i,I}^{\text{instant}} - u_{i,NI}^{\text{instant}} = (\beta\rho - \gamma)(e_I - e_{NI}) < 0 \tag{3}$$

The model thus explains why high education mothers invest a greater amount of time in childcare, despite lacking greater marginal productivity in it, and despite not enjoying it. As in other papers, our model predicts that mothers will spend more time with their children as returns to human capital increase (Doepke & Zilibotti, 2017; Dotti Sani & Treas, 2016; Ramey & Ramey, 2010).

**Result 3**: *While the instantaneous utility of higher educated mothers will be lower than their less educated counterparts, overall life satisfaction may be either higher or lower, since lower instantaneous utility is compensated by greater social prestige*:

$$E[u_{i,I} \mid \eta_i > \eta^*] - E[u_{i,NI} \mid \eta_i < \eta^*] = \int_{\eta^*}^{2\bar{\eta}} \frac{u_{i,I}}{2\bar{\eta} - \eta^*}\, d\eta_i - \int_0^{\eta^*} \frac{u_{i,NI}}{\eta^*}\, d\eta_i = \underbrace{\rho(\sigma(e_I - e_{NI} + \bar{\eta}) + \beta\bar{\eta})}_{\text{greater social prestige}} - \underbrace{(\gamma - \rho\beta)(e_I - e_{NI})}_{\text{lower instantaneous utility}} \tag{4}$$

[10]The sufficient conditions which bound $\eta^*$ between 0 and $2\bar{\eta}$ are $0 < \sigma - \frac{(\gamma/\rho - \beta - \sigma)(e_I - e_{NI})}{\bar{\eta}} < \kappa$.

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## 4 | EMPIRICAL STRATEGY

This section describes the methodology employed to examine the relationship between the reported instantaneous happiness, child-care time allocation, and overall life satisfaction, on the one hand, and the educational level of mothers, on the other. Utilising linear regression models, we incorporate indicators of mothers' educational attainment to investigate the expected negative association between higher education levels and instantaneous happiness during childcare, juxtaposed with the anticipated positive correlation between education levels and time allocated to childcare. The relationship with life satisfaction (e.g., well-being ladder) remains an open inquiry. Our empirical approach involves rigorous statistical analysis, employing the empirical equation to scrutinise and validate the theoretical assertions. This analytical framework enables us to assess the hypothesised relationships, offering empirical evidence to corroborate or challenge the model's predictions.

For the analysis of the feelings reported during child-care activities, we employ Random Effects (RE) panel data techniques to handle the multilevel nature of our data, where episodes are nested within individuals (Wooldridge, 2010). Additionally, in line with the findings of Ferrer-i-Carbonell and Frijters (2004), who emphasise the need to control for individual differences when studying well-being/happiness, we utilise the RE estimator. The RE estimator helps us account for the personal unobserved heterogeneity among individuals and address interpersonal scaling differences in instantaneous well-being measures. This approach is akin to the outcomes achieved using ordinary least squares (OLS) estimators, where the error term is clustered at the individual level. This clustering method is crucial in capturing the scaling effect exhibited by individuals when expressing their immediate enjoyment, as demonstrated by Kahneman and Krueger (2006).

We estimate separate random-effects models for each instantaneous utility measure as follows:

$$W_{j,i} = \alpha_0 + \alpha_1 E_i + \alpha_2 Z_i + \alpha_3 X_j + \varepsilon_{j,i} \tag{5}$$

where $W_{j,i}$ represents mother $i$'s standardised instantaneous utility measure during a given child-related episode $j$. To standardise these scores, we subtract the mean and divide the result by the standard deviation, following the method outlined by Sacks et al. (2012). $E_i$ is a vector of maternal education dummies, and $Z_i$ is a vector of person-level covariates commonly used in the literature.[11] We also control for the standardised subjective well-being measure (e.g., well-being ladder), to rule out that lower levels of life satisfaction among more educated mothers drive the negative education effect in instantaneous well-being scores. $X_j$ is a vector of episode-level covariates that controls for the duration of the activity and the type of child-related activity, and $\varepsilon_{j,i}$ is a random error term. Our coefficient of interest is $\alpha_1$, capturing the average number of standard deviation changes in instantaneous well-being associated with different categories of maternal education, with respect to the reference educational group (e.g., fewer than 12 years of education).

A number of person-level and diary-episode specific features may confound associations between mothers' educational achievement and their experiences in childcare. For example, more educated mothers are more likely to work and be married, which has been correlated with how mothers experience childcare (Musick et al., 2016). More educated mothers tend to have fewer and younger children, have a higher household income, and are more likely to be white than less educated mothers, so we control for household income, the number of household children, the age of the youngest child, and the race of mothers (Kalil et al., 2023). We also account for the fact that higher educated mothers may systematically display different levels of subjective life satisfaction compared to less educated mothers. Integrating total child-care time into the analysis is essential for a thorough comprehension of the relationship between maternal education, childcare duration, and well-being, given the inherent trade-off between childcare and leisure. Since highly educated mothers invest more time in childcare, their diminished leisure time can adversely affect overall well-being, potentially explaining their reported lower levels of well-being during child-care activities relative to less educated mothers.

[11] A description of how socio-demographic and episode-level controls are built, and their average values by education, are shown in Tables S2 and S4, respectively.

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Episode-level controls include the duration of the episode, the type of child-care activity, the location, and the time of day when child-care activities are conducted.[12] Gershuny (2013) shows that there are decreasing marginal returns to child-care activities. To the extent that less educated mothers reach decreasing returns sooner than mothers with higher education, controlling for heterogeneity in the duration of childcare for mothers with different levels of education is crucial. Thus, by controlling for the duration of the child-care episode, we ensure that the differences in maternal reported levels of well-being across different educational groups are a result of how mothers experience childcare, as opposed to how long they spend on it.

Controlling for the timing of activities is vital for accurately understanding the dynamics of maternal well-being during childcare. The time of day when activities occur can significantly impact the quality of maternal engagement, particularly during evening hours when higher educated mothers are more available due to daytime work commitments. This timing factor may be influenced by fatigue, affecting both mother and child and potentially diminishing the enjoyment and effectiveness of caregiving tasks, thereby influencing maternal well-being in real time. Therefore, considering activity timing is essential to disentangle the effects of education level from temporal factors. To address this, we incorporate dummy variables to control for the time of day when the activity is conducted, encompassing 24 time bands (e.g., one for each hour of the day). This approach allows us to better isolate the genuine drivers of maternal well-being in child-care contexts.

We also account for the location of the child-care activity. The locations are categorised as follows: (1) respondent's home, (2) respondent's workplace, (3) others' homes, (4) other locations, and (5) travel (reference category). The geographical setting of economic activities impacts instantaneous utility (Su et al., 2023). Moreover, Diener and Seligman (2004) discuss how environmental factors, including the quality of local infrastructure and community engagement, contribute significantly to individuals' immediate satisfaction and happiness. These perspectives underscore the critical role of location in shaping not only economic outcomes but also the everyday experiences and well-being of individuals within society.

Regarding the socio-demographic characteristics of mothers in the sample, there are notable differences across educational levels (see Table S4). Compared to mothers with 12 or fewer years of education, highly educated mothers are considerably older, with the average age rising from 33.24 years in the least educated group to 37.75 years in the most educated group. The proportion of white mothers decreases slightly with higher education levels, from 86% in the lowest education category to 79% in the highest. Employment rates are significantly higher among more educated mothers, with 83% of mothers with more than 16 years of education working, compared to only 25% of those with fewer than 12 years of education. This higher employment rate correlates with household income, where the proportion of mothers with household income above the median increases from 15% in the lowest education category to 84% in the highest. Additionally, more educated mothers tend to have fewer children, with the average number of children decreasing from 2.33 to 1.95 as education level increases.

In terms of episode-level controls, there are distinct differences in child-care activities based on educational attainment. Highly educated mothers spend less time per episode on child-care activities, with the average duration of a child-care episode decreasing from 41.80 minutes for the least educated group to 31.44 min for the most educated group. Additionally, there is a positive educational gradient in the proportion of educational child-care episodes. Highly educated mothers are more likely to engage in educational childcare, with the proportion of such

[12]We utilise a fixed effects model, considering time-invariant characteristics (e.g., duration, activity type, location, and time of day of the activity), and stratify by education level (e.g., high school level or less vs. more than high school) to analyse how these factors affect maternal well-being during childcare. Our results indicate that location plays a significant role in maternal well-being, with notable differences observed when childcare is performed at the respondent's workplace, where happiness significantly decreases for all. Focusing on differences between educational levels, we find that mothers with higher education experience greater happiness during recreational child-care activities ($\beta = 0.60$) compared to mothers with lower education ($\beta = 0.47$), although the difference is not statistically significant. These findings emphasise the importance of considering these factors in understanding maternal experiences, and we control for them in our main regressions. Results are shown in Appendix S3.

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episodes increasing from 9% in the least educated group to 12% in the most educated group. This indicates that while highly educated mothers spend less time on each child-care episode, they prioritise educational activities more than their less educated counterparts.

In relation to the analysis of child-care time, this variable is continuous and assessed once for each individual by aggregating the time allocated to primary child-care activities during the diary day. To examine this variable, we employ an Ordinary Least Squares estimator, in line with prior research in this field (refer to Gimenez-Nadal & Molina, 2022 for an overview). We estimate the following equation:

$$T_i = \alpha_0 + \alpha_1 E_i + \alpha_2 Z_i + \varepsilon_{j,i} \tag{6}$$

where $T_i$ represents mother $i$'s time in primary child-care activities. $E_i$ is a vector of maternal education dummies, and $Z_i$ is a vector of person-level covariates commonly used in the literature. We also control for the standardised subjective well-being measure (e.g., well-being ladder), and $\varepsilon_{j,i}$ is a random error term. Our coefficient of interest is $\alpha_1$, capturing the additional hours per day of childcare associated with different categories of maternal education, with respect to the reference educational group (e.g., fewer than 12 years of education).

In the examination of overall life satisfaction (e.g., well-being ladder), this variable is continuous and assessed once per individual, defined within the survey at an individual level. To analyze this variable, we employ an OLS estimator and estimate the following equation:

$$WB_i = \alpha_0 + \alpha_1 E_i + \alpha_2 Z_i + \varepsilon_{j,i} \tag{7}$$

where $WB_i$ represents mother i's overall subjective well-being, measured through the well-being ladder question. $E_i$ is a vector of maternal education dummies, and $Z_i$ is a vector of person-level covariates commonly used in the literature. $\varepsilon_{j,i}$ is a random error term. Our coefficient of interest is $\alpha_1$, capturing the average number of standard deviation changes in overall life satisfaction associated with different categories of maternal education, with respect to the reference educational group (e.g., fewer than 12 years of education).

## 5 | RESULTS

Table 1 illustrates that highly educated mothers report lower levels of instantaneous happiness, despite dedicating more time to child-care activities, when we account for the socio-demographic characteristics of mothers. The educational factors utilised to gauge differences across educational levels exhibit a negative correlation with instantaneous happiness but a positive correlation with time spent in child-care activities. These findings validate the evidence from the summary statistics, and support the primary predictions of the model suggesting that gender norms underlie this phenomenon. However, concerning subjective well-being—measured by the well-being ladder—the educational variables are not statistically significant at standard levels. This implies that there are no discernible differences in mothers' subjective well-being based on their level of education, which is also consistent with the theoretical model.

Regarding feelings reported by mothers during child-care activities, mothers with a college education tend to manifest more negative emotions during child-care activities, marking a notable contrast with less educated mothers. More precisely, the disparity in instantaneous happiness between mothers without a high school diploma and those with varying educational backgrounds—ranging from high school graduates to individuals with 12–13 years, 16 years, and over 16 years of education—is measured at 0.25, 0.28, 0.37, and 0.39 standard deviations, respectively, using the instantaneous happiness metric.

We examine potential differences in the magnitude of estimated coefficients for different educational levels. This evaluation involves a Wald-type test for distinct coefficients, comparing mothers with over 16 years of education to those with a high school diploma. The resulting differences in estimated coefficients emerge as statistically significant. These findings suggest that, in contrast to mothers with a high school diploma, mothers

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**TABLE 1** Educational attainment and instantaneous well-being in child-care activities.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | **Happiness** | **Meaning** | **Sadness** | **Stress** | **Tiredness** | **Time in childcare** | **Subjective Well-being** |
| *Dependent variable* | | | | | | | |
| 12 years | −0.25*** | 0.08 | 0.08 | 0.15 | 0.21** | 0.21 | 0.04 |
| | (0.089) | (0.184) | (0.092) | (0.091) | (0.092) | (0.259) | (0.247) |
| 13–16 years | −0.28*** | −0.04 | −0.07 | 0.19** | 0.15 | 0.57** | −0.32 |
| | (0.089) | (0.167) | (0.089) | (0.092) | (0.093) | (0.263) | (0.257) |
| 16 years | −0.37*** | −0.23 | −0.10 | 0.11 | 0.18* | 0.56** | −0.11 |
| | (0.092) | (0.151) | (0.089) | (0.091) | (0.095) | (0.270) | (0.261) |
| 16+ years | −0.39*** | −0.19 | −0.09 | 0.17* | 0.16* | 0.67** | 0.19 |
| | (0.094) | (0.166) | (0.092) | (0.093) | (0.097) | (0.278) | (0.263) |
| Subjective Well-being | 0.14*** | 0.04 | −0.11*** | −0.15*** | −0.10*** | 0.06* | – |
| | (0.013) | (0.026) | (0.013) | (0.012) | (0.012) | (0.032) | – |
| *Person-level Controls* | | | | | | | |
| Age | −0.01 | 0.01* | 0.01* | 0.00 | 0.00 | 0.00 | 0.00 |
| | (0.004) | (0.008) | (0.004) | (0.004) | (0.004) | (0.010) | (0.010) |
| White | −0.19*** | −0.07 | 0.07 | 0.15** | 0.19*** | −0.10 | 0.61*** |
| | (0.070) | (0.134) | (0.063) | (0.070) | (0.072) | (0.190) | (0.196) |
| Black | −0.11 | 0.09 | 0.16* | 0.09 | 0.06 | −0.56** | −0.30 |
| | (0.094) | (0.189) | (0.094) | (0.098) | (0.098) | (0.241) | (0.277) |
| Working | 0.03 | −0.10 | −0.06 | 0.00 | 0.15*** | −1.19*** | −0.15 |
| | (0.044) | (0.084) | (0.045) | (0.044) | (0.046) | (0.126) | (0.123) |
| Youngest child 0–2 | 0.11* | 0.13 | −0.03 | 0.05 | 0.16*** | 1.28*** | 0.14 |
| | (0.062) | (0.109) | (0.060) | (0.060) | (0.058) | (0.154) | (0.153) |
| Youngest child 3–5 | 0.10* | −0.02 | −0.06 | 0.04 | 0.04 | 0.32** | −0.10 |
| | (0.055) | (0.076) | (0.056) | (0.056) | (0.054) | (0.135) | (0.134) |
| Number of children | −0.14*** | −0.10** | 0.00 | 0.08*** | 0.03 | 0.36*** | 0.16** |
| | (0.028) | (0.044) | (0.028) | (0.028) | (0.027) | (0.075) | (0.073) |
| Above Median hhdd inc. | −0.16*** | −0.16** | 0.07 | 0.08* | 0.04 | 0.20 | 0.48*** |
| | (0.048) | (0.075) | (0.047) | (0.048) | (0.047) | (0.142) | (0.126) |
| Time in childcare | 0.00 | 0.00 | 0.00 | 0.00 | 0.00*** | – | 0.04* |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | – | (0.023) |
| *Episode-level controls* | | | | | | | |
| Minutes in activity | 0.00 | 0.00* | 0.00 | 0.00** | 0.00*** | – | – |
| | (0.000) | (0.000) | (0.001) | (0.001) | (0.001) | – | – |
| Recreational childcare | 0.51*** | 0.10*** | −0.15*** | −0.31*** | −0.11* | – | – |
| | (0.051) | (0.029) | (0.055) | (0.058) | (0.060) | – | – |
| Educational childcare | 0.23*** | 0.16*** | −0.03 | −0.18*** | −0.16*** | – | – |
| | (0.062) | (0.032) | (0.054) | (0.056) | (0.056) | – | – |

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**TABLE 1** (Continued)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | Happiness | Meaning | Sadness | Stress | Tiredness | Time in childcare | Subjective Well-being |
| Management childcare | 0.07 | −0.14*** | −0.04 | 0.11 | −0.09 | – | – |
| | (0.054) | (0.042) | (0.081) | (0.081) | (0.075) | – | – |
| Constant | −0.31* | −0.41 | 0.66*** | 0.52** | 0.24 | – | – |
| | (0.185) | (0.288) | (0.209) | (0.214) | (0.217) | – | – |
| Episode-level controls | Yes | Yes | Yes | Yes | Yes | No | No |
| N° episodes | 2877 | 2877 | 2877 | 2877 | 2877 | – | – |
| Number of mothers | 2132 | 2132 | 2132 | 2132 | 2132 | 2132 | 2132 |
| R-Squared | 0.123 | 0.020 | 0.070 | 0.099 | 0.158 | 0.178 | 0.089 |

*Note*: Robust standard errors in parenthesis. Our sample consists of all child-care episodes in the diary of mothers between ages 21 and 55 with children under 13 in the household, from the 2012, 2013 and 2021 ATUS Well-Being Module. Child-care activities are defined as those in which the respondent reports engaging in childcare as the main activity. Estimates for columns 1–5 refer to Equation (5) where we apply the Random Effects (RE) estimator with robust standard errors. Estimates for columns 6 and 7 refer to Equations (6) and (7) where we apply the Ordinary Least Squares (OLS) estimator with robust standard errors. Episode-level controls (FE) include the duration of the activity and dummy variables to control for activity type, the time of the day, and the location of activities *Significant at the 10 percent level **Significant at the 5 percent level ***Significant at the 1 percent level.

with 16 or more years of education report lower levels of immediate happiness during child-care activities. These conclusions are in line with existing literature, such as a study by Kalil et al. (2023), which similarly demonstrates that college-educated mothers tend to express fewer positive emotions while engaging in child-care activities.

Regarding the other feelings, we find that more educated mothers report being more tired during child-care activities, in comparison to mothers with less than a high school diploma. However, we do not find that mothers with a college education tend to manifest more tiredness during child-care activities. In particular, the disparity in tiredness between mothers without a high school diploma and those with varying educational backgrounds—ranging from high school graduates to individuals with 12–13 years, 16 years, and over 16 years of education—is measured at 0.21, 0.15, 0.18, and 0.16 standard deviations, respectively, using the tiredness metric.

In examining individuals' subjective well-being, as indicated by their position on the well-being ladder, those reporting higher levels of well-being experience increased levels of happiness, and reduced levels of sadness, stress, and tiredness during particular child-care activities. Each one-step increase on the well-being ladder correlates with a 0.14 standard deviation increase in happiness and a corresponding decrease of 0.11, 0.15, and 0.10 standard deviations in stress, sadness, and tiredness, respectively.

Upon analysing the correlation between reported feelings and various socio-demographic factors, distinct patterns become evident. First, being white correlates with heightened feelings of stress and tiredness during childcare, alongside decreased levels of instantaneous happiness. These findings resonate with prior research by Musick et al. (2016), who highlight emotional variations based on individuals' racial backgrounds. Moreover, involvement in the labour market, particularly among parents with children under 2 years old, is linked to increased feelings of tiredness.

Furthermore, with each additional child in a household, there is a reduction in instantaneous happiness and perceived meaning by 0.14 and 0.10 standard deviations, respectively, alongside a rise in stress by 0.08 standard deviations. Notably, households surpassing the median income, in contrast to those below it, tend to report diminished levels of instantaneous happiness and meaning during child-care activities.

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In examining the episode-level controls, it becomes evident that the duration of child-care episodes significantly impacts meaning, and stress levels. Specifically, a one-hour increase in episode duration correlates with higher levels of meaning and stress. Additionally, the type of child-care activity directly influences instantaneous well-being. Mothers report elevated levels of happiness (0.51 and 0.23 standard deviations) and meaning (0.10 and 0.16 standard deviations) when playing with children and engaging in educational child-care activities, respectively, compared to basic childcare. Conversely, during these activities, they report lower levels of sadness (0.16 standard deviations), stress (0.31 and 0.18 standard deviations), and tiredness (0.16 standard deviations for educational childcare). Notably, in management childcare, mothers experience reduced perceived meaning (0.14 standard deviations) compared to basic child-care activities. These findings align with Musick et al. (2016), indicating that parents consistently report higher levels of happiness in playing childcare and educational childcare, in contrast to basic and management childcare.

The results regarding child-care time indicate educational disparities in the allocation of child-care responsibilities. Highly educated mothers tend to dedicate more time to child-care activities, aligning with the theoretical model. The contrast in child-care hours between mothers without a high school diploma and those with 12–13 years, 16 years, and over 16 years of education is 0.57, 0.56, and 0.67 h per day, respectively. These differences amount to approximately 0.5 h daily or 3.5 h weekly, which is half the impact of engaging in the labour market versus not working. These findings align consistently with prior studies utilising time-use data (Aguiar & Hurst, 2007; Dotti Sani & Treas, 2016; Gimenez-Nadal & Sevilla, 2012; Guryan et al., 2008; Ramey & Ramey, 2010).

Several factors influence the time mothers allocate to child-care activities, including race, employment status, and the age and number of children. Specifically, being black is associated with a decrease of 0.56 h per day in child-care activities, while being employed, compared to not being employed, is linked to a reduction of 1.19 h per day in child-care activities. Additionally, each additional child is associated with an extra 0.36 h per day devoted to childcare. Furthermore, in contrast to having children aged 6–12 years old, having children aged 0–2 and 3–5 years old is associated with increases of 1.28 and 0.32 h per day in child-care activities, respectively.

Regarding the analysis of life satisfaction measures using the well-being ladder, we did not discover significant educational differences, as the educational indicators did not exhibit statistical significance at standard levels. Our theoretical model suggests that life satisfaction or well-being might differ for highly educated mothers when compared to their less educated counterparts. This discrepancy could arise due to the potential increase in well-being associated with the greater social prestige resulting from their heightened commitment to intense mothering. This increase might offset any decrease in well-being linked to the lower instanteneous utility derived from their choices. The absence of educational differences in well-being indicates a potential balance between these two effects.

Other factors related to the well-being of mothers include race, the number of children, and household income. Being white, having an additional child, and having a household income above the median are associated with increases of 0.61, 0.16, and 0.48 standard deviations in the well-being measure, respectively.

## 5.1 | Additional analysis

We explore the relationship between primary childcare and how mothers' education interacts with the reported feelings, considering the nature of child-care activities. The wide array of child-care tasks can significantly impact parental well-being, child development, and the parent–child relationship. Gender norms strongly influence why mothers may prioritise certain activities, such as assisting with schoolwork or engaging in play, over routine care tasks. Societal expectations often emphasise nurturing and educational roles for mothers, reinforcing the idea of active involvement in children's cognitive and emotional growth. This societal expectation aligns with the perceived importance of educational tasks or interactive play in supporting child development and strengthening the parent–child bond. As a result, mothers might view these activities

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as more fulfilling and crucial due to societal norms, affecting how they distribute their time and attention. Additionally, diverse child-care approaches can vary in their contributions to children's human capital development. Quality educational childcare significantly shapes this development by fostering essential knowledge, skills, and intangible assets vital for lifelong economic and social well-being. Particularly in early childhood's rapid brain development phase, educational childcare creates nurturing environments that support cognitive, social, and emotional growth. Early social interactions promote cooperation, effective communication, and positive relationships, while exposure to language-rich settings enhances communication skills essential for academic success. Furthermore, these activities enhance cognitive abilities like memory and logical reasoning, crucial for both academic and professional success.

Following the framework established by Guryan et al. (2008), we examine the four categories outlined in Table 1. *Basic childcare* comprises fundamental tasks such as feeding, grooming, and providing medical care. *Educational childcare* involves activities like reading, teaching, and assisting with homework. *Recreational childcare* encompasses playing games and engaging in outdoor activities. Lastly, *management childcare* pertains to attending events or handling travel associated with other child-care responsibilities. While all these activities contribute to the development of human capital to some extent, we contend that educational primary child-care is the activity most relevant to determining human capital. Consequently, we would expect our theoretical predictions to apply most intensely in the educational category. Specifically, we anticipate that more educated mothers will put in greater effort, experience a stronger negative impact on their well-being, but also gain more social status. In contrast, we assume non-human capital-promoting activities will affect well-being similarly across mothers of different education levels, as these activities are not influenced by the same social expectations and pressures related to human capital development.

In Table 2, we present the results obtained by estimating Equation (1) for the subset of the four types of child-care activities, and additional coefficients are detailed in Tables S5–S8. Our findings consistently demonstrate a pattern where mothers with higher levels of education tend to experience reduced happiness during both basic and educational child-care activities in comparison to mothers with less than a high school diploma. Furthermore, mothers with 16 or more years of education exhibit lower instantaneous happiness (more stress) during educational child-care activities compared to those with a high school diploma (less than 16 years of education), which indicates it is during teaching child-care activities where mothers with 16 years of education and more report to be worse off in comparison to their less educated counterparts. Thus, it seems that educational differences in instantaneous happiness during child-care time are driven by differences during educational childcare.[13]

Regarding basic childcare, our analysis reveals a negative correlation between higher education levels and the disparity in instantaneous happiness. This disparity is measured at 0.27, 0.29, 0.34, and 0.41 standard deviations, respectively, between mothers without a high school diploma and those with various educational backgrounds—ranging from high school graduates to individuals with 12–13 years, 16 years, and over 16 years of education—using the instantaneous happiness metric. Similarly, for educational childcare, the coefficients associated with education consistently show negative and statistically significant results at standard levels. The difference in instantaneous happiness between mothers without a high school diploma and those with varying educational backgrounds—ranging from high school graduates to individuals with 12–13 years, 16 years, and over 16 years of education—is measured at 0.52, 0.75, 0.93, and 0.94 standard deviations, respectively, using the instantaneous happiness metric.

Interestingly, when comparing all education groups to the reference group (those with fewer than 12 years of education), significant differences are observed. Wald tests, available upon request, confirm that mothers with

[13]We conduct a heterogeneity analysis by including an interaction term between the education level of mothers and the duration of time spent in childcare to investigate if the duration has any differential impact based on the mother's educational attainment. The results, presented in Table S9, show that the educational gradient in maternal happiness persists, and there are no notable patterns related to the total time spent in childcare. This suggests that the duration of child-care activities does not significantly alter the relationship between education and maternal well-being.

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**TABLE 2** Educational attainment and instantaneous well-being, by activity type.

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Happiness | Meaning | Sadness | Stress | Tiredness |
| Dependent variable | Panel A. Basic primary child-care | | | | |
| 12 years | −0.27** | 0.07 | 0.07 | 0.20* | 0.29*** |
| | (0.108) | (0.238) | (0.110) | (0.107) | (0.107) |
| 13–16 years | −0.29*** | −0.02 | −0.09 | 0.24** | 0.21* |
| | (0.108) | (0.224) | (0.107) | (0.107) | (0.108) |
| 16 years | −0.34*** | −0.27 | −0.10 | 0.17 | 0.26** |
| | (0.112) | (0.201) | (0.107) | (0.108) | (0.112) |
| 16+ years | −0.41*** | −0.24 | −0.08 | 0.20* | 0.22* |
| | (0.115) | (0.216) | (0.108) | (0.110) | (0.114) |
| N° episodes | 1892 | 1892 | 1892 | 1892 | 1892 |
| Number of mothers | 1545 | 1545 | 1545 | 1545 | 1545 |
| R-Squared | 0.104 | 0.029 | 0.072 | 0.090 | 0.165 |
| | Panel B. Recreational child-care | | | | |
| 12 years | 0.03 | 0.01 | −0.08 | −0.20 | 0.09 |
| | (0.124) | (0.033) | (0.162) | (0.239) | (0.257) |
| 13–16 years | −0.03 | 0.02 | 0.02 | −0.04 | 0.36 |
| | (0.137) | (0.034) | (0.171) | (0.244) | (0.254) |
| 16 years | −0.36** | −0.07 | −0.11 | −0.19 | 0.19 |
| | (0.147) | (0.045) | (0.167) | (0.257) | (0.268) |
| 16+ years | −0.17 | −0.07 | −0.18 | −0.15 | 0.28 |
| | (0.161) | (0.049) | (0.191) | (0.273) | (0.286) |
| N° episodes | 299 | 299 | 299 | 299 | 299 |
| Number of mothers | 281 | 281 | 281 | 281 | 281 |
| R-Squared | 0.207 | 0.153 | 0.109 | 0.138 | 0.169 |
| | Panel C. Educational child-care | | | | |
| 12 years | −0.52** | 0.17 | 0.02 | 0.40* | 0.18 |
| | (0.234) | (0.335) | (0.237) | (0.216) | (0.284) |
| 13–16 years | −0.75*** | −0.31 | 0.00 | 0.41* | 0.27 |
| | (0.239) | (0.207) | (0.236) | (0.219) | (0.289) |
| 16 years | −0.93*** | −0.27 | −0.11 | 0.46** | 0.12 |
| | (0.264) | (0.181) | (0.224) | (0.222) | (0.283) |
| 16+ years | −0.94*** | −0.29 | −0.08 | 0.67*** | 0.37 |
| | (0.262) | (0.225) | (0.230) | (0.217) | (0.296) |
| N° episodes | 310 | 310 | 310 | 310 | 310 |
| Number of mothers | 298 | 298 | 298 | 298 | 298 |
| R-Squared | 0.253 | 0.101 | 0.148 | 0.223 | 0.124 |

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**TABLE 2** (Continued)

| | Panel D. Supervisory child-care | | | | |
|---|---|---|---|---|---|
| 12 years | −0.21 | 0.27 | 0.17 | 0.04 | −0.16 |
| | (0.289) | (0.396) | (0.228) | (0.263) | (0.232) |
| 13–16 years | −0.03 | 0.40 | −0.10 | −0.04 | −0.15 |
| | (0.286) | (0.388) | (0.208) | (0.266) | (0.237) |
| 16 years | −0.15 | 0.14 | −0.11 | 0.05 | 0.24 |
| | (0.299) | (0.279) | (0.243) | (0.274) | (0.245) |
| 16+ years | −0.14 | 0.05 | −0.26 | 0.00 | −0.11 |
| | (0.297) | (0.246) | (0.237) | (0.273) | (0.241) |
| N° episodes | 376 | 376 | 376 | 376 | 376 |
| Number of mothers | 361 | 361 | 361 | 361 | 361 |
| R-Squared | 0.19 | 0.12 | 0.18 | 0.19 | 0.26 |

*Note*: Robust standard errors in parenthesis. Our sample consists of all child-care episodes in the diary of mothers between ages 21 and 55 with children under 13 in the household, from the 2012, 2013 and 2021 ATUS Well-Being Module. Primary child-care activities are defined as those in which the respondent reports engaging in childcare as the main activity. Estimates refer to Equation (5) where we apply the Random Effects (RE) estimator. Episode-level controls (FE) include the duration of the activity and dummy variables to control for the time of the day and the location of activities *Significant at the 10 percent level **Significant at the 5 percent level ***Significant at the 1 percent level.

16 or more years of education experience lower instantaneous happiness during educational child-care activities compared to mothers with a high school diploma. Moreover, more educated mothers report higher levels of tiredness during basic child-care activities compared to their counterparts with less than a high school diploma. However, Wald tests, available upon request, do not confirm the lower instantaneous happiness during educational child-care activities for mothers with 16 or more years of education compared to those with a high school diploma.

Additionally, mothers with 16 or more years of education exhibit higher levels of stress during educational child-care activities compared to those with a high school diploma. The measured stress levels of mothers without a high school diploma and those with 16 or more years of education are 0.46 and 0.67 standard deviations, respectively.

We next analyse child-related activities in which childcare is not reported as the primary activity, but the mother reports having a child in her care or being in the presence of a child during the activity. The fact that mothers record an activity as non-primary childcare may suggest a lower quality value that mothers place on non-primary childcare, which tends to involve less active interactions than parental time in primary childcare. Non-primary childcare has also been shown not to be as human capital enhancing for the child as primary child-care activities. Social prescriptions of the ideology of intensive mothering maintain that the ultimate goal of a mother's continuous time and attention is a child's future development (Lundberg, 2015).

However, the presence of another person during child-care activities could also contribute to mothers' perceived social pressure, which might affect their instantaneous well-being. This added dimension of social pressure may lead to lower maternal well-being when another person is present, independent of the non-primary nature of the child-care activity. Therefore, the educational differences in the well-being of mothers during non-primary childcare activities may be influenced not only by the lower perceived value of non-primary childcare but also by the heightened social pressure experienced in the presence of others.

Furthermore, this additional analysis is essential for distinguishing whether the observed effects are specific to child-care activities or more broadly linked to the educational attainment of individuals. Bertrand (2013) finds that higher educational achievement correlates with elevated stress levels, as assessed by the Well-Being

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Measure (WBM), suggesting a pervasive trend where more educated individuals experience heightened stress across diverse activities. Our aim is to ascertain whether this trend holds uniquely for child-care activities or extends to other tasks performed in the presence of children. Through an examination of non-primary child-care episodes, our goal is to demonstrate that the diminished well-being associated with higher education is notably pronounced during child-care activities. This would bolster the argument that such diminished well-being is specific to child-care contexts rather than a general consequence of higher education. If our findings indicate that the educational gradient in well-being is less marked or absent in non-primary childcare activities, it would imply that the reduced well-being observed in highly educated individuals is primarily attributable to the demands and responsibilities of childcare itself, rather than a general predisposition to reduced well-being associated with higher education.

We utilise questions like "Who else was present" and "Was at least one of your own household/non-household children <13 in your care during this activity" to define non-primary childcare, following the methodology established by Guryan et al. (2008). Remarkably, approximately 80% of all child-care instances fall under the category of non-primary childcare. Furthermore, nearly 80% of all leisure and housework episodes, around 60% of personal care episodes, and 10% of paid work episodes involve some form of non-primary childcare.

Table 3 presents the outcomes derived from estimating Equation (5) for the subset of mothers engaged in non-primary childcare activities.[14] Notably, our findings indicate a consistent trend among highly educated mothers, who tend to experience diminished levels of instantaneous happiness and meaning, even after controlling for various factors. Specifically, the contrast in instantaneous happiness between mothers lacking a high school diploma and those with a college degree or higher stands at 0.22 and 0.29 standard deviations, respectively. Additionally, the disparity in instantaneous meaning between mothers without a high school diploma and those with a college degree or higher is 0.07 and 0.12 standard deviations, with the former being statistically significant at the 90 percent confidence level.[15] Furthermore, in comparison to primary child-care activities, the educational gradient in happiness is less marked for non-primary childcare activities (e.g., the coefficient for 12 years of education is not statistically significant), and the rest of the educational coefficients are smaller in magnitude.

## 6 | CONCLUSION

Using data from the 2012, 2013 and 2021 WBM of the ATUS, we analyse the time that mothers spend in childcare, and the levels of happiness, meaning, sadness, stress, and pain during child-care activities of mothers, according to their level of education. We find that mothers with a college degree or more spend almost 3 h per day in childcare, whereas mothers with less than a high school degree spend a bit more than two-and-a-half hours. We find a negative education gradient, ranging between 30 and 40 percent of a standard deviation, in instantaneous happiness and meaning scores during childcare between the two extremes of the education distribution. We propose an economic identity model of intensive mothering that is consistent with more-educated mothers investing more time in children, as well as reporting lower levels of instantaneous well-being during childcare. Overall, these results emphasise the importance of incorporating identity considerations into parental time investment models.

The welfare consequences of competitive parenting, to mothers themselves at least, are ambiguous. While highly educated mothers in a sense opt into this competition by adopting the intensive parenting norm, in

[14] Table S10 shows the results for the rest of explanatory variables included in Equation (1).

[15] It is evident that the coefficients associated with education level exhibit a negative correlation with sadness, reaching statistical significance at the 95 percent confidence level. Wald tests assessing the equality of these coefficients on sadness, available upon request, demonstrate their equivalence. Consequently, we cannot assert that mothers with college education or higher experience greater sadness during non-primary childcare activities compared to mothers with a high school diploma. These findings preclude any interpretation suggesting disparities in sadness between highly educated and less educated mothers in this context.

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**TABLE 3** Educational attainment and instantaneous well-being in non-primary childcare activities.

| | (1) Happiness | (2) Meaning | (3) Sadness | (4) Stress | (5) Tiredness |
|---|---|---|---|---|---|
| *Non-primary childcare* | | | | | |
| 12 years | −0.03 | −0.04 | −0.11* | −0.05 | 0.05 |
| | (0.054) | (0.041) | (0.068) | (0.058) | (0.060) |
| 13–16 years | −0.19*** | 0.02 | −0.15** | −0.01 | 0.06 |
| | (0.054) | (0.048) | (0.068) | (0.058) | (0.060) |
| 16 years | −0.22*** | −0.07* | −0.18*** | 0.01 | 0.11* |
| | (0.056) | (0.041) | (0.069) | (0.060) | (0.062) |
| 16+ years | −0.29*** | −0.12*** | −0.21*** | 0.08 | 0.13** |
| | (0.059) | (0.043) | (0.071) | (0.062) | (0.065) |
| SWB measure | 0.15*** | 0.02** | −0.12*** | −0.14*** | −0.10*** |
| | (0.008) | (0.010) | (0.011) | (0.009) | (0.008) |
| Time in childcare | 0.01*** | 0.00 | −0.01*** | −0.01*** | −0.01 |
| | (0.004) | (0.003) | (0.004) | (0.004) | (0.004) |
| Constant | −0.77*** | −0.27** | 0.88*** | 0.76*** | 0.38** |
| | (0.145) | (0.132) | (0.167) | (0.154) | (0.154) |
| Episode-level controls | Yes | Yes | Yes | Yes | Yes |
| N° episodes | 7318 | 7318 | 7318 | 7318 | 7318 |
| Number of mothers | 3696 | 3696 | 3696 | 3696 | 3696 |
| R-Squared | 0.15 | 0.02 | 0.08 | 0.11 | 0.11 |

*Note*: Robust standard errors in parenthesis. Our sample consists of all child-care episodes in the diary of mothers between ages 21 and 55 with children under 13 in the household, from the 2012, 2013 and 2021 ATUS Well-Being Module. Non-primary childcare activities are defined as those in which the respondent reports engaging in non-childcare as the primary activity, but the mother reports having a child in her care or being in the presence of a child during the activity. Estimates refer to Equation (5) where we apply the random effects (RE) estimator. Episode-level controls (FE) include the duration of the activity and dummy variables to control for activity type, the time of the day, and the location of activities *Significant at the 10 percent level **Significant at the 5 percent level ***Significant at the 1 percent level.

distinguishing themselves from less educated mothers they create a negative status externality. Everyone not able to keep up with the intensive parenting norm loses social prestige, and those who are able to keep up bear extra signalling costs through their effort. This is consistent with the ATUS data: more educated mothers, being the ones who spend extra time with their children, enjoy it less. Our theory also explains—in contrast to theories supposing that education increases mothers' marginal parenting productivity—why more-educated mothers feel that their extra child-care effort is not purposeful. Some who adopt the intensive parenting norm may even have preferred a situation where no signalling is possible. Though intensive parenting is beneficial to children on an individual basis in terms of that child's social mobility, the education gradient in this pattern and the overall implications for social mobility may be negative (Doepke & Zilibotti, 2021).

## ORCID

*Steven J. Bosworth* https://orcid.org/0000-0002-8978-9516
*José Ignacio Gimenez-Nadal* https://orcid.org/0000-0002-1610-5451
*Almudena Sevilla* https://orcid.org/0000-0001-6143-5903

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

**Data S1.**

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