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# Education Gradients in Parental Time Investment and Subjective Well-being\*

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## Abstract

College-educated mothers spend substantially more time in intensive childcare than less educated mothers despite their higher opportunity cost of time and working more hours. Using data from the 2010–2013 and 2021 waves of the Well-being Module of the American Time Use Survey, we investigate this puzzle by testing the hypothesis that college-educated mothers enjoy childcare more. We find that among all mothers, spending time in childcare is associated with higher positive feelings compared to spending time in other activities. However, college-educated mothers experience no more positive feelings and no fewer negative feelings during intensive childcare than other mothers. Moreover, college-educated mothers report substantially fewer positive feelings for time spent in management activities and substantially more negative feelings for time spent in educational activities with their child. Findings are robust to controlling for a rich set of covariates, mother fixed effects, and simulations to account for selection into intensive childcare.

**Keywords:** Parental time investment, intensive childcare, maternal enjoyment, maternal education, time use

**JEL codes:** D13, J13, J22

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## 1. Introduction

Parental time investment is widely viewed as a key determinant for children's future economic and social success and may be a source of the intergenerational transmission of human capital (Cunha et al. 2010; Del Boca et al. 2014; Hsin and Felfe 2014). The most recent evidence from U.S. time diary data shows that mothers with at least a bachelor's degree spend nearly six hours more per week in direct, intensive childcare (i.e., activities such as reading, playing, and bathing with their children) than do mothers with a high school degree (Flood et al., 2022; see also Guryan et al. 2008 and Kalil et al., 2012).<sup>1</sup> This means that over a year, the children of highly educated parents receive on average 300 more hours of direct parental time than children of less-educated parents. This is equivalent to almost 10 weeks of six-hour days or preschool. These gaps persist even when controlling for number and ages of children in the household, marital status, and hours and timing of employment (Gauthier et al. 2004; Guryan et al. 2008; Hill and Stafford 1974). What then explains the education gradient in parental time investment?

In this paper we test the “enjoyment” hypothesis: high-education mothers spend more time in intensive childcare than low-education mothers because they enjoy it more; i.e, they experience more positive feelings and fewer negative feelings during their childcare time. Understanding the sources of the childcare education gap is important from a public policy perspective because many interventions targeted to low-income mothers aim to increase the amount of time mothers spend engaged in their children's learning with the goal of closing income-based gaps in children's skill development. Of the policy approaches to narrowing parent

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<sup>1</sup> “Time in childcare” is not synonymous with “all time with children.” The latter includes time in which mothers are available to children but are not actively engaged with them; a large share of time with children is of this type (Allard et al. 2007). Education-based gaps have been demonstrated for time in childcare (as the main activity) but not all time with children (see e.g., Table 3 in Kendig and Bianchi 2008). As such, the present paper focuses on time in childcare, which we refer as intensive childcare.

engagement gaps between higher-and lower-SES parents, home visiting programs are by far the most common. One of the main goals of home visiting programs is to increase the amount and quality of parents' time with their children.

We use data from the American Time Use Study Well-being Module (ATUS WB Module) to test for the enjoyment hypothesis. In 2010, 2012, 2013, and 2021 mothers reported how happy, meaningful, tired, stressed, sad, and in pain they felt during various activities, including childcare. We distinguish between pre- and post-pandemic years as the COVID-19 pandemic may have structurally changed parental time allocation and how they value their time and the importance of intensive childcare. Focusing on pre-pandemic years, we document that college-educated mothers in our sample spend 28 more minutes or 27 percent more time per day in intensive childcare than less-educated mothers, consistent with prior research. We interpret this fact through a Beckerian framework of time allocation, such that college-educated mothers must enjoy childcare more than less-educated mothers or differentially enjoy it more relative to other activities.

Our findings provide no support for the enjoyment hypothesis. All mothers report higher positive feelings for spending time in childcare compared to spending time in other activities. However, highly educated mothers report neither higher positive feelings nor lower negative feelings during intensive childcare than other mothers, and results hold after controlling for a rich set of mother characteristics and life circumstances, such as family structure and health. Next, we take advantage of mothers' multiple feelings reports across activities and employ a mother fixed-effect design to account for invariant observed and unobserved factors within mothers that may impact their feelings across education groups. One such factor could be college educated mothers feeling more pessimistic overall. We find that college educated

mothers do not differentially enjoy childcare more relative to other activities than other mothers. Results are robust to various constructs of feelings and generalize to post-pandemic years. We examine specific types of childcare activities, separating education-based activities from other activities, and find that highly educated mothers report 0.28 SD worse negative feelings for time spent in educational activities (a measure we construct that includes time in reading, talking, helping with homework, or any other educational activity directly related to children).

Our results suggest that other factors besides enjoyment must be driving the education gradient in parental time investment. For example, highly educated parents may perceive a higher return to their time investment; some studies find that less educated mothers have lower subjective expectation about the impact of investment in child development and this partly explains education-based differences in childcare time (Cunha et al., 2022; Biroli et al, 2022).

This paper contributes to the literature on time allocation and specifically on the determinants of parental time investment. Prior work has documented a positive education gradient in time in childcare and a negative gradient for leisure and home production, suggesting that childcare is essentially distinct from other parental activities (Aguilar and Hurst, 2007; Guryan et al., 2008; Bianchi, 2000). Several hypotheses about the drivers of the childcare gradient have been proposed, and we specifically build on the work related to the enjoyment hypothesis. Wang (2013) and Gimenez-Nadal and Sevilla (2016) show that college-educated mothers report lower levels of enjoyment for childcare; however, these mothers also report lower levels for other activities, which may indicate that unobserved factors may be confounding their findings. Our quasi-experimental strategy of mother fixed-effects accounts for such mother-invariant confounding factors. We also contribute to this literature by generalizing our findings to the post-pandemic years; constructing alternative measures of well-being, such as the U-Index

that does not assume cardinality of individuals' feelings (Kahneman and Krueger 2006); and accounting for selection bias that may arise given that mothers without a college degree are 10 p.p. less likely to select into intensive childcare, possibly due to unobserved negative feelings from engaging with their child.

The next section lays out our theoretical framework of time allocation and the enjoyment hypothesis. Next, we discuss the data, sample, and main outcomes. Section 4 describes our methodology to test for the enjoyment hypothesis, and Section 5 presents results and robustness checks. We discuss alternative hypothesis that could explain the education gradient in childcare time in Section 6. Section 7 concludes.

## **2. Parental time in childcare and the enjoyment hypothesis**

### **2.1. Theoretical framework**

Our empirical analysis is organized around the Beckerian framework of time allocation, where parents decide how to spend their time across various activities, and this decision is driven by the relative quality or enjoyment of various activities (Becker, 1965). Specifically, we build on Aguiar et al.'s (2021) economic model and direct the reader to their paper for details. Here we highlight our main points.

Parents are endowed with one unit of time, which they allocate to market work  $N$ , childcare  $t_c$ , leisure  $t_l$ , and home production  $t_h$ . Parents derive utility from the latter three activities  $\mathbf{t} = \{t_c, t_l, t_h\}$  and a consumption good  $c$ . We assume weak separability between consumption and these activities,  $U(c, v(\mathbf{t}))$ , where  $v$  is an aggregator over activities. Parents earn a wage  $w$  and nonlabor income  $I$ . Letting  $i$  index parents and  $j$  activities, parent  $i$ 's maximization problem is:

$$\max_{c, \{t_j\}, N} U(c_i, v(\mathbf{t}_i)) \quad (1)$$

subject to the budget and time constraints:

$$c \leq wN + I$$

$$\sum_{j=1}^J t_j + N \leq 1$$

The monetary and time budget constraints can be combined to form a single wealth constraint  $c + w \sum_{k=1}^K t_{ik} \leq w$  where the right-hand side is full income if parents devote their whole time working.

The first order condition with respect to activity  $j$  is

$$U_v v_j = \lambda w \quad \text{for } j = 1, \dots, J \quad (2)$$

where  $U_v = \partial U / \partial v$ ,  $v_j = \partial v / \partial t_j$ , and  $\lambda$  is the marginal value of wealth.<sup>2</sup> The parent equates the marginal value of an activity to the opportunity cost of time. An increase in wages  $w$  has two counteracting forces. On the one hand, it reduces the time spent in activity  $j$  due to the increase in the opportunity cost of time (substitution effect). On the other hand, it increases time spent in activity  $j$  given that the parent may reach the same level of consumption as before by working less time, freeing time to spend on nonmarket activities (income effect).

We model the effect of college education on parental preferences as follows. Each parent belongs to a type  $e \in \{\text{college}, \text{high school}\}$ . For simplicity, we assume that  $v$  is additively separable over activities as follows:

$$v(\mathbf{t}_i; \boldsymbol{\theta}, \boldsymbol{\gamma}_e, \boldsymbol{\delta}_i) = \sum_{j=1}^J \frac{(\theta_j \gamma_{ej} \delta_{ij} t_{ij})^{1-(1/\eta_j)}}{1-(1/\eta_j)} \quad (3)$$

where the parameter  $\eta_j > 0$  is activity specific. The parameter  $\boldsymbol{\theta} = \{\theta_c, \theta_l, \theta_h\}$  is a vector of technology shifters,  $\boldsymbol{\gamma} = \{\gamma_c, \gamma_l, \gamma_h\}$  is another vector of technology shifters that may vary by

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<sup>2</sup> Weak separability allows us to divide the maximization problem into two steps. In one step the parent chooses her level of consumption  $c$  and market work time  $N$ , and in the second step she allocates the remaining nonmarket time into childcare, home production, and leisure  $\mathbf{t}$ . We will focus on the second step and take as given nonmarket time ( $H = 1 - N$ ).

parental type, and  $\delta = \{\delta_c, \delta_l, \delta_h\}$  are idiosyncratic preferences over activities. The main difference between this model and that of Aguiar et al.'s is the education-specific preference parameter  $\gamma_e$ , which captures any differences in how college and non-college parents value their time. The distinction between  $\theta_j$ ,  $\gamma_{ej}$ , and  $\delta_{ij}$  is that  $\theta_j$  is common across individuals,  $\gamma_{ej}$  is common across individuals with the same educational type, and  $\delta_{ij}$  is idiosyncratic that is independently and identically distributed across individuals.

Substituting Eq. 3 in Eq. 2 and solving for activity  $j$ , we get:

$$t_{ij} = (\theta_j \gamma_{ej} \delta_{ij})^{\eta_j - 1} \omega^{-\eta_j} \quad (4)$$

where  $\omega \equiv \lambda w / U_v$  denote the normalized price of time. Here, the parameter  $\eta_j$  is the elasticity of demand for activity  $j$  with respect to the normalized shadow price  $\omega$ . We assume  $\eta_j > 1$  for childcare, i.e., the activity is highly sensitive to changes in the opportunity cost of time. All else equal, an increase in technology  $\theta_j$ , education-specific preference  $\gamma_{ej}$ , or preference shifter  $\delta_{ij}$  increases time allocated to activity  $j$ .

We can infer how parents value their time by looking at education-based differences in their time allocation. Let  $j$  denote the activity of interest (e.g., childcare) and  $k \neq j$  be a reference activity. Taking log in Eq. 4 and differencing between these two activities, we get

$$\begin{aligned} \frac{\ln t_{ij}}{\eta_j} - \frac{\ln t_{ik}}{\eta_k} &= \left( \frac{\eta_j - 1}{\eta_j} \right) \ln \theta_j - \left( \frac{\eta_k - 1}{\eta_k} \right) \ln \theta_k + \left( \frac{\eta_j - 1}{\eta_j} \right) \ln \gamma_{ej} - \left( \frac{\eta_k - 1}{\eta_k} \right) \ln \gamma_{ek} \\ &+ \left( \frac{\eta_j - 1}{\eta_j} \right) \ln \delta_{ij} - \left( \frac{\eta_k - 1}{\eta_k} \right) \ln \delta_{ik} \end{aligned} \quad (5)$$

The education-specific price of time  $\omega$  differences out at the margin, meaning that this equation holds independently of wages, nonlabor income, and the levels of consumption and market work time. Now consider aggregating individuals by type and taking the difference in time allocation between college- and noncollege-educated parents,  $\Delta \ln t_j = \ln t_{col,j} - \ln t_{hs,j}$ . Equation (5)



becomes:

$$\frac{\Delta \ln t_j}{\eta_j} - \frac{\Delta \ln t_k}{\eta_k} = \left( \frac{\eta_j - 1}{\eta_j} \right) \Delta \ln \gamma_j - \left( \frac{\eta_k - 1}{\eta_k} \right) \Delta \ln \gamma_k \quad (6)$$

The technology shifter that is common across people differences out, and the idiosyncratic preference term also differences out since it is similar across education types on average. The left-hand side is the education gradient in relative time allocation between activity  $j$  and the reference activity  $k$ , normalized by the elasticities. The right-hand side captures the education gradient in relative preferences between these activities. Under the assumption that the technology for the reference activity  $j$  is stable across education groups (i.e.,  $\gamma_{col,j} = \gamma_{hs,j}$ ), we can rewrite equation (6) as

$$\Delta \ln \gamma_j = \frac{1}{\eta_j - 1} \left( \Delta \ln t_j - \frac{\eta_j}{\eta_k} \Delta \ln t_k \right) \quad (7)$$

**Proposition 1 (enjoyment hypothesis):** Suppose  $\eta_j > 1$ . If college-educated parents spend more time in activity  $j$  than high-school-educated parents,  $\Delta t_j > 0$ , and spend no more time in the reference activity  $k$ ,  $\Delta t_k \leq 0$ , then they must value activity  $j$  more,  $\gamma_{col,j} > \gamma_{hs,j}$ .

*Proof.* Proposition 1 assumes that activity  $j$  is highly responsive to the price of time, an assumption we do not test here. The first term inside the parenthesis is positive given that the log function is monotonically increasing ( $\Delta t_j > 0 \rightarrow \Delta \ln t_j > 0$ ). The second term is also positive due to the minus sign multiplying a negative term ( $\Delta t_k \leq 0 \rightarrow \Delta \ln t_k \leq 0 \rightarrow -\Delta \ln t_k \geq 0$ ) and given that the parameters  $\eta_j, \eta_k > 0$  are positive. The right-hand side is positive; hence the left-hand side must be positive ( $\Delta \ln \gamma_j > 0 \rightarrow \Delta \gamma_j > 0 \rightarrow \gamma_{col,j} > \gamma_{hs,j}$ ). ■

Proposition 1 establishes the enjoyment hypothesis about parental time allocation and the relative enjoyment of childcare compared to other activities.

## **2.2. Maternal time allocation**

Before testing the enjoyment hypothesis, we first document the educational gradient in time spent across various activities (next section describes the data and sample). We focus on mothers and divide them into two education groups: with and without a college degree. We follow Wang (2013) in categorizing activities into seven major categories: time in childcare, paid work, housework, watching television, leisure, sleeping, and other. Figure 1 shows the average time spent in each activity by maternal education for the ATUS pre-pandemic period (Panel A, N=41,788) and WB Module (Panel B, N=6,869), and Appendix Table 1 reports the underlying bivariate regression.

Consistent with prior work, we find that college-educated mothers spend significantly more time in childcare than less-educated mothers (Guryan et al. 2008, Kalil et al. 2012, and Ramey and Ramey 2010). Panel A of Fig. 1 shows that mothers with a college degree spend 28 more minutes or 27 percent more time in childcare per day than mothers without a college degree, whose reported time doing childcare is 106 minutes per day.<sup>3</sup> Also consistent with prior work, we find that college-educated mothers spend more time in paid work (37 more minutes or 19 percent) and less time in housework (21 less minutes or 13 percent) than other mothers. Looking at specific leisure activities, we find that college-educated mothers spend less time sleeping (26 less minutes or 5 percent), much less time watching TV (44 less minutes or 35 percent), but slightly more time in other leisure activities (9 more minutes or 9 percent). If we aggregate these activities into a single leisure activity, college-educated mothers spend less time

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<sup>3</sup> Guryan et al. (2008) finds that mothers with a college education spend about 4.5 hours more per week (or 38.6 mins per day) in childcare than mothers with a high school degree or less.

in total leisure than other mothers. The documented education gradient in childcare and other activities hold for our sample of mothers in the Well-being Module (Panel B).

We examine specific types of time spent with children and find a positive education gradient across these activities. Following Kalil et al. (2012), we further categorized intensive childcare activities into teaching, play, basic care, and management. College-educated mothers spend 3–10 more minutes or 16–54 percent more time per day in each of these activities (see Appendix Fig. 1 with underlying data in Appendix Table 2).

### **2.3. Enjoyment hypothesis**

The education gradient is positive for childcare time ( $\Delta t_j > 0$ ) but negative for total leisure and home production activities ( $\Delta t_k \leq 0$ ). If enjoyment is the driver of these differences, Proposition 1 indicates that one should expect college-educated mothers to report differentially higher enjoyment in childcare than other activities compared to noncollege-educated mothers ( $\Delta \gamma_j - \Delta \gamma_k > 0$ ). If we find that college-educated mothers report higher enjoyment during childcare than less educated mothers, then we cannot reject the hypothesis that the enjoyment motive drives the education-based differences in parental time. If we find that they report lower levels of enjoyment for childcare, then other things must explain the differences in childcare time. As we demonstrate below, we reject this hypothesis.

Previous research on parent's subjective feelings about childcare time are sparse and the existing literature provides support for and against the enjoyment hypothesis. On the one hand, Wang (2013) uses the ATUS Well-being data to show that time in childcare was rated as the most meaningful and the least stressful activity among mothers compared to time in activities not including children. On the other hand, Connelly and Kimmel (2015) find that mothers do not enjoy time in childcare more than fathers even though evidence clearly shows that mothers spend

much more time than fathers in childcare. We shed new light on the enjoyment hypothesis.

Several factors could explain why highly educated parents derive greater utility from childcare time compared to less educated parents. Highly educated parents may feel more confident during childcare. For example, a parent who struggles with reading may find it unpleasant to read to her child and parents with math anxiety may find it unpleasant to engage in math activities with the child. Second, highly educated parents on average have higher income which allows them to purchase higher quality materials for engaging their child, which can make time in childcare more enjoyable. Third, highly educated mothers are more likely to be married (Blau and Winkler, 2018) and hence more likely to have a spouse with whom they could potentially share childcare time, increasing their enjoyment.

### **3. Data and descriptive statistics**

#### **3.1. Data sources**

Our data come from the ATUS and its Well-being Modules. The ATUS is a time diary study of a nationally representative sample of Americans (Hofferth et al. 2013). ATUS respondents report on their activities over a 24-hour period, from 4:00 a.m. of the day before the interview until 4:00 a.m. on the following day, indicating the type of activity as well as where, when, and with whom it occurred. Over 400 activity categories are represented by the classification. Data are collected on every day of the week, including holidays, with weekends oversampled. 50% of diaries are about weekend days and 50% are about weekdays. ATUS sample members are drawn from the Current Population Survey (CPS) respondents. One individual aged 15 or older per CPS participating household is invited to participate in the ATUS during the two to five months following their exit from the CPS. The ATUS has been fielded yearly since 2003. It has an average response rate of 51.9% from 2003 to 2019 (ATUS 2021). The sample is nationally

representative with proper application of weights.

In 2010, 2012, 2013 and 2021 the ATUS added a well-being module (WB) that asked respondents who completed the time diary to also report on how they felt during an activity. Our main analysis focuses on the pre-pandemic years and leaves the post-pandemic year to test for generalizability of results in a different context that affected people's life and time allocation. After respondents completed the 24-hour time diary, three activities that lasted at least five minutes—excluding sleep and personal grooming—were randomly selected and for each of these activities respondents were asked how they felt during the time they were engaged in the activity. Respondents reported on a scale from zero to six (with six indicating a higher value) how happy, tired, stressed, sad, or in pain they felt during the activity and how meaningful they considered the activity.<sup>4</sup> We apply weights provided by the Bureau of Labor Statistics for this sample in order to compute average levels of feelings that individuals report during specific activities (i.e., the weights adjust for the time that respondents spent in sampled activities).<sup>5</sup>

Our analysis focuses on intensive childcare. We count time in intensive childcare only when childcare is reported as the mother's primary activity, which is a subset of all time with children (see Footnote 1). A primary activity refers to an individual's main activity. Time spent simultaneously on other activities is not counted as a primary activity. Thus, if a mother reports that she was watching TV and her child was there, her primary activity was watching TV. If she

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<sup>4</sup> The specific language used for each item is available in ATUS (2014b).

<sup>5</sup> Specifically, activity weights were constructed as follows:

$ActivityWeight_{ij} = RespondentWeight_i \times EligibleActivities_i \times TimeActivity_{ij}$  where

$ActivityWeight_{ij}$  is the sampling weight assigned to activity  $j$  done by respondent  $i$ ;

$RespondentWeight_i$  is respondent-level weight for individual  $i$ , which is the ATUS weights adjusted to account for nonresponses in the Well-being Module;  $EligibleActivities_i$  is total number of activities in respondent  $i$ 's diary that are eligible for the Well-being Module, hence it is proportional to the inverse probability of sampling an activity; and  $TimeActivity_{ij}$  is the total time spent in activity  $j$ . These activity weights are used to estimate average feelings of population in a specific activity (ATUS 2014a).

reports that she was watching TV and feeding her child but states the latter was the main activity, then feeding her child is recorded as her primary activity. We follow Wang (2013) in categorizing activities into seven major categories: time in childcare, paid work, housework, watching television, leisure, sleeping, and other. We further follow Kalil et al. (2012) and categorize intensive childcare activities into teaching, which includes time in reading, talking, helping with homework, or any other educational activity directly related to children; play, which includes playing games and doing arts and crafts; basic care, which refers to physical care and looking after the child; and management, which includes picking up and dropping off children, planning, and organizing the child's life outside the home.

### **3.2. Sample selection and representativeness**

Our sample consists of women aged 25–60 years old living with at least one own child who is younger than 18 years old at the time of time use survey.<sup>6</sup> We focus only on mothers' and not fathers' time in childcare. A full analysis of all mothers, fathers, and other caregivers is beyond the scope of this study. Moreover, because the ATUS is a draw of representative households and not individuals, the sample of mothers is more generalizable than the sample of fathers, given differences in custody and single parenthood by race/ethnicity and income. We focus on the 25–60 age range because few women younger than 25 have completed their education, and few mothers older than 60 have a child in their household for whom they are the main caregivers, and those who do may differ in important ways from younger mothers.<sup>7</sup>

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<sup>6</sup> Biological children, stepchildren, and adopted children are considered own children, while foster children are not.

<sup>7</sup> No mother younger than 22 years old has a college degree in the Well-being Module sample. About 2% of 22- and 23-year-old mothers have a college degree, and this percentage is close to 10% for 24-year-old women. At the same time, in the United States in 2013, the percentage of women aged 18–24 years old with a college degree is 11%, lower than the 31% of women 25 years and older (U.S. Census Bureau 2016).

Table 1 shows how the sample size changes across the ATUS and WB datasets after imposing sample restrictions. Column 1 shows the sample for the entire ATUS dataset from the pre-pandemic years 2003-2019, Column 2 restricts the ATUS sample to the years in which the WB module was fielded (2010, 2012 and 2013), and Column 3 shows the sample sizes for the WB dataset. Rows 1–5 of Table 1 show the number of individuals, number who are women, number who are women who satisfy the age criterion, number who are mothers, and number who are mothers who reported any time in intensive childcare activities. Across these three datasets, the percentage of women interviewed (56 percent, see row 7), the percentage of women who are mothers (36 percent, see row 8), and the percentage of mothers who reported any time in childcare activities (75 percent, see row 9) are similar. With the appropriate application of weights for nonresponse in the WB, our analytic sample is nationally representative of mothers aged 25–60 residing in the United States and with at least one own child at the time of the survey.

We divide mothers into two education groups: those with less than a four-year college degree and those with a bachelor’s degree or higher. We do this following prior studies showing that the education-based gap in childcare time arises from differences between college-educated mothers and all other mothers (Guryan et al. 2008; Kalil et al. 2012). Columns 4 and 5 of Table 1 show that 57.9 percent of mothers (3,979 out of 6,869) have less than a four-year college degree and 42.1 percent (2,890 out of 6,869) have a college degree or higher (see row 4).

Row 9 of Columns 4 and 5 in Table 1 show that college-educated mothers are more likely than mothers with less schooling to report spending any time in intensive childcare (81 percent versus 71 percent) and thus are also more likely to be randomly selected to report their feelings during intensive childcare time (47 percent versus 38 percent, see row 10). With proper

sampling, mothers who were asked to report their feelings during childcare should be representative of those who reported spending time in intensive childcare but who were not selected to report their feelings during childcare. Mothers who did not report spending time in childcare during the 24-hour time diary were not eligible to report their feelings during these activities. If mothers with less schooling did not engage in intensive childcare because they would have felt less happy and found it less meaningful or would have felt more sad, stressed, and tired, excluding their unobserved feelings would bias our results against the enjoyment hypothesis. Although we have no information on how these mothers would have felt had they selected into intensive childcare activities, we conduct sensitivity analyses based on behavioral assumptions about these mothers.

### **3.3. Measuring feelings**

We distinguish between positive feelings (happy and meaningful) and negative feelings (sad, stress, and tired) because researchers have long argued that these are qualitatively distinct phenomena and not opposite ends of a unidimensional spectrum (Kushlev et al. 2015; Taylor 1991). This distinction is also supported by the data. Happy and meaningful are positively and strongly correlated; sad, stress, and tired are positively and strongly correlated; but each positive feeling is negatively correlated with each negative feeling (see Appendix Table 3). In Fig. 2 we plot how mothers feel across different activities. Activities that produce high feelings of happiness also have high feelings of meaningfulness, except for watching TV. However, activities that produce the highest levels of positive feelings do not necessarily produce the lowest levels of negative feelings. For example, mothers report the highest positive feelings for childcare but feel more stress than watching TV or leisure activities. Mothers in general report greater positive feelings than negative feelings across every activity, and this pattern holds by



education groups (see Appendix Fig. 2). This evidence indicates that happy and meaningful behave similarly and that positive feelings are distinct from negative feelings.

Our main outcomes are positive feeling, negative feeling, and net affect indexes. The positive feeling index,  $y_{ij}^{pos}$ , is the average of mother  $i$ 's reports of happiness and meaningfulness for activity  $j$  and varies from zero (when a parent reports feeling not at all happy *and* reports feeling that the activity is not at all meaningful) to six (when a parent reports feeling very happy *and* reports feeling that the activity is very meaningful). Similarly, the negative feeling index,  $y_{ij}^{neg}$ , is the average of parents' reports of feeling sad, tired, and stressed, which can also vary from zero to six. If the report of any feeling is missing, the constructed indexes take the average of the non-missing values.<sup>8</sup> The net positive feelings measure,  $y_{ij}^{netaff} = y_{ij}^{pos} - y_{ij}^{neg}$ , is the difference between the average positive and negative feelings. The net feelings measure provides an indication of whether a given activity is on balance held positively or negatively by mothers. We exclude pain from all measures to avoid confounding what might be the report of a physical sensation with psychological feelings.

We standardize each index with respect to the reported feelings of less-educated mothers to ease interpretation. For example, the standardized positive feeling index,  $Y_{ij}^{pos}$ , is given by:

$$Y_{ij}^{pos} = \frac{y_{ij}^{pos} - \mu_c^{pos}}{\sigma_c^{pos}}, \quad (8)$$

where  $y_{ij}^{pos}$  is individual  $i$ 's average positive feeling for activity  $j$  constructed from reported happiness and meaningfulness,  $\mu_c^{pos}$  and  $\sigma_c^{pos}$  are the mean and standard deviation of positive feeling index across all activities for the less-than-college education group. We also compute a

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<sup>8</sup> The percentage of observations with any missing positive feeling is 0.56 percent and with any missing negative feeling is 0.20 percent.

comparable standardized measure of negative feelings  $Y_{ij}^{neg}$  and net affect  $Y_{ij}^{netaff}$ .<sup>9</sup> These standardized measures represent the difference in reported feelings with respect to less-educated mothers as a percent of the standard deviation of less-educated mothers.

We also construct several secondary outcomes: (i) the “Very Positive” indicator takes a value of one if a mother felt very happy and very meaningful during the activity (reported a six on happy and on meaningful); (ii) the “Very Negative” indicator equals one if the mother felt very stressed, very sad, and very tired; and (iii) the U-index (Kahneman and Krueger 2006; Krueger 2007) gives more weight to negative feelings and classifies an activity as “unpleasant” if the maximum rating on any of the negative feelings (stressed, tired, and sad) is strictly greater than the maximum rating on any of the positive feelings (happy and meaningful). Results of these measures are presented as robustness checks.

### 3.4. Descriptive statistics

**Demographics.** Mothers in our analytic sample have demographic characteristics that are similar to all mothers in the 2003–2019 ATUS. Columns 1, 2 and 3 of Table 2 present demographic characteristics of mothers in the ATUS sample for the period 2003-2019, ATUS sample for the years when the WB module was administered, and WB analytic sample, respectively. Panel A shows summary statistics of mother-level variables available across datasets. For the 2003–2019 ATUS sample, 37 percent of mothers have a college degree. They are 38 years old on average, 61 percent are non-Hispanic white, 12 percent non-Hispanic black, and 20 percent Hispanic. Seventy-four percent are married with about 2 children in the household, and only 38 percent of mothers have only one child. Mothers spend about 116.6

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<sup>9</sup> The standardized net affect index is  $Y_{ij}^{netaff} = \frac{(y_{ij}^{pos} - y_{ij}^{neg}) - (\mu_c^{pos} - \mu_c^{neg})}{\sigma_c^{pos-neg}}$ , where  $\sigma_c^{pos-neg}$  is the standard deviation of the difference  $y_{ij}^{pos} - y_{ij}^{neg}$ .

minutes in a day doing childcare activities. These figures are remarkably similar to the 2010–2013 subsample and WB analytic sample (Columns 2 and 3).

Columns 4 and 5 of Table 2 show summary statistics of the analytic sample by education group. Mothers with a college degree are 2 years older, more likely to be white (74 vs 53 percent) and less likely to be black (9 vs 14 percent) and Hispanic (7 vs 28 percent) than mothers without a college degree. They are 20 p.p. more likely to be married and have slightly fewer children. Their youngest child is 1 year older, and college-educated mothers are more likely to be employed and have full-time employment. As previously mentioned, college educated mothers spend 31 more minutes in day doing childcare activities than mothers with a high school degree or less (131 versus 100 minutes).

**Feelings.** Mothers with a college degree report lower levels of positive feelings and negative feelings across all activities compared to mothers with less schooling. Panels B and C of Table 2 show summary statistics of feelings, which are activity-level variables available only to the analytic sample. The total number of observations at the activity level is larger than the total number of mothers because mothers reported feelings during three randomly selected activities. Relative to mothers without a college degree, college-educated mothers report lower levels of happiness (4.3 vs 4.5) and meaningfulness (4.4 vs 4.7) but also lower levels of sadness (0.5 vs 0.7) and fatigue (2.6 vs 2.7). The level of stress is similar across education groups and indistinguishable from 0. For intensive childcare activities (Panel C), college educated mothers report lower levels of happiness and meaning, lower levels of sadness and tiredness, and similar levels of stress as less-educated mothers.

We find similar education-based patterns in feelings across activity groups. We plot positive feeling, negative feeling and net affect indexes by activity group and maternal education

in Fig. 3 (with underlying data presented in Appendix Table 4). For both education groups, childcare produces the highest positive affect but not necessarily the lowest negative affect (Panels A and B). Childcare's net affect—the difference between positive and negative feelings—is the highest followed by leisure and other activities (Panel C). Compared to mothers without a college degree, mothers with a college degree report 0.16SD lower (worse) positive affect for childcare and 0.14–0.31SD lower across all other activities, except for leisure whose difference is not statistically significant. They also report 0.08SD higher (better) negative affect for childcare and 0.07–0.22SD higher for other activities, except for leisure and paid work whose difference is not statistically significant. It is hard to say whether these reported differences in feelings reflect differences in reporting or true differences in affect. Our empirical methodology aims to address this.

#### 4. Empirical Methodology

We test the enjoyment hypothesis first with the following empirical model:

$$Y_{i,childcare}^{feel} = \alpha + \delta College_i + X_i\beta + \varepsilon_{i,childcare}, \quad (9)$$

where  $Y_{i,childcare}^{feel}$  measures the constructed well-being indices ( $Y_{i,childcare}^{pos}$ ,  $Y_{i,childcare}^{neg}$ , and  $Y_{i,childcare}^{netaff}$ ) of mother  $i$  when engaging in childcare activities,  $College_i$  is a dummy variable equal to one if mother has at least a college degree. The sample of mothers is restricted to those who reported feelings for childcare. To account for factors independent of education that might also affect positive and negative feelings,  $X_i$  is a set of exogenous covariates of mothers, which includes mothers' age, age squared, race and ethnicity, and marital status (married or not married), as family bargaining over household responsibilities may be affected by the presence of a partner. This set of covariates also incorporates time indicators to account for secular trends in feelings, including indicators for year, month and day of the week on which the activity

occurred, and whether the day is a holiday. In robustness checks, we control for mother's life circumstances, such as income and employment status, family characteristics, and health. These covariates are likely endogenous to education as they are affected by it; therefore, our preferred specification only includes the basic set of covariates. The coefficient  $\delta$  is the estimated difference in feelings between highly educated and other mothers. We refer to Eq. 9 as Model 1 or between-person model.

College-educated mothers may not find childcare more enjoyable than mothers with no college degree, but they may value childcare relatively more with respect to other activities. Based on Proposition 1, this differential valuation of childcare could explain the education-gradient in time spent in intensive childcare. To test for this, we exploit the multiple reports by mothers for three randomly selected activities.<sup>10</sup> With this information, we can estimate a person-level fixed-effect model to also account for any unobserved characteristics that are invariant by mother that might shape how they report their feelings—for example, being an inherently negative person or inherently optimistic person that does not vary by time or context.

We pool reports of all activities and estimate the following expanded model:

$$Y_{ij}^{feel} = \alpha + \gamma ChildCare_{ij} + \delta College_i \times ChildCare_{ij} + \sum_s \theta_s Activity_{is} + \sum_s \vartheta_s College_i \times Activity_{is} + \tau_i + \varepsilon_{ij}, \quad (10)$$

where  $Y_{ij}^{feel}$  is individual  $i$ 's feeling index during activity  $j$ ;  $College_i$  equals one if respondent has a college degree and zero otherwise;  $ChildCare_{ij}$  equals one if the activity is child care and zero otherwise;  $College_i \times ChildCare_{ij}$  is interaction term between these indicators;

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<sup>10</sup> Ninety-eight percent of respondents in our sample reported feelings for three activities, 1.8 percent for two and 0.2 percent for only one activity. Controlling for the number of activities reported does not significantly change results.

$Activity_{ij} \in \{Paidwork, Housework, WatchingTV, Other\}$  is an indicator variable equals one if the activity is paid work, housework, watching TV, or others, respectively;  $\tau_i$  is individual fixed effect, which absorbs mother's invariant observable and unobservable characteristics (e.g.,  $College_i$  and  $X_i$ ); and  $\varepsilon_{ij}$  is the error term. The omitted activity group is leisure; therefore, the coefficient  $\gamma$  captures how mothers feel during childcare compared to leisure activities. Our parameter of interest is  $\delta$ , which tells us the extent to which college-educated mothers experience differentially more positive feelings in intensive childcare instead of leisure, relative to other mothers. The sample includes all mothers who reported feelings for any activity. We refer to Eq. 10 as Model 2 or fixed-effect or within-person model.

Empirically, we estimate a modified version of Model 2 to increase power for within-person comparisons. Because only three activities were randomly selected per mother, the likelihood that the same mother reports feelings for both childcare and the omitted category (leisure or any other activity) is low. The percentage of mothers who report feelings for leisure given that they reported feelings for childcare is 15 percent, and this percentage ranges from 13 to 57 percent depending on the selected omitted activity. Instead, we group all activities but childcare into a single group and refers to this larger group as the omitted category. Hence the  $\delta$  coefficient in Model 2 captures how college-educated mothers differentially value intensive childcare relative to other non-childcare activities. Results are qualitatively similar whether we disaggregate or not non-childcare activities.

## 5. Results

### 5.1. Results from between- and within-person models

Table 3 presents estimates from Model 1 (between-person model) excluding and including covariates for each of the three measures of affect. The college coefficient is reported, and

standard errors are clustered at the individual level to account for multiple reports per respondent. The model uses the sample of mothers who spent time in childcare and were randomly selected to report their feelings during time in childcare ( $N\ mothers = 2,839$ ,  $N\ activities = 3,815$ ). As shown in Column 1 (model with no covariates), college-educated mothers report 0.17 SD lower levels of positive affect during childcare activities, and this difference is statistically significant at conventional significance levels. The difference in positive feelings between highly educated mothers and less-educated mothers is large. Mothers without a college degree experience 0.40 SD higher positive feelings in childcare relative to other activities (feelings were standardized across all activities), but college-educated mothers experience 40 percent ( $0.17 / 0.40$ ) lower positive feelings. In our preferred specification of Model 1 (Column 2), the negative college gradient in reported positive feelings holds after controlling for mothers' demographics, at -0.11 SD and is marginally significant. Being married has no effect on reported feelings (coefficient not shown). Columns 5 and 8 show estimates for negative feelings and net affect. Mothers with a college degree are no more or less likely to report negative feelings than other mothers. Similarly, we see no difference by educational attainment in the net affect outcome.

Controlling for mothers' life circumstances does not qualitatively alter our findings. People's life circumstances affect emotional well-being, thus differences in reported feelings between well-off mothers, who tend to have a college degree, and less well-off mothers may reflect these circumstances. Columns 3, 6 and 9 show that college-educated mothers report lower positive affect and net affect but not more or less negative affect.

Table 4 presents our main results for Model 2 (within-person model). We estimate models without individual fixed effects (Columns 1, 4, and 7), without fixed effects but

including covariates (Columns 2, 5, and 8), and with individual fixed effects (Columns 3, 6, and 9) for our three constructed measures of feelings. These estimations use the sample of all mothers in the WB module ( $N\ mothers = 6,869$ ,  $N\ activities = 20,450$ ) by pooling all activities in addition to childcare. Starting with specifications without fixed effects, college-educated mothers tend to report statistically significant lower positive affect overall (0.15–0.18 SD) and slightly lower but not strongly significant negative affect (0.04–0.07 SD). Relative to non-childcare activities (omitted group), spending time in childcare is associated with statistically significant higher positive feelings (0.46–0.48 SD) and marginally significant lower negative affect (0.09–0.10). However, the interaction between the college education dummy and the childcare dummy is not statistically significant in any of the specifications for all three outcomes, which suggests that college-educated mothers experience no more positive feelings and no fewer negative feelings from childcare than other mothers (despite spending more time on this activity).

Columns 3, 6 and 9 of Table 4 show our preferred specification, which includes individual fixed effects to control for mothers' invariant characteristics such as the tendency to over-report feelings. Mothers' demographic characteristics and other covariates are absorbed by the individual fixed effects. We find that college-educated mothers relative to mothers with less schooling do not report more positive affect or less negative affect for childcare over other activities. Recall that the between-person estimates (Model 1) suggested that college-educated mothers experienced significantly less positive feeling during childcare activities, whereas these within-person analyses (Model 2) show that college-educated mothers and less-educated mothers have similar levels of positive feeling during childcare activities. The difference in results is



likely because college-educated mothers report less positive feeling in general, no matter what activity they are spending time in.

We examine specific types of childcare activities, separating education-based activities from other activities, and present results in Table 5. Columns 1–3 show estimates of Model 1, and each row comes from separate regressions that restrict sample to basic care ( $N\ mothers = 1,385$ ,  $N\ activities = 1,586$ ), play ( $N\ mothers = 330$ ,  $N\ activities = 349$ ), teaching ( $N\ mothers = 415$ ,  $N\ activities = 427$ ), and management activities ( $N\ mothers = 1,172$ ,  $N\ activities = 1,453$ ). We find that college-educated mothers report 0.3 SD lower positive feelings for management but similar levels for other childcare activities as mothers without a college degree. This suggests that the negative education-gradient in positive feelings for childcare (Table 3 Column 2) may be driven by their feelings for child management activities. We also find that college-educated mothers experience basic care with less negative affect (-0.19 SD) and teaching activities with more negative affect (0.28 SD), counteracting forces that may be masking the null education-gradient in negative feelings for childcare (Table 3 Column 5).

Columns 4– 6 show estimates of Model 2, where we regress outcomes on indicators for basic care, play, teaching and management activities, their interaction with college indicator, and individual fixed effects. The omitted group is non-childcare activities. The reported coefficient is the interaction term between college indicator and the respective childcare activity indicator. All coefficients in each column come from the same regression ( $N\ mothers = 6,869$ ,  $N\ activities = 20,450$ ). We do not detect any significant differential valuation from mothers with a college degree on each childcare activity. In sum, we find qualitatively similar patterns in that for teaching, play, basic care, and management, college-educated mothers do not report higher positive feelings despite spending more time in these activities. However, we find that

teaching produces more negative feelings and management produces fewer positive feelings relative to other activities for college educated mothers.

## **5.2. Robustness checks**

We additionally constructed other summary measures, including an indicator for “very positive” feelings, “very negative” feelings, and a U-index to consider any nonlinearity in feelings. We also measured each feeling separately (i.e., happy, meaningful, stress, tired, and sad). The latter is important because in the literature on the measurement of subjective well-being, ‘meaning’ is a eudemonic measure that taps something different than happiness or general positive affect, and this may be a measure that crosses the positive-negative dimension (National Research Council, 2013). If highly educated mothers spend more time with their children not because they enjoy it, but because they see it as an investment, then ‘meaning’ could reasonably capture the investment motive. However, the strong correlation between happiness and meaningful affect in our data may indicate that ‘meaning’ includes both direct utility and investment motive.

Table 6 shows robustness checks, and we find qualitatively similar results in that mothers with a college degree report neither higher positive nor lower negative feelings while performing intensive childcare activities relative to their peers. Specifically, the college coefficient in Panel A (between-person model) is statistically negative for meaning and “very positive,” indicating that college mothers report lower levels of positive feelings. The coefficient for stress, tired, and sad measures are negative but not statistically significant at conventional levels. After considering individual-invariant observables and unobservables in Panel B (fixed-effects model), the reports for various measures of well-being are indistinguishable between college-educated and non-college-educated mothers. The exception is sadness, in which college mothers report marginally significant higher values. Few mothers report very high negative feelings.

We estimate Model 1 with context covariates for our extended list of secondary outcomes and find that college-educated mothers report statistically significantly (at 5 percent level) lower scores for happiness, meaningful, and very positive feelings and marginally significantly (at 10 percent level) higher scores for stress and sadness (see Appendix Table 5 Panel A). For the years 2012 and 2013, two questions were added to the well-being module about general life satisfaction and respondents' overall emotional experience on the dairy day.<sup>11</sup> Adding these additional “anchoring” covariates does not change results—highly educated mothers report worse positive feelings and similar negative feelings as mothers without a college degree (see Appendix Table 5 Panel B). Life circumstances and life satisfaction covariates are absorbed by individual fixed-effects in Model 2.

### **5.3. Sensitivity analysis for selection into intensive childcare to report feelings**

As reported earlier, mothers without college degrees are 10 p.p. less likely than mothers with a college degree to spend time with their children (71 vs. 81 percent). Mothers who did not spend any time in intensive childcare activities during the 24-hour period of inquiry were not eligible to report their unobserved feelings for this activity. If mothers do not spend time in intensive childcare because it is not pleasant to do so, then the differential selection into childcare by education group may bias our results against the enjoyment hypothesis. We perform a sensitivity analysis to bound estimates that consider this potential source of bias. Appendix Section B describes in more detail this exercise.

We assume one extreme scenario that could drive bias in our results—that is, that only the less-educated mothers who enjoy spending time with their children are spending time in

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<sup>11</sup> Specifically, the life satisfaction question is measured using the Cantril self-anchoring scale, which asks respondents to rate his or her current life on a ladder scale in which 10 represents the best possible life and 0 the worst possible life. The respondents' overall experience asks how the respondent's good and bad feelings compared to those on a typical day (whether they were better, the same, or worse).

intensive childcare (hence, subsequent reports of feelings are positively skewed). We assume that mothers who selected out of intensive childcare would have reported a score of zero for happiness and meaning and a score of six for stress, sadness, and tired. We ask how many less-educated mothers with reports of negative feelings must populate the analytic sample to overturn our findings.<sup>12</sup>

Table 7 presents results of the sensitivity analysis. Focusing on positive affect, these simulations suggest that 14 percent (out of  $N=1,172$ ) of less-educated mothers who did not report spending any time in childcare would need to report the worst feelings about spending such time to overturn our findings for the between-group model (Column 1). These percentages to overturn estimates for negative feelings and net affect are about 4% and 8%, respectively. To put these numbers into perspective, in the original WB sample, the percent of mothers with no college degree who have an unstandardized average of zero positive feelings on any activity is 3.2%, an average of six on negative feelings is 1.5%, and an average of zero for positive feelings *and* six for negative feelings for a given activity is 0.4%. Thus, the 14% estimated share of the sample of less-educated mothers with such minimal positive feelings necessary to reverse our findings is quite large.

To overturn our findings in the within-group model (Column 4 of Table 7), 4% of mothers who did not spend any time in childcare must report the worst feelings. That this estimate is lower than the 14% estimated from the between-group models is not surprising,

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<sup>12</sup> Sensitivity analysis is related to the power of a test. The null hypothesis is  $\delta = 0$  and the alternative hypothesis is  $\delta > 0$ , where  $\delta$  is the coefficient of  $College_i$  in between-person model (Model 1) or the interaction term coefficient  $College_i \times ChildCare_{ij}$  in within-person model (Model 2). Assuming that the alternative hypothesis is true, we increase the sample of mothers in less-than-college group reporting their worst feelings so that we reject the null hypothesis. Another way to perform the sensitivity analysis is by increasing the sample of mothers in the college group reporting extremely positive feelings, but this exercise contradicts the theory of time allocation because they would have engaged in childcare and reported these feelings in the first place.

because the unstandardized average positive feeling for low-educated mothers who did not spend time in childcare is 4.5, and thus adding observations with zero values of feelings will dampen within person comparisons. The percent of mothers to change our findings in Model 2 for negative feelings and net affect are 8% and 6%, respectively.

The above simulations assume the worst-case scenario that assigns 0 to unobserved positive feelings and 6 to unobserved negative feelings. Assigning less-extreme values results in a higher proportion of less-educated mothers reporting their counterfactual feelings needed to overturn our main results, as one would expect. For example, if these mothers reported scores of 1, 2, or 3 for their unobserved positive feelings, we would need 18, 24, and 40 percent additional mothers, respectively, to conclude that college educated mothers experience better feelings during childcare than other mothers.<sup>13</sup> To put these numbers in perspective, the percentage of observed mothers without college degree who report scores less than or equal to 1, 2 or 3 are 7, 17 and 38 percent, respectively.

In summary, under the most conservative scenario, our sensitivity analyses suggest that between 4% and 14% of low-educated mothers who did not report any intensive childcare time would have had to report the worst feelings for childcare in order to reverse our findings.

#### **5.4. Generalizability to post-pandemic years**

We test the generalizability of our results using the new cohort of mothers from the 2021 Well-

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<sup>13</sup> Appendix Fig. 3 and 4 show results of sensitivity analysis in graphical form. Appendix Fig. 3 uses Model 1 and Appendix Fig. 4 uses Model 2. In each figure, the dependent variable in Panels A, B and C are positive feelings, negative feelings, and net affect, respectively. We vary the percentage of noncollege-educated mothers who did not engage in intensive childcare,  $X \in [0,100]$  percent, and the values of their unobserved feelings,  $E \in \{0,1,2,3,4,5,6\}$  for positive and negative feelings and  $E \in \{0, -1, -2, -3, -4, -5, -6\}$  for net affect (which is the difference between positive and negative feelings). For each combination of  $X$  and  $E$ , we run 100 simulations and report the proportion of simulations rejecting the null hypothesis that college-educated mothers report better feelings (i.e., higher positive affect, lower negative affect, and higher net affect) than mothers with less schooling.

being Module, fielded after the COVID-19 pandemic. The pandemic was a major disruption to the economy and people's lives and may have changed how people allocate and value their time. For example, working from home and remote schooling may have impacted how mothers allocate their time to work and childcare, and this impact may be differential by education group since some jobs are more flexible than others and children had differential access to remote schooling.

Appendix Figure 5 shows mothers' time allocation in post-pandemic years (2021–2022) for the ATUS sample (Panel A) and Well-being sample (Panel B).<sup>14</sup> The time allocation is similar across the ATUS sample and the Well-being samples of mothers. Relative to pre-pandemic years, mothers without a college degree did not dramatically change their time allocation except for reducing their time watching TV and doing other activities and sleeping more. In contrast, we observe dramatic changes in the education gradient across various activities. In particular, the education gradient widened for paid work time (from 37 to 62 more minutes. In the post-pandemic period, mothers without a college reduced their time watching TV and doing 'other' activities and increased their time sleeping. College educated mothers spent even more relative time in work and less relative time in housework than during the pre-pandemic years. The education gradient for childcare stayed about the same (from 28 to 22 more minutes). Do we find similar results for the enjoyment hypothesis before and after the pandemic? The answer is yes we do—the enjoyment hypothesis does not hold either before or after the pandemic. Regardless of the changes in time allocation of highly educated mothers, they still do not experience more

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<sup>14</sup> We note some differences in response rates across pre- and post-pandemic years. The percentage of women who are mothers in post-pandemic years decreased (36% to 27%, see Appendix Table 7), but the percentage of mothers who selected into intensive childcare remained the same (75%). However, they became less likely to report feelings for this activity (41 vs. 22%) and the education gradient in who reported feelings for childcare disappeared.

positive or fewer negative feelings during intensive childcare compared to less educated mothers (see Appendix Table 6).

## **6. Discussion**

We find, in a between-parent comparison, that less-educated mothers report more positive feelings in almost *all* activities. However, once we account for possible reporting differences, college-educated mothers report the same degree of positive and negative feelings during time in childcare. We also find no enjoyment gradient for spending time in childcare relative to other activities for mothers with a college degree. In fact, college-educated mothers report more negative feelings than other mothers for the time they spend “teaching” children. Together these findings lead us to reject the enjoyment perspective and leave open the hypothesis that highly educated mothers are spending more time in childcare because of other reasons. What then could explain the education gradient in parental time investment?

Economic theories of time allocation suggest that highly educated parents might expect a higher return to the time they spend with their children in terms of the child’s future economic security. Parents might be motivated to invest time with their children to achieve these goals whether that time investment is enjoyable or not.

Economic theories may also suggest that parents view market-based childcare options as poor substitutes for parental time. If parents invest material resources and time on child’s human capital, then as wages increase parents are likely to purchase more nonparental care if the parent believes such nonparental care is of equal or greater quality than their own care. Empirical evidence suggests that more highly educated parents do purchase more nonparental time for their children in the form of enriching lessons, sports, and the like (Phillips 2011), although this appears to substitute for time children spend in other types of unstructured, less developmentally

stimulating time (Hsin and Felfe 2014).

A third economic reason for the education gradient in parental time investment is that parents may see childcare as a luxury good. As income increases, the marginal utility of spending time on childcare must be higher than the marginal utility of spending time in another activity. This is related to the enjoyment hypothesis in that highly educated parents should value childcare differentially more; however, we do not find support for such differential valuation.

We acknowledge, however, that economic theories also make assumptions that parent time allocation decisions are rational, i.e., made under conditions of full information, stable preferences and beliefs, and with clear calculations of future benefits. These assumptions may or may not be supported in which case other complementary theories, such as those drawn from psychology and sociology, can expand to alternative hypotheses underlying why enjoyment may or may not influence education-based differences in childcare including the role of social norms, peers, and parental identity.

The time diary and well-being data we use here do not allow us to test differences by education in mothers' inclination to substitute nonmaternal care for their time in childcare, nor can we test the potentially important role of differential returns to time with mothers with differing education levels. And an important caveat to this study is that information about how people feel when they spend time doing certain things cannot be used to make causal statements about how individuals should optimally allocate their time. To make such causal statements, we would have to know how time spent during particular episodes affects well-being at other times (spill over) or why people choose to engage in certain activities in the first place (selection). Most people probably believe that individuals sort the activities that they engage in based on, in part, how much enjoyment they derive from them while doing them. Ruling out this explanation



we can turn our focus toward other explanations. For instance, people might spend time in activities because it produces other future benefits or because it affects others' well-being. This work can serve as a starting point for studies to understand parents' own well-being more fully across and within certain activities, the implications for their own health and outcomes, and the outcomes of their children.

## **7. Conclusions**

We find, as did Wang (2013), that for all mothers, spending time in intensive childcare is associated with higher positive feelings than is spending time in other activities. However, despite spending more time in childcare, our findings offer no support for the hypothesis that highly educated mothers enjoy time in childcare more than their less-educated counterparts. Economic theories of time allocation lead us, given these findings, to hypothesize that the education-based differences may therefore be driven by an investment motive (or other motives). Children's feelings during parent-child time may also matter and create a feedback loop. If children of less educated parents spend less time engaged with their parents, the children may enjoy it more and that may make the parents enjoy it more. Of course this leaves parents with the dilemma that the more childcare time they spend, the less enjoyable it is for everyone and parents must find an equilibrium between investing in children when no one likes it or investing less so everyone likes it. Regardless of why highly educated parents spend more time on intensive childcare, the fact that they do so may have important implications for the intergenerational transmission of human capital (Guryan et al., 2008).

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**Table 1:** Sample Sizes of the ATUS and Well-being Module

Data Set		ATUS		Well-being Module		
Survey Years		2003-2019	2010, 2012, 2013	2010, 2012, 2013		
Sample		Both educ groups (1)	Both educ groups (2)	Both educ groups (3)	Less than college (4)	College (5)
1	Total sample size	210,586	37,088	34,565	23,256	11,309
2	Women only	117,978	20,657	19,264	12,988	6,276
3	Women 25–60 years old	74,326	13,097	12,288	7,404	4,884
4	Mothers (women 25–60 with a child<18 y.o.)	41,788	7,355	6,869	3,979	2,890
5	Mothers who reported any time in childcare activities	31,460	5,500	5,139	2,807	2,332
6	Mothers who reported feelings during childcare activities	-	-	2,839	1,495	1,344
7	Percentage of women	56.0%	55.7%	55.7%	55.8%	55.5%
8	Percentage of women who are mothers	35.4%	35.6%	35.7%	30.6%	46.0%
9	Percentage of mothers who reported any time in childcare activities	75.3%	74.8%	74.8%	70.5%	80.7%
10	Percentage of mothers who reported feelings for childcare activities	-	-	41.3%	37.6%	46.5%

*Note: Table shows how sample size changes after imposing sample restrictions. Data come ATUS and its Well-being Module. Both education groups represent the whole sample, less-than-college group includes individuals with no college degree, and college group includes individuals with a college degree or higher.*

**Table 2:** Characteristics of Mothers in ATUS and Well-being Module by Education Group

Data	ATUS		Well-being Module		
	2003-2019	2010, 2012, 2013	2010, 2012, 2013		
Years	Both educ	Both educ	Both educ	Less than	College
Sample	groups	groups	groups	college	College
	(1)	(2)	(3)	(4)	(5)
<i>Panel A: Mother level variables</i>					
College	0.37	0.38	0.38	0.00	1.00
	[0.48]	[0.48]	[0.48]	[0]	[0]
Age	38.23	38.30	38.27	37.45	39.63
	[7.56]	[7.64]	[7.62]	[7.75]	[7.21]
White non-Hispanic	0.61	0.61	0.61	0.53	0.74
	[0.49]	[0.49]	[0.49]	[0.5]	[0.44]
Black non-Hispanic	0.12	0.12	0.12	0.14	0.09
	[0.33]	[0.32]	[0.32]	[0.34]	[0.28]
Hispanic	0.20	0.20	0.20	0.28	0.07
	[0.4]	[0.4]	[0.4]	[0.45]	[0.26]
Other race	0.07	0.07	0.07	0.05	0.10
	[0.25]	[0.26]	[0.25]	[0.21]	[0.3]
Married	0.74	0.73	0.73	0.65	0.86
	[0.44]	[0.44]	[0.45]	[0.48]	[0.35]
Number of children	1.96	1.96	1.95	2.00	1.86
	[1.01]	[1.03]	[1.02]	[1.09]	[0.88]
Only one child	0.38	0.38	0.38	0.38	0.38
	[0.48]	[0.48]	[0.48]	[0.49]	[0.48]
Age of youngest child	7.15	7.22	7.26	7.55	6.77
	[5.2]	[5.2]	[5.2]	[5.18]	[5.18]
Youngest child is <= 6 y.o.	0.50	0.50	0.50	0.48	0.52
	[0.5]	[0.5]	[0.5]	[0.5]	[0.5]
Employed	0.69	0.67	0.67	0.62	0.76
	[0.46]	[0.47]	[0.47]	[0.48]	[0.43]
Full-time employed	0.49	0.46	0.46	0.41	0.55
	[0.5]	[0.5]	[0.5]	[0.49]	[0.5]
Total time doing childcare in a day	116.60	112.64	111.70	99.99	131.01
	[128.91]	[124.95]	[124.16]	[117.6]	[132.05]
N (mothers)	41,788	7,355	6,869	3,979	2,890

*Panel B: Activity level variables*

Happy	4.41 [1.55]	4.47 [1.64]	4.30 [1.4]
Meaningful	4.55 [1.77]	4.66 [1.8]	4.38 [1.71]
Sad	0.58 [1.32]	0.66 [1.44]	0.46 [1.09]
Stressed	1.71 [1.87]	1.71 [1.93]	1.72 [1.77]
Tired	2.67 [1.97]	2.72 [2.05]	2.60 [1.84]
Activity is childcare	0.12 [0.33]	0.11 [0.31]	0.14 [0.35]
N (activities)	20,450	11,837	8,613

*Panel C: Restricted to childcare only, activity level variables*

Happy	4.81 [1.39]	4.89 [1.46]	4.70 [1.29]
Meaningful	5.29 [1.29]	5.41 [1.26]	5.12 [1.32]
Sad	0.36 [1.03]	0.39 [1.12]	0.33 [0.9]
Stressed	1.49 [1.72]	1.51 [1.83]	1.48 [1.58]
Tired	2.77 [2.01]	2.87 [2.15]	2.64 [1.8]
Activity is childcare	1.00 [0]	1.00 [0]	1.00 [0]
N (activities)	3,815	2,004	1,811
N (mothers)	2,839	1,495	1,344

*Note: Table shows summary statistics of mother characteristics and reported feelings. Data come from ATUS and its Well-being Module. The less-than-college group includes individuals with no college degree, and college group includes individuals with a college degree or higher. Means are reported and standard deviations are shown in square brackets. Panel A shows summary statistics of mother level variables, Panels B and C shows statistics for activity level variables. Mother weights are used for Panel A and activity level weights for Panels B and C.*

**Table 3:** Between-Group Model: Effect of College Degree on Feelings during Childcare Activities

	Positive feelings (std)			Negative feelings (std)			Net affect (std)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
College	-0.17*** (0.05)	-0.11* (0.04)	-0.16*** (0.05)	-0.08 (0.06)	-0.05 (0.05)	0.03 (0.05)	-0.06 (0.05)	-0.04 (0.05)	-0.13** (0.05)
Constant	0.40*** (0.04)	0.71 (0.54)	0.18 (0.54)	-0.08 (0.05)	0.22 (0.68)	-0.39 (0.67)	0.32*** (0.03)	0.29 (0.67)	0.31 (0.65)
Covariates		Yes	Yes		Yes	Yes		Yes	Yes
Context covariates			Yes			Yes			Yes
N (activities)	3799	3799	3799	3809	3809	3809	3795	3795	3795
N (mothers)	2829	2829	2829	2836	2836	2836	2827	2827	2827
R-squared	0.01	0.06	0.10	0.00	0.03	0.20	0.00	0.03	0.16

*Note: Table shows OLS estimates of the effect of being college educated on measures of feelings. Standard errors are in parentheses and clustered at the mother level. Sample is restricted to mothers who reported feelings for childcare activities. Positive feelings index is the average of happy and meaning feelings. Negative feelings index is the average of stress, tired, and sad. Net affect is the difference between positive and negative feelings. Each outcome is standardized by the mean and standard deviation of the less-than-college educated mothers. Covariates include mother's age, age squared, marital status, race and ethnicity indicators, year, month, and day fixed effects, and whether the day was a holiday. Context covariates include number of children, indicator for only one child, age of youngest child, indicator for whether child is younger than 6 years old, whether mother is employed, whether mother is full-time employed, weekly earnings, whether partner was present, indicator for presence of partner, overall health, hypertension, and how well rested. Asterisks denote \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$ , †  $p < 0.1$ .*

**Table 4:** Fixed-Effects Model: Effect of Childcare Time and College Degree on Feelings

	Positive feelings (std)			Negative feelings (std)			Net affect (std)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
College	-0.18*** (0.04)	-0.15*** (0.04)		-0.07* (0.04)	-0.04 (0.03)		-0.08* (0.04)	-0.07* (0.04)	
Childcare	0.46*** (0.05)	0.48*** (0.05)	0.37*** (0.04)	-0.09+ (0.05)	-0.10+ (0.05)	-0.01 (0.05)	0.36*** (0.04)	0.38*** (0.04)	0.25*** (0.04)
College X Childcare	0.02 (0.06)	-0.01 (0.06)	0.03 (0.06)	-0.01 (0.06)	0.02 (0.06)	0.04 (0.06)	0.01 (0.06)	-0.02 (0.06)	-0.01 (0.06)
Constant	-0.05* (0.02)	0.05 (0.43)	-0.11*** (0.00)	0.01 (0.02)	-0.32 (0.43)	-0.03*** (0.00)	-0.04+ (0.02)	0.17 (0.43)	-0.06*** (0.00)
Covariates		Yes			Yes			Yes	
Individual f.e.			Yes			Yes			Yes
N (activities)	20,347	20,347	20,347	20,422	20,422	20,422	20,325	20,325	20,325
N (mothers)	6,856	6,856	6,856	6,868	6,868	6,868	6,853	6,853	6,853
R-squared	0.03	0.05	0.78	0.00	0.03	0.83	0.02	0.04	0.80

*Note:* Table shows OLS regression of various measures of feelings on college and childcare indicators and their interaction. Standard errors are reported in parentheses and clustered at the mother level. Sample includes all mothers who reported feelings for any activity. The omitted activity group is non-childcare activities. Positive feelings index is the average of happy and meaning feelings. Negative feelings index is the average of stress, tired, and sad. Net affect is the difference between positive and negative feelings. Each outcome is standardized by the mean and standard deviation of the less-than-college educated mothers. Covariates include mother's age, age squared, marital status, race and ethnicity indicators, year, month, and day fixed effects, and whether the day was a holiday. Asterisks denote \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$ , †  $p < 0.1$ .



**Table 5:** Effect of College Degree on Feelings for Specific Childcare Activities

	Between-group model			Fixed-effects model		
	Positive feelings (std)	Negative feelings (std)	Net affect (std)	Positive feelings (std)	Negative feelings (std)	Net affect (std)
	(1)	(2)	(3)	(4)	(5)	(6)
Basic care	0.00 (0.06)	-0.19* (0.08)	0.11 (0.07)	0.09 (0.08)	-0.03 (0.08)	0.07 (0.08)
Play	-0.03 (0.07)	-0.01 (0.10)	-0.01 (0.08)	0.20 (0.14)	-0.10 (0.12)	0.19 (0.13)
Teaching	-0.03 (0.09)	0.28* (0.13)	-0.19 (0.12)	0.01 (0.14)	0.14 (0.12)	-0.09 (0.12)
Management	-0.32*** (0.07)	0.11 (0.08)	-0.28*** (0.08)	-0.14 (0.09)	0.14 (0.10)	-0.18+ (0.10)

*Notes: Table shows results of between-group model (Columns 1-3) and fixed-effects model (Columns 4-6). Standard errors are reported in parentheses and clustered at the mother level. Columns 1-3 report regressions of positive feelings (Column 1), negative feelings (Column 2) and net affect (Column 3) on college indicator, controlling for covariates. The reported coefficient is the college indicator coefficient. Covariates include mother's age, age squared, marital status, race and ethnicity indicators, year, month, and day fixed effects, and whether the day was a holiday. Each row in Columns 1-3 is a separate regression that restricts the sample to mothers who reported feelings for each of the indicated childcare activity, for example, row 1 restricts sample to basic care. Columns 4-6 report fixed-effect regressions of various measures of feelings on college indicator, indicators for each childcare activity, and their two-way interaction with college dummy, controlling for mother fixed effects. The reported coefficient is the interaction term between college indicator and the respective childcare activity indicator. Each column in Columns 4-6 comes from the same regression that pools all mothers across activities. Positive feelings index is the average of happy and meaning feelings. Negative feelings index is the average of stress, tired, and sad. Net affect is the difference between positive and negative feelings. Each outcome is standardized by the mean and standard deviation of the less-than-college educated mothers. Activity level weights are used. Asterisks denote \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$ , †  $p < 0.1$ .*

**Table 6:** Effect of College Degree on Various Measures of Feelings during Childcare Activities

	Happy std (1)	Meaning std (2)	Stress std (3)	Tired std (4)	Sad std (5)	Very positive feelings (6)	Very negative feelings (7)	U-Index (8)
<i>Panel A: Between-group model restricted to childcare activity only</i>								
College	-0.08 (0.05)	-0.10* (0.04)	-0.03 (0.06)	-0.07 (0.06)	-0.01 (0.03)	-0.12*** (0.03)	-0.00 (0.00)	0.01 (0.01)
Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N (activities)	3,810	3,800	3,814	3,811	3,814	3,815	3,815	3,815
N (mothers)	2,835	2,829	2,838	2,836	2,838	2,838	2,838	2,838
R-squared	0.05	0.05	0.03	0.08	0.03	0.08	0.02	0.02
<i>Panel B: Fixed-effects model pooling activities</i>								
Childcare	0.20*** (0.05)	0.42*** (0.05)	0.03 (0.06)	0.04 (0.05)	-0.12** (0.04)	0.12*** (0.02)	0.01 (0.01)	-0.05+ (0.03)
College X Childcare	-0.02 (0.06)	0.05 (0.07)	-0.06 (0.07)	0.07 (0.07)	0.09+ (0.05)	0.03 (0.03)	-0.00 (0.01)	0.04 (0.04)
Individual f.e.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N (activities)	20,425	20,365	20,441	20,440	20,439	20,347	20,422	20,450
N (mothers)	6,868	6,857	6,869	6,869	6,869	6,856	6,868	6,869
R-squared	0.76	0.74	0.77	0.79	0.80	0.76	0.76	0.70

*Note: Table shows results of between-group model (Panel A) and fixed-effects model (Panel B). Standard errors are reported in parentheses and clustered at the mother level. Sample in Panel A is restricted to mothers who reported feelings for childcare and in Panel B includes all mothers who reported feelings for any activity. Happy std. is the reported feeling for happiness standardized by the mean and standard deviation of the less-than-college group, and similarly for the other feelings (meaning, stress, tired, and sad). Very positive and very negative are indicators for whether the average of positive and negative feelings is 6, the highest value, respectively. U-Index equals 1 if the maximum rating on any of the negative feelings (stressed, tired, and sad) is strictly greater than the maximum rating on any of the positive feelings (happy and meaningful). Covariates include mother's age, age squared, marital status, race and ethnicity indicators, year, month, and day fixed effects, and whether the day was a holiday. Activity level weights are used. Asterisks denote \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$ , †  $p < 0.1$ .*

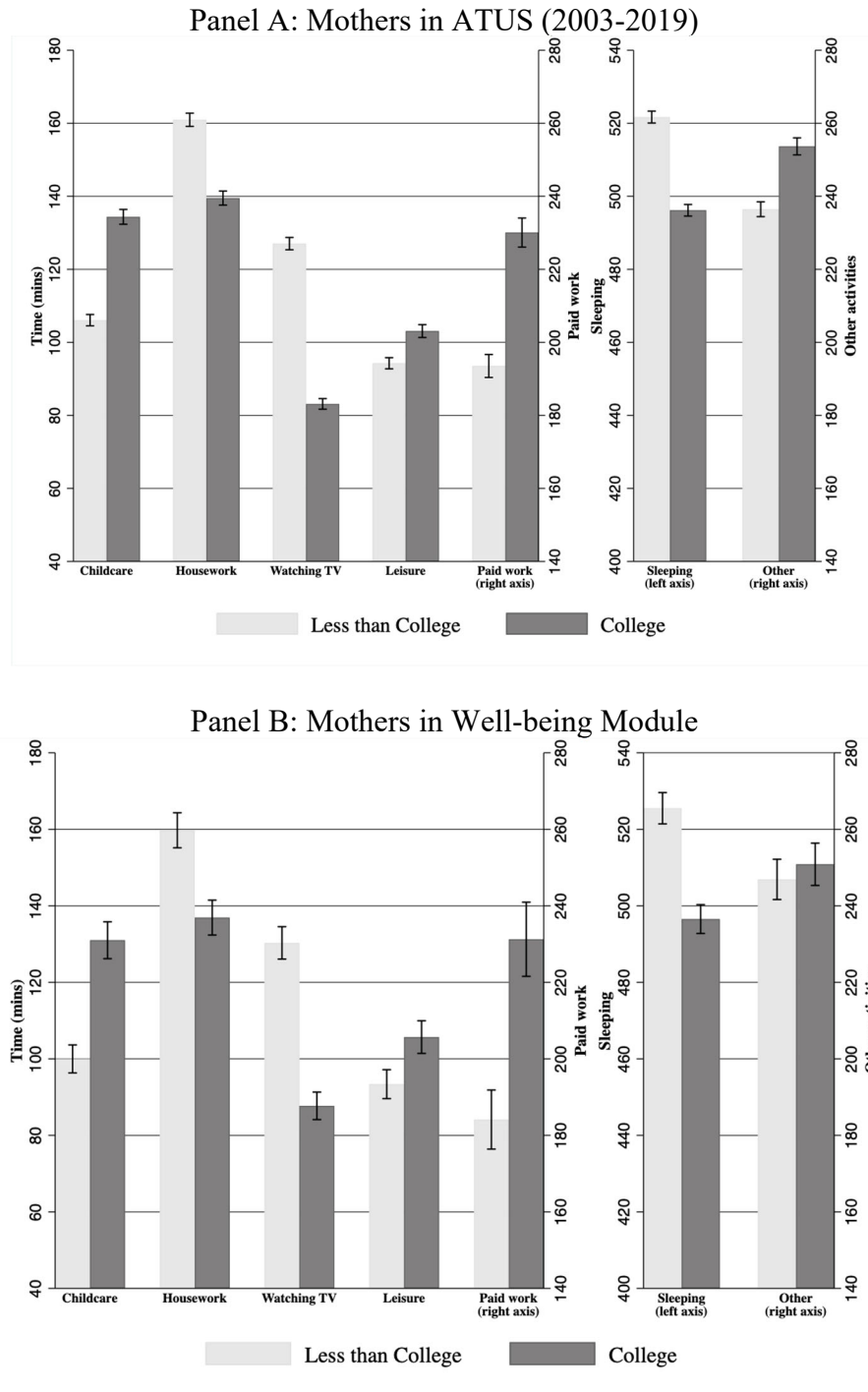
**Table 7:** Sensitivity Analysis: Percentage of Mothers with no College Degree Reporting their Unobserved Feelings and its Effect on Estimations of Group Differences

	Between-group model			Fixed-effects model		
	Positive feelings (std) (1)	Negative feelings (std) (2)	Net affect (std) (3)	Positive feelings (std) (4)	Negative feelings (std) (5)	Net affect (std) (6)
0 percent	-0.11 (0.04)	-0.05 (0.05)	-0.04 (0.05)	0.03 (0.06)	0.04 (0.06)	-0.01 (0.06)
p-value <0.05	0.00	0.00	0.00	0.00	0.00	0.00
2 percent	-0.07 (0.04)	-0.08 (0.05)	0.00 (0.05)	0.08 (0.06)	-0.01 (0.06)	0.05 (0.06)
p-value <0.05	0.00	0.29	0.00	0.08	0.00	0.00
4 percent	-0.04 (0.04)	-0.11 (0.05)	0.04 (0.05)	0.12 (0.06)	-0.05 (0.06)	0.11 (0.07)
p-value <0.05	0.00	0.97	0.00	0.84	0.00	0.46
6 percent	-0.01 (0.05)	-0.14 (0.05)	0.08 (0.05)	0.17 (0.07)	-0.10 (0.06)	0.16 (0.07)
p-value <0.05	0.00	1.00	0.31	1.00	0.34	1.00
8 percent	0.02 (0.05)	-0.17 (0.06)	0.11 (0.05)	0.21 (0.07)	-0.14 (0.06)	0.22 (0.07)
p-value <0.05	0.00	1.00	0.91	1.00	0.93	1.00
10 percent	0.05 (0.05)	-0.20 (0.06)	0.15 (0.05)	0.26 (0.07)	-0.18 (0.07)	0.27 (0.07)
p-value <0.05	0.03	1.00	1.00	1.00	1.00	1.00
12 percent	0.07 (0.05)	-0.22 (0.06)	0.18 (0.05)	0.29 (0.07)	-0.21 (0.07)	0.31 (0.07)
p-value <0.05	0.35	1.00	1.00	1.00	1.00	1.00
14 percent	0.10 (0.05)	-0.25 (0.06)	0.21 (0.05)	0.34 (0.07)	-0.25 (0.07)	0.37 (0.07)
p-value <0.05	0.89	1.00	1.00	1.00	1.00	1.00

*Notes: Table shows results of sensitivity analysis using between-group model (Columns 1-3) and fixed-effects model (Columns 4-6). We run 100 simulations under the scenario that X percent of additional mothers with no college degree who did not engage in intensive childcare report their unobserved feelings, where X takes values from 0 to 14. The simulations assume the worst-case scenario, where less-than-college educated mothers report 0 for positive feelings and 6 for negative feelings. Columns 1-3 report OLS regression of various measures of feelings on college indicator, controlling for covariates. The reported coefficient in Columns 1-3 is the college coefficient. Columns 4-6 report fixed-effects regression of various measures of feelings on college indicator, childcare activity indicator, and their interaction term. The omitted activity*

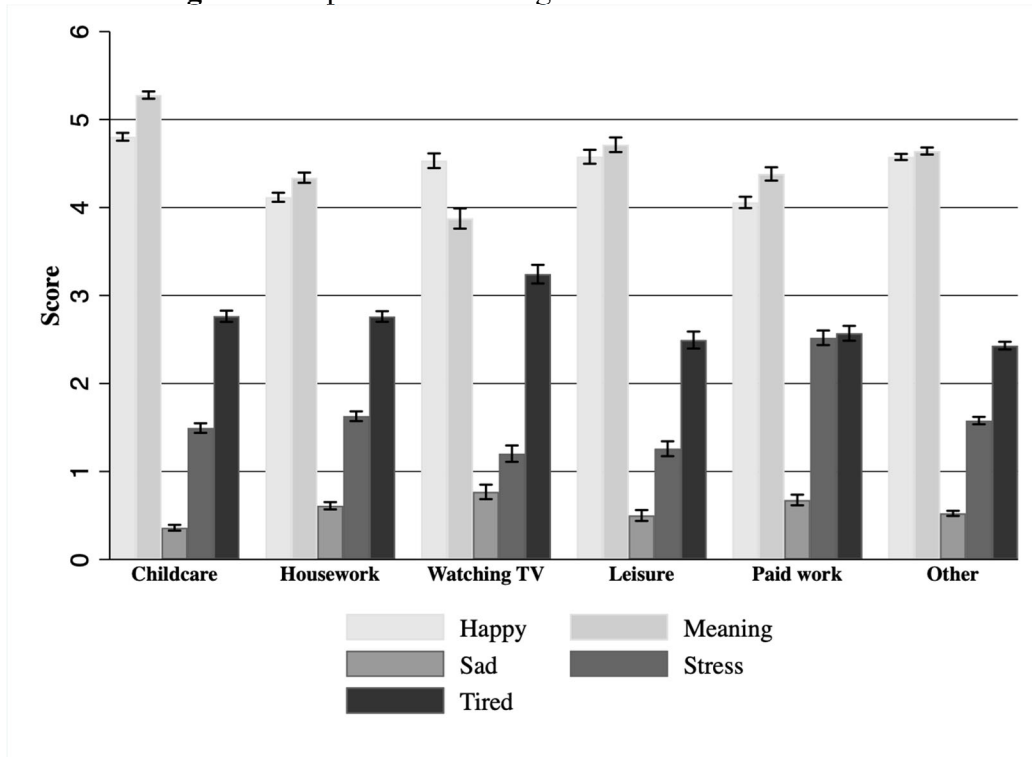
*group is non-childcare activities. The reported coefficient is the interaction term. For each row, we show the average coefficient across 100 simulations and the average of the standard error in parentheses. As our sensitivity analysis incorporates the unobserved feelings of lower-educated mothers, we test whether college-educated mothers report better feelings. Specifically, we test the null hypotheses that college coefficient (or the interaction term) is greater than or equal to zero for positive feelings (Columns 1 and 4), lower than or equal to zero for negative feelings (Columns 2 and 5), and greater than or equal to zero for net affect (Columns 3 and 6). We report the fraction of times across the 100 simulations that the null hypothesis is rejected at 5 percent significance level. Positive feelings index is the average of happy and meaning feelings. Negative feelings index is the average of stress, tired, and sad. Net affect is the difference between positive and negative feelings. Each outcome is standardized by the mean and standard deviation of the less-than-college educated mothers. Activity level weights are used.*

**Figure 1:** Time Spent in a Day (Minutes) in Various Activities by Education Group



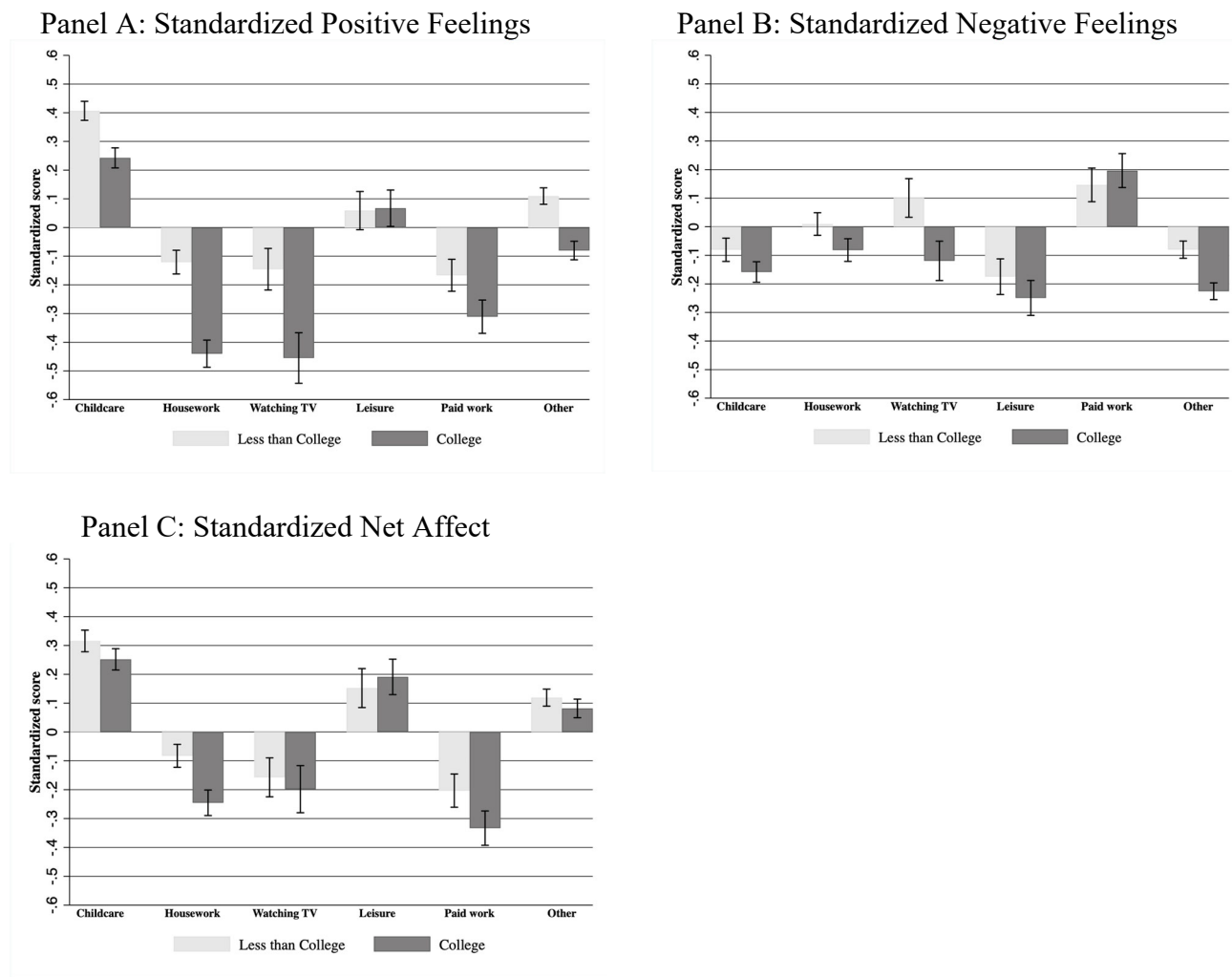
*Note: Figures show average time in minutes that college and noncollege educated mothers spent in various activities on a day. Data come from ATUS from 2003-2019 (Panel A) and Well-being Module (Panel B). Vertical lines represent 95% confidence intervals. Sample is restricted to mothers. Estimates are weighted by respondent level weights.*

**Figure 2:** Experiential Feelings across Various Activities



*Note: Figure shows average feelings reported by mothers during various activities. Data come from ATUS Well-being Module. Vertical lines represent 95% confidence intervals. Respondents were asked to report how they felt during the selected activity using a scale from 0 to 6, where a 0 means they did not experience this feeling at all and a 6 means the feeling was very strong. The reported feelings were happy, meaningful, sad, stress, and tired. Activity level weights are used.*

**Figure 3:** Standardized Positive Feelings, Negative Feelings, and Net Affect across Various Activities by Education Group



*Note: Figures show average feelings during various activities by education group. Data come from ATUS Well-being Module. Vertical lines represent 95% confidence intervals. Positive feelings index (Panel A) is the average of happy and meaning feelings. Negative feelings index (Panel B) is the average of stress, tired, and sad. Net affect (Panel C) is the difference between positive and negative feelings. Each outcome is standardized by the mean and standard deviation of the less-than-college educated mothers. Activity level weights are used.*

## Online Appendix

### Appendix Section A: Tables and Figures

**Appendix Table 1:** Time Spent in a Day (Minutes) in Various Activities by Education Group

	Paid work	Housework	Childcare	Watching TV	Leisure	Sleeping	Other
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Panel A: Mothers in ATUS (2003-2019)</i>							
College	36.54*** (3.32)	-21.44*** (1.69)	28.29*** (1.64)	-43.90*** (1.46)	8.81*** (1.40)	-25.51*** (1.47)	17.22*** (1.93)
Constant	193.52*** (2.15)	160.95*** (1.22)	106.08*** (1.05)	127.04*** (1.17)	94.27*** (0.97)	521.69*** (1.09)	236.45*** (1.33)
N	41788	41788	41788	41788	41788	41788	41788
<i>Panel B: Mothers in Well-being Module</i>							
College	47.14*** (7.95)	-22.84*** (4.07)	31.02*** (3.70)	-42.60*** (3.61)	12.31*** (3.31)	-28.97*** (3.40)	3.94 (4.67)
Constant	184.13*** (5.09)	159.75*** (3.01)	99.99*** (2.29)	130.32*** (2.86)	93.38*** (2.25)	525.51*** (2.54)	246.92*** (3.38)
N	6869	6869	6869	6869	6869	6869	6869

*Note:* Table shows OLS regression of time spent on the specified activity (in minutes) on college indicator. Data come from ATUS from 2003-2019 (Panel A) and Well-being Module (Panel B). Standard errors are reported in parentheses. Panels A and B show sample of mothers. Estimates are weighted by respondent level weights.



**Appendix Table 2:** Time Spent in a Day (Minutes) in Various Childcare Activities by Education Group

	Basic care (1)	Play (2)	Teaching (3)	Management (4)
<i>Panel A: Mothers in ATUS (2003-2019)</i>				
College	9.47*** (0.95)	8.81*** (0.68)	2.82*** (0.52)	7.19*** (0.75)
Constant	43.06*** (0.59)	16.35*** (0.41)	17.20*** (0.34)	29.47*** (0.48)
N	41788	41788	41788	41788
<i>Panel B: Mothers in Well-being Module</i>				
College	11.46*** (2.07)	7.49*** (1.57)	3.81** (1.31)	8.27*** (1.73)
Constant	38.51*** (1.15)	16.90*** (0.98)	17.22*** (0.82)	27.36*** (1.03)
N	6869	6869	6869	6869

*Note:* Table shows OLS regression of time spent on the specified activity (in minutes) on college indicator. Data come from ATUS from 2003-2019 (Panel A) and Well-being Module (Panel B). Standard errors are reported in parentheses. Panels A and B show sample of mothers. Estimates are weighted by respondent level weights.

**Appendix Table 3:** Correlation Table of Feelings

	Happy	Meaningful	Sad	Stressed
Meaningful	0.403***	1		
Sad	-0.283***	-0.0719***	1	
Stressed	-0.355***	-0.0533***	0.411***	1
Tired	-0.156***	-0.0410***	0.216***	0.316***

*Note: Table shows correlation between various feelings. Activity level weights are used. Asterisks denote \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$ , †  $p < 0.1$ .*

**Appendix Table 4:** Experiential Feelings and Constructed Feeling Indexes across Various Activities by Education Group

Major activity	All activities (1)	Paid work (2)	Housework (3)	Childcare (4)	Watching TV (5)	Leisure (6)	Other (7)
<i>Dep var:</i>	<i>Happy</i>						
College	-0.17*** (0.02)	-0.26*** (0.07)	-0.36*** (0.06)	-0.19*** (0.05)	-0.04 (0.09)	0.13 (0.08)	-0.16*** (0.04)
Constant	4.46*** (0.01)	4.17*** (0.04)	4.24*** (0.03)	4.89*** (0.03)	4.54*** (0.05)	4.53*** (0.05)	4.63*** (0.02)
<i>Dep var:</i>	<i>Meaningful</i>						
College	-0.32*** (0.03)	-0.16* (0.08)	-0.56*** (0.06)	-0.29*** (0.04)	-0.86*** (0.12)	-0.10 (0.09)	-0.39*** (0.04)
Constant	4.64*** (0.02)	4.45*** (0.05)	4.52*** (0.04)	5.40*** (0.03)	4.14*** (0.07)	4.75*** (0.05)	4.79*** (0.03)
<i>Dep var:</i>	<i>Sad</i>						
College	-0.20*** (0.02)	-0.12+ (0.06)	-0.22*** (0.04)	-0.06+ (0.03)	-0.43*** (0.09)	-0.18** (0.06)	-0.20*** (0.03)
Constant	0.66*** (0.01)	0.73*** (0.04)	0.68*** (0.03)	0.39*** (0.02)	0.90*** (0.05)	0.57*** (0.04)	0.60*** (0.02)
<i>Dep var:</i>	<i>Stressed</i>						
College	0.02 (0.03)	0.46*** (0.08)	-0.05 (0.06)	-0.03 (0.06)	-0.54*** (0.10)	-0.25** (0.09)	-0.22*** (0.04)
Constant	1.70*** (0.02)	2.32*** (0.06)	1.64*** (0.03)	1.51*** (0.04)	1.37*** (0.06)	1.36*** (0.06)	1.66*** (0.03)
<i>Dep var:</i>	<i>Tired</i>						
College	-0.13*** (0.03)	-0.14 (0.09)	-0.10 (0.07)	-0.22*** (0.07)	0.07 (0.12)	0.12 (0.10)	-0.17*** (0.05)
Constant	2.72*** (0.02)	2.63*** (0.06)	2.80*** (0.04)	2.86*** (0.04)	3.22*** (0.06)	2.44*** (0.06)	2.50*** (0.03)
<i>Dep var:</i>	<i>Positive feelings (std)</i>						
College	-0.17*** (0.01)	-0.14*** (0.04)	-0.32*** (0.03)	-0.16*** (0.02)	-0.31*** (0.06)	0.01 (0.05)	-0.19*** (0.02)
Constant	-0.00	-0.17***	-0.12***	0.41***	-0.15***	0.06+	0.11***

	(0.01)	(0.03)	(0.02)	(0.02)	(0.03)	(0.03)	(0.01)
<i>Dep var:</i>	<i>Negative feelings (std)</i>						
College	-0.07*** (0.01)	0.05 (0.04)	-0.09** (0.03)	-0.08** (0.03)	-0.22*** (0.06)	-0.07 (0.05)	-0.15*** (0.02)
Constant	0.00 (0.01)	0.15*** (0.03)	0.01 (0.02)	-0.08*** (0.02)	0.10** (0.03)	-0.17*** (0.03)	-0.08*** (0.01)
<i>Dep var:</i>	<i>Net affect (std)</i>						
College	-0.07*** (0.01)	-0.13** (0.04)	-0.15*** (0.03)	-0.06* (0.03)	-0.07 (0.06)	0.05 (0.05)	-0.04 (0.02)
Constant	-0.00 (0.01)	-0.20*** (0.03)	-0.09*** (0.02)	0.32*** (0.02)	-0.16*** (0.03)	0.15*** (0.03)	0.12*** (0.01)
N (activities)	20450	1915	4180	3815	1258	1678	7604

*Note: Table shows OLS regression of reported experiential feelings by major activities on college indicator. Data come from ATUS Well-being Module. Standard errors are reported in parentheses. Sample is restricted to mothers. Column 1 row 1 shows regression of reported happiness feeling score across every activity on college indicator. Columns 2–7 row 1 restricts sample to activities related to paid work, housework, childcare, watching TV, leisure, and other activities, respectively. Rows 2–7 reports as dependent variables scores for meaningful, sad, stressed, tired, positive feelings, negative feelings, and net affect, respectively. Positive feelings index is the average of happy and meaning feelings; negative feelings index is the average of stress, tired, and sad; net affect is the difference between positive and negative feelings; and each of these outcomes is standardized by the mean and standard deviation of the less-than-college educated mothers. Estimates are weighted by activity level weights.*

**Appendix Table 5:** Between-Group Model: Effect of College Degree on Feelings during Childcare Activities Controlling for Context and Anchoring Covariates

	Positive feelings (std) (1)	Negative feelings (std) (2)	Net affect (std) (3)	Happy (std) (4)	Meaning (std) (5)	Stress (std) (6)	Tired (std) (7)	Sad (std) (8)	Very positive feelings (9)	Very negative feelings (10)	U-Index (11)
<i>Panel A: Controlling for context covariates</i>											
College	-0.16*** (0.05)	0.03 (0.05)	-0.13** (0.05)	-0.15** (0.06)	-0.12** (0.04)	0.09+ (0.05)	-0.06 (0.06)	0.06+ (0.03)	-0.16*** (0.03)	-0.00 (0.00)	0.02 (0.02)
Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Context covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N (activities)	3,799	3,809	3,795	3,810	3,800	3,814	3,811	3,814	3,815	3,815	3,815
N (mothers)	2,829	2,836	2,827	2,835	2,829	2,838	2,836	2,838	2,838	2,838	2,838
R-squared	0.10	0.20	0.16	0.10	0.07	0.13	0.22	0.07	0.12	0.03	0.05
<i>Panel B: Controlling for context and anchoring covariates</i>											
College	-0.18*** (0.05)	-0.01 (0.05)	-0.12* (0.05)	-0.15* (0.07)	-0.15** (0.05)	0.05 (0.06)	-0.09 (0.07)	0.03 (0.04)	-0.18*** (0.04)	-0.00 (0.00)	0.03+ (0.02)
Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Context covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Anchoring covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N (activities)	2,318	2,324	2,315	2,328	2,318	2,327	2,325	2,328	2,328	2,328	2,328
N (mothers)	1,733	1,737	1,731	1,739	1,733	1,739	1,737	1,739	1,739	1,739	1,739
R-squared	0.19	0.28	0.28	0.20	0.10	0.22	0.26	0.14	0.21	0.06	0.09

*Note: Table shows OLS regression of various measures of feelings on college indicator and various sets of controls. Standard errors are reported in parentheses and clustered at the mother level. Sample is restricted to mothers who reported feelings for childcare*

*activities. Positive feelings index is the average of happy and meaning feelings. Negative feelings index is the average of stress, tired, and sad. Net affect is the difference between positive and negative feelings. Each outcome is standardized by the mean and standard deviation of the less-than-college educated mothers, except for the latter three columns. Very positive and very negative are indicators for whether the average of positive and negative feelings is 6, the highest value, respectively. U-Index equals 1 if the maximum rating on any of the negative feelings (stressed, tired, and sad) is strictly greater than the maximum rating on any of the positive feelings (happy and meaningful). Covariates include mother's age, age squared, marital status, race and ethnicity indicators, year, month, and day fixed effects, and whether the day was a holiday. Context covariates include number of children, indicator for only one child, age of youngest child, indicator for whether child is younger than 6 years old, whether mother is employed, whether mother is full-time employed, weekly earnings, whether partner was present, indicator for presence of partner, overall health, hypertension, and how well rested. Anchoring covariates include life satisfaction ladder and dummies for how feelings compare to a typical day. Activity level weights are used. Asterisks denote \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$ , †  $p < 0.1$ .*

**Appendix Table 6:** Effect of College Degree on Various Measures of Feelings during Childcare Activities in 2021

	Positive feelings (std) (1)	Negative feelings (std) (2)	Net affect (std) (3)
<i>Panel A: Between-group model restricted to childcare activity only</i>			
College	-0.22* (0.10)	-0.01 (0.10)	-0.13 (0.10)
Covariates	Yes	Yes	Yes
N (activities)	576	582	576
N (mothers)	422	427	422
R-squared	0.13	0.04	0.09
<i>Panel B: Fixed-effects model pooling activities</i>			
Childcare	0.33*** (0.09)	0.02 (0.08)	0.20* (0.09)
College X Childcare	0.03 (0.13)	-0.15 (0.15)	0.10 (0.14)
Individual f.e.	Yes	Yes	Yes
N (activities)	2,944	2,958	2,939
N (mothers)	1,001	1,002	1,000
R-squared	0.79	0.84	0.81

*Note:* Table shows results of between-group model (Panel A) and fixed-effects model (Panel B). Standard errors are reported in parentheses and clustered at the mother level. Sample in Panel A is restricted to mothers who reported feelings for childcare and in Panel B includes all mothers who reported feelings for any activity. Positive feelings index is the average of happy and meaning feelings. Negative feelings index is the average of stress, tired, and sad. Net affect is the difference between positive and negative feelings. Each outcome is standardized by the mean and standard deviation of the less-than-college educated mothers. Covariates include mother's age, age squared, marital status, race and ethnicity indicators, year, month, and day fixed effects, and whether the day was a holiday. Activity level weights are used. Asterisks denote \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$ , †  $p < 0.1$ .

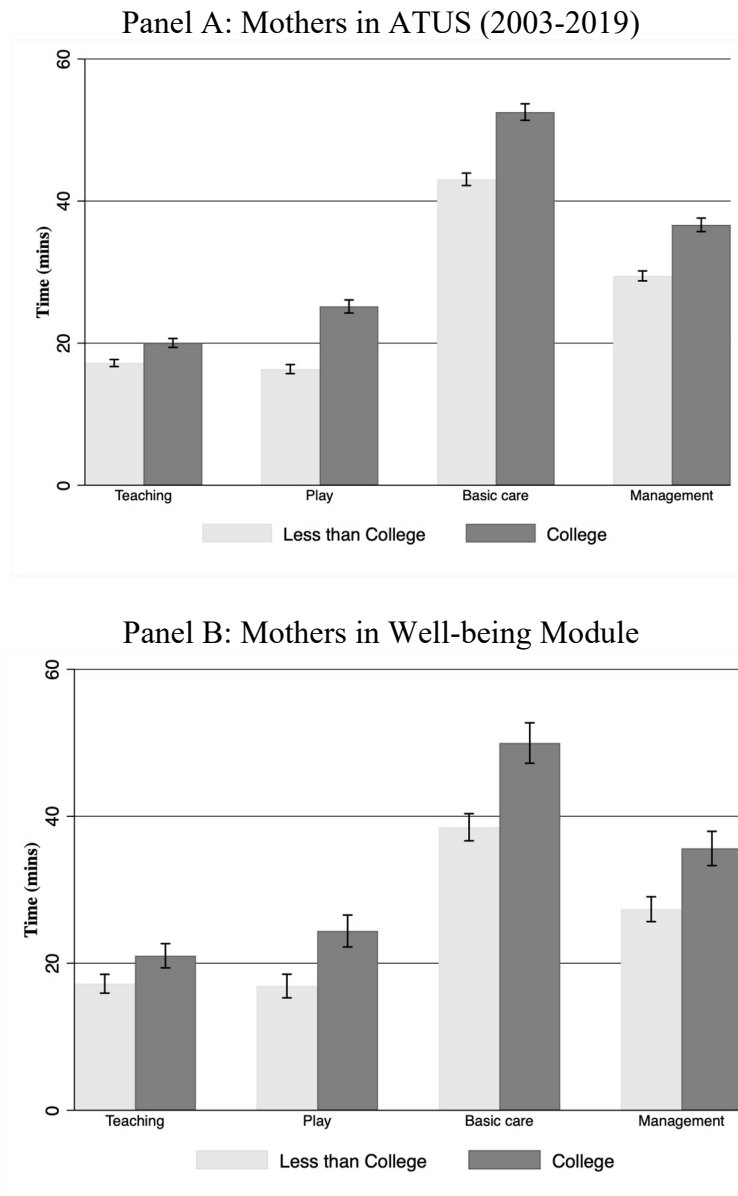
**Appendix Table 7:** Sample Sizes of the ATUS and Well-being Module in Post-Pandemic Years (2021-2022)

Data Set	Survey Years	ATUS		Well-being Module		
		2021-2022	2021	2021		
Sample		Both educ groups (1)	Both educ groups (2)	Both educ groups (3)	Less than college (4)	College (5)
1	Total sample size	17,223	9,087	6,902	3,940	2,962
2	Women only	9,384	4,954	3,742	2,149	1,593
3	Women 25–60 years old	4,994	2,691	2,022	1,000	1,022
4	Mothers (women 25–60 with a child<18 y.o.)	2,468	1,365	1,002	467	535
5	Mothers who reported any time in childcare activities	1,809	1,003	747	324	423
6	Mothers who reported feelings during childcare activities	-	-	217	98	119
7	Percentage of women	54.5%	54.5%	54.2%	54.5%	53.8%
8	Percentage of women who are mothers	26.3%	27.6%	26.8%	21.7%	33.6%
9	Percentage of mothers who reported any time in childcare activities	73.3%	73.5%	74.6%	69.4%	79.1%
10	Percentage of mothers who reported feelings for childcare activities	-	-	21.7%	21.0%	22.2%

*Note: Table shows how sample size changes after imposing sample restrictions in post-pandemic years. Data come 2021-22 ATUS and its 2021 Well-being Module. Both education groups represent the whole sample, less-than-college group includes individuals with no college degree, and college group includes individuals with a college degree or higher.*

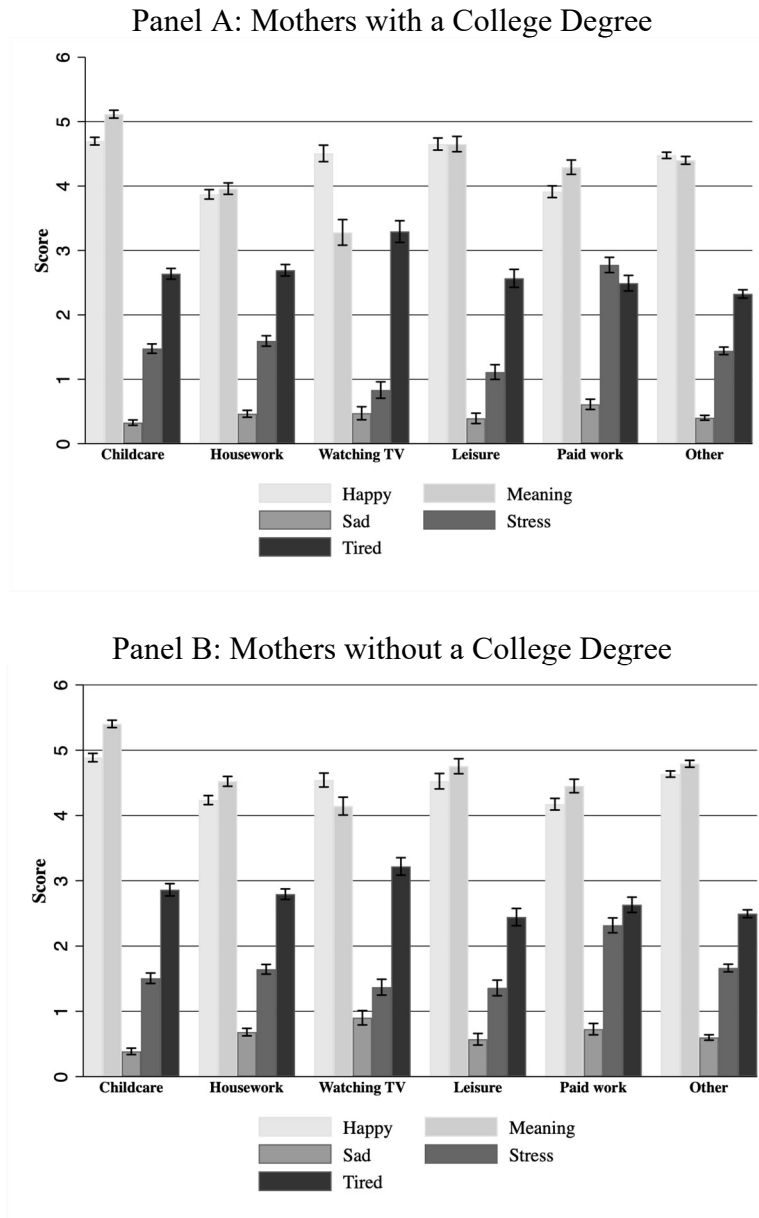


**Appendix Figure 1: Time Spent in a Day (Minutes) in Various Childcare Activities by Education Group**



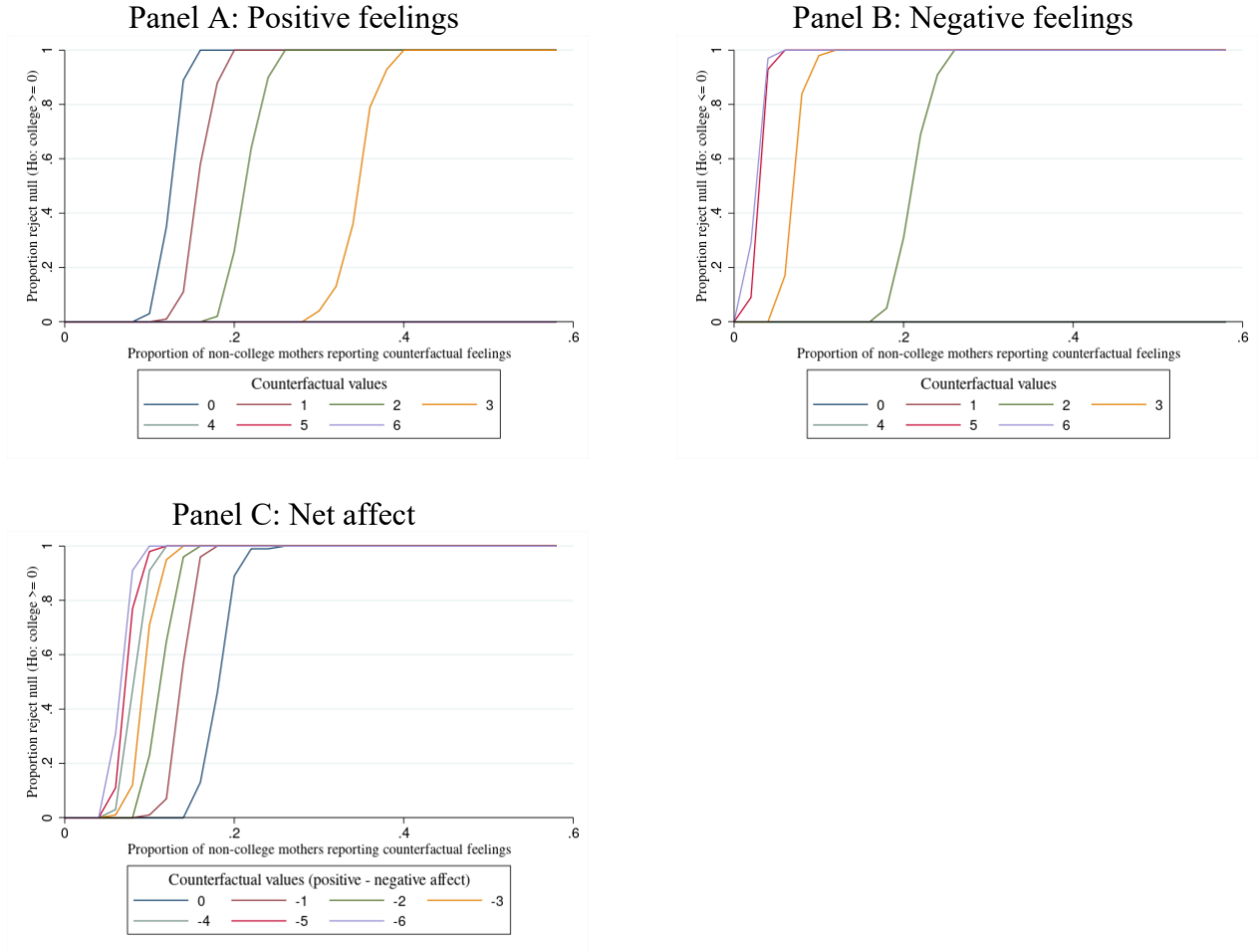
*Note: Figures show average time in minutes that college and noncollege educated mothers spent in various childcare activities on a day. Data come from ATUS from 2003 to 2019 (Panel A) and Well-being Module (Panels B and C). Vertical lines represent 95% confidence interval. Sample is restricted to mothers. Estimates are weighted by respondent level weights.*

**Appendix Figure 2: Experiential Feelings across Various Activities by Education Group**



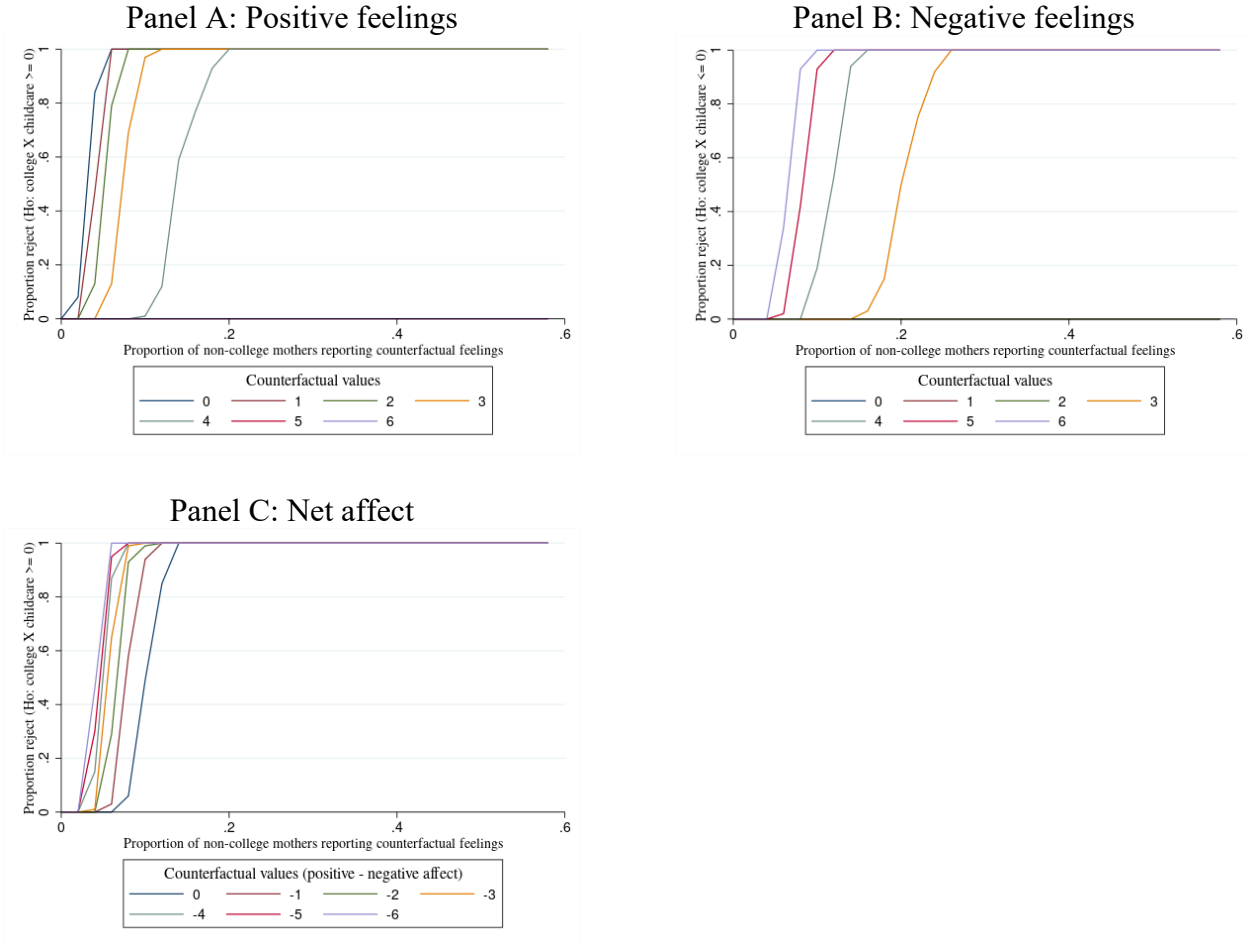
*Note: Figures show average feeling during various activities by education group. Data come from ATUS Well-being Module. Vertical lines represent 95% confidence intervals. Respondents were asked to report how they felt during the selected activity using a scale from 0 to 6, where a 0 means they did not experience this feeling at all and a 6 means the feeling was very strong. The feelings were happy, meaningful, sad, stress, and tired. Sample is restricted to mothers with a college degree (Panel A) and mothers without a college degree (Panel B). Activity level weights are used.*

**Appendix Figure 3: Sensitivity Analysis for Model 1 (Between Group): Proportion of Simulations Rejecting the Null Hypothesis that College-Educated Mothers Experience Better Feelings during Childcare**



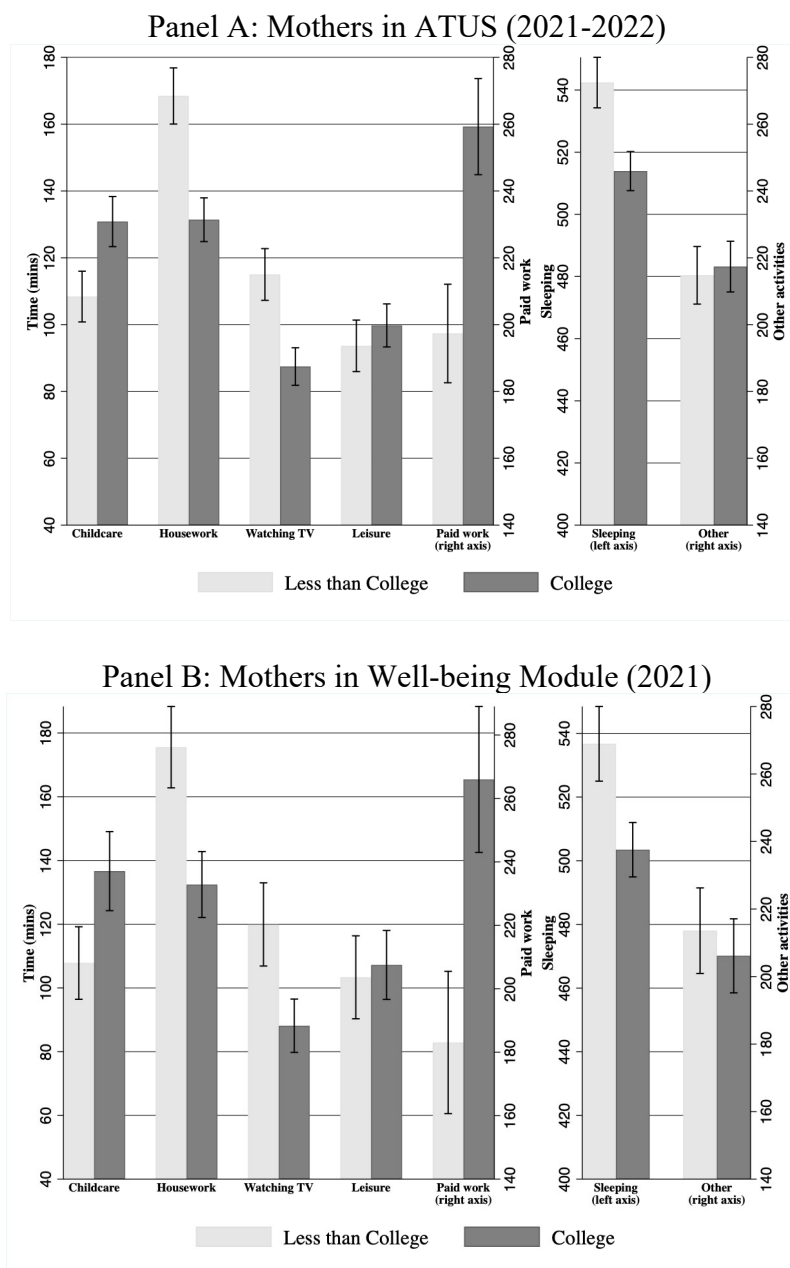
*Notes: Figures show results of sensitivity analysis for Model 1, which regresses positive feelings (Panel A), negative feelings (Panel B), and net affect (Panel C) on college coefficient and mothers' demographic characteristics. We vary the percentage of noncollege-educated mothers reporting their unobserved feelings, where  $X \in [0, 100]$  percent, and the values of their unobserved feelings, where  $E \in \{0, 1, 2, 3, 4, 5, 6\}$  for positive and negative affect and  $E \in \{0, -1, -2, -3, -4, -5, -6\}$  for net affect (positive – negative affect). For each combination of  $X$  and  $E$ , we run 100 simulations and report the proportion of simulations rejecting the null hypothesis that college-educated mothers report better feelings (i.e., higher positive affect, lower negative affect, and higher net affect) than mothers with less schooling.*

**Appendix Figure 4: Sensitivity Analysis for Model 2 (Within Group): Proportion of Simulations Rejecting the Null Hypothesis that College-Educated Mothers Experience Better Feelings during Childcare**



*Notes: Figures show results of sensitivity analysis for Model 2, which is an individual fixed-effect regression of positive feelings (Panel A), negative feelings (Panel B), and net affect (Panel C) on childcare indicator and interaction between childcare and college indicators. We vary the percentage of noncollege-educated mothers reporting their unobserved feelings, where  $X \in [0, 100]$  percent, and the values of their unobserved feelings, where  $E \in \{0, 1, 2, 3, 4, 5, 6\}$  for positive and negative affect and  $E \in \{0, -1, -2, -3, -4, -5, -6\}$  for net affect (positive – negative feelings). For each combination of  $X$  and  $E$ , we run 100 simulations and report the proportion of simulations rejecting the null hypothesis that college-educated mothers report better feelings (i.e., higher positive affect, lower negative affect, and higher net affect) than mothers with less schooling.*

**Appendix Figure 5:** Time Spent in a Day (Minutes) in Various Activities by Education Group in Post-Pandemic Years



*Note: Figures show average time (in minutes) spent in various activities on a day in post-pandemic years by education group. Data come from ATUS from 2021-2022 (Panel A) and Well-being Module 2021 (Panel B). 95% confidence intervals are represented by the vertical lines. Sample is restricted to mothers. Estimates are weighted by respondent level weights.*

## Appendix Section B: Sensitivity Analysis for Selection into Intensive Childcare

We begin our sensitivity analysis assigning the most negative feelings for time spent in intensive childcare to mothers who reported no time spent with children. These mothers are assigned a score of zero for happiness and meaningful feelings and a score of six for each feeling related to stress, sadness, and being tired. We also assume they spend the same average amount of time in childcare as all other mothers in their education group who did report spending time in intensive childcare. This second assumption is necessary because the sampling weights are adjusted by the length of the activity.

The second step of our sensitivity analysis is to select the sample of mothers for whom we will impute negative feelings associated with time spent in childcare. For each mother in the less-than-college group who did not report any time in childcare ( $N = 1,172$ ), one observation is created with counterfactual information about their feelings for this activity. This observation, as specified above, has scores of zero for happy and meaningful and six for stress, sad, and tired.<sup>15</sup> Then,  $X$  percent of these mothers are randomly selected with the following procedure: (i) random numbers are drawn with uniform distribution from zero to one, (ii) if the number is less than  $X$  percent, the mother is selected for the imputed value, and (iii) if the number is greater than  $X$  percent, she is not selected. We then re-estimate the models with the new sample of less-educated mothers with imputed estimates of negative feelings associated with time spent in childcare, while holding the number of college-educated mothers fixed. More specifically, we allow  $X$ , the percentage of mothers with no college degree with imputed values of negative

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<sup>15</sup> We assign a weight of 33.38 to the counterfactual feelings. The value of 33.38 minutes represent the unweighted average duration of selected childcare activities for mothers with no college degree in the Well-being Module, and they do not necessarily correspond to the total time spent in childcare during the day. For instance, if a mother spent 30 minutes with her son in the morning and 30 minutes at night, average duration of childcare activity is 30 but total time in childcare during the day is 60.

feelings, to take values from 0 to 100. An  $X$  equal to 10 means that 10% of mothers in the less-than-college group who did not spend any time with their children are now assumed to be reporting negative feelings. For each value of  $X$ , we re-estimated Model 1 (between group) and Model 2 (within group). Given that  $X$  percent of mothers are randomly selected, 100 simulations were done for each value of  $X$ .<sup>16</sup> We report the  $\delta$  coefficient of  $College_i$  variable for Model 1 and of interaction term  $College_i \times Childcare_{ij}$  for Model 2.

Appendix Table 6 presents results of this sensitivity analysis. The first panel ( $X = 0$  percent) presents base results as reported in Tables 3 and 4, and the second to the last panels ( $X = 2, \dots, 14$  percent, respectively) vary the proportion of mothers assumed to have worse affect during time spent in childcare. Columns 1, 2, and 3 report the average across 100 simulations of the estimated college coefficient after regressing affect outcomes during childcare on college indicator and mothers' demographic characteristics (Model 1). Columns 4, 5, and 6 report the average across simulations of the estimated interaction term between college and childcare indicators, resulting from individual fixed-effect regressions (Model 2). The average of standard errors is reported in parentheses. As our sensitivity analysis incorporates the unobserved feelings of lower-educated mothers, we test whether college-educated mothers report *better* feelings. Specifically, we test the null hypotheses that the college coefficient (or the interaction term) is *greater* than or equal to zero for positive affect (Columns 1 and 4), *lower* than or equal to zero for negative affect (Columns 2 and 5), and *greater* than or equal to zero for net affect (Columns

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<sup>16</sup> In the re-estimated models, the total number of mothers stays the same ( $N = 6,869$ ), but the sample of mothers who spent time in childcare and report their feelings for this activity increases by about  $1,172 \times X\%$  (sample size is  $N = 2,838 + 1,172 \times X\%$ ). Total number of childcare activities increases by the same amount ( $N = 3,815 + 1,172 \times X\%$ ) as well as the total number of activities ( $N = 20,450 + 1,172 \times X\%$ ).

3 and 6). We report the fraction of times across the 100 simulations that the null hypothesis is rejected at 5 percent significance level.