



Article

The Developmental Course of Parental Time Investments in Children from Infancy to Late Adolescence

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Abstract: This study evaluated parent-child time from a child's infancy to age 18 for mothers and fathers. Parent-child time remains a key input in child development. The theory on intergenerational transfers from parents to children posits that mother-child time and father-child time may adjust as children grow. This study used the nationally representative American Time Use Survey (2003–2019; N = 148,576) to study children ages 0–18 in a pooled cross-sectional sample. Using least squares regression, the study traced out parent-child contact, playing time, quality time, and one-on-one time, and tested differences between mothers and fathers. Mothers and fathers have provided substantial time investments in children of all ages. When children were young, mothers spent more time with children compared to fathers, highlighting a need for more nuanced discussions about differences in parenting between mothers and fathers. One-on-one time remained stable through late childhood and adolescence as parents prioritized focused interactions as children aged.

Keywords: parent-child time; parental time investments; developmental course of childhood; gender differences in parenting



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1. Introduction

This study evaluates parent-child time for mothers and fathers from a child's infancy through age 18 in the United States. Parenting behaviors and practices, including the time parents and children spend together, shape a child's day-to-day development and well-being (Sayer et al. 2004). Playing, spending quality time, and having one-on-one experiences all relate to positive developmental outcomes. A child's age remains an important contextual factor related to a child's need for time with parents (Cunha and Heckman 2007; Del Boca et al. 2014). For example, infants and young children have limited ability to meet their own needs (Silver 2000), and infancy and early childhood are important periods for parents and children to interact and establish strong bonds (Honig 1981). As children progress through childhood and into adolescence, they generally grow in autonomy, expand their social networks, and spend less time at home (Steinberg 2020). As a result, amounts and forms of parental time with children likely change as children age (Kalil et al. 2012; Lam et al. 2012). The theory on intergenerational transfers from parents to children posits that parental time adjusts as children's needs change with age.

While it may seem apparent that parental time with an infant differs from parental time with an adolescent, no quantitative research has evaluated the developmental course of parental time investments in children across the panorama of childhood and adolescence. Establishing a baseline for parental time with children from age 0 to age 18 is vital for understanding the timing of the transmission of knowledge and skills from parents to children. Prior research provides insight into shorter spans of childhood and adolescence (Åman-Back and Björkqvist 2004; Lam et al. 2012; Larson et al. 1996; Yeung et al. 2001), leaving open questions about whether parental time changes gradually or exhibits discrete changes at key ages during childhood.

Parental time throughout childhood and adolescence likely differs for mothers and fathers in meaningful ways (Åman-Back and Björkqvist 2004; Ascigil et al. 2020; Yeung

et al. 2001). Fathers and mothers influence child development differently (Parke 2013), suggesting an important role for gendered parental time investments throughout childhood. While past research suggests that mothers spend more time with young children than fathers (Åman-Back and Björkqvist 2004; Lankes 2022), gaps may not be stable through later childhood and adolescence. Building on past literature, this study provides a thorough exploration of the developmental course of mothers' and fathers' time with children from infancy through late adolescence. The study is not limited to traditional or heteronormative families, and our exploration of mothers and fathers using nationally representative data included a variety of family structures.

2. Parental Time with Children

The foundations for this study are rooted in ecological theories which position parents as key players in a child's development (Becker and Tomes 1976; Bronfenbrenner 1986). Parents convey skills and knowledge through their parenting behaviors and practices when spending time with their children (Kalil et al. 2012). Because parental time is a form of intergenerational transfer of human capital (Moroni et al. 2019), it is often termed an investment in children (Gibby et al. 2021; Sayer et al. 2004). Parents often use shared time to convey love, nurturance, and values (Milkie et al. 2015). Time spent with children correlates with improved proximal outcomes for children, such as higher self-worth (Lam et al. 2012) and improved emotional well-being (Wikle et al. 2019; Wikle and Hoagland 2020). Parent-child shared time correlates with fewer behavioral problems, less substance abuse, higher math performance, and fewer delinquent behaviors (Milkie et al. 2015). Parental time with children also improves children's long-term educational progress (Gould et al. 2020) and decreases contact with the criminal justice system in adulthood (Breining et al. 2020). Some of this research is premised on having healthy and functional parent-child relationships. For most children, parental time with children is a valuable component of a child's development.

Beyond the overall shared time, time informative activities have implications for development. One-on-one time, reading time, and playing time all meaningfully contribute to a child's development. For example, one-on-one time, also termed dyadic time, facilitates parental foci on children (Larson et al. 1996; Wikle et al. 2019). One-on-one time may be particularly conducive to parents providing cognitive stimulation to their children. Parent-child one-on-one time likely promotes parental engagement and responsiveness (Crouter and Crowley 1990). One-on-one time leads to greater self-worth for children (Lam et al. 2012) and closeness between parent and child (Larson and Richards 1991; Larson et al. 1996). Reading with a parent helps children learn the meanings of words and expand their vocabulary. Children with low levels of parent-child reading time have been shown to have an increased risk of poor vocabulary throughout childhood (Farrant and Zubrick 2013). Parent-child reading time that facilitates discussion and utilizes open-ended questions is particularly beneficial for children (Britto et al. 2006; Price and Kalil 2019). Parent-child play is another valuable form of parental time. Parent-child play contributes to the cognitive, physical, social, and emotional well-being of children and youth (Ginsburg 2007). Parent-child play can be a safe setting for children to develop motor skills, imagination, communication skills, flexibility during uncertainty, and social adaptation (Keown and Palmer 2014; Parke 2013). Further, it strengthens parent-child bonds by providing parents with unique opportunities to understand their children's perspectives and learn to communicate with their children according to their needs (Ginsburg 2007; Hodge and Wikle 2021).

3. Developmental Course of Parent-Child Time

Parental time with children likely has differential benefits depending on the child's age, and parents likely tailor their parenting efforts to meet age-specific needs. Interestingly, little research addresses how parental time evolves throughout childhood (Lam et al. 2012). Here, we briefly review the extant literature on parental time with children and its benefits at different points throughout childhood, framing children's age-specific needs for parental time and attention within general developmental stages. Even though our research could not assess child outcomes because of the nature of the dataset, understanding the existing literature analyzing the developmental benefits of parent time with children remains helpful. Although our analysis evaluated year-by-year changes as children aged and did not separate children into developmental stages, we structured our framing around common groupings to provide foundational theory and background for why parental time investments at various ages might influence a child's development. Our age-specific analysis from infancy through age 18 connects across developmental stages and answers questions about whether parental time with children adjusts in gradual or discrete ways as children transition through these stages.

3.1. Parent-Child Time in Early Childhood

Research suggests that parents devote high levels of time and attention to infants and young children (Åman-Back and Björkqvist 2004; Monna and Gauthier 2008; Yeung et al. 2001; Zick and Bryant 1996). Because young children have limited ability to meet their own needs, they require intensive personal care, such as feeding, washing, dressing, and medical care (Silver 2000). In addition to physical care and comfort, young children benefit from positive bonding with and attachment to caregivers, which is facilitated as parents remain responsive and available to their young children (Honig 1981). Because research suggests that infants and very young children require more time (Mammen 2011; Yeung et al. 2001), we expect parental time with infants and young children to be high.

Through one-on-one time, parents can attend to the nuances of parent-infant interactions, such as eye contact, pointing, head-turning, gestures, and verbal labeling, which facilitate socioemotional development and reciprocity (Farrant and Zubrick 2013). As research has shifted towards analyzing specific activities, reading has been identified as particularly important for promoting early childhood development (Keown and Palmer 2014). Language acquisition is also a crucial developmental task of early childhood (Farrant and Zubrick 2013), with the highest point of language development being from ages 18 to 36 months (Fletcher 1984). Reading with preschool children provides opportunities for children to display their knowledge, contributes to primary school success, and promotes brain development (Price and Kalil 2019). Low levels of joint attention and reading are correlated with poor vocabulary throughout childhood (Farrant and Zubrick 2013). Parent-child play in early childhood has also been identified as a means of fostering young children's social cognition and the development of trust with caregivers (Ginsburg 2007). Research, therefore, suggests that the returns on investments in one-on-one time, reading time, and playing should be particularly high for young children.

3.2. Parent-Child Time in Middle Childhood

Meeting children's basic needs requires less parental involvement in physical care once children begin elementary school (Mammen 2011; Silver 2000), and the amount of time children spend with their families decreases as children enter school (Dubas and Gerris 2002). Facilitated by biological, cognitive, and environmental changes of middle childhood, children begin to form their identities and become aware of and involved in the world beyond their families (Eccles 1999). During middle childhood, children begin to interpret societal structures and form ideas about themselves (Coll and Szalacha 2004). These developmental changes are likely accompanied by adjustments to parental input. Although youth in middle childhood require adult supervision from caregivers, we expect

total parental time with children in middle childhood to decrease as children become capable of greater independence.

Despite children's less-intensive physical care needs in middle childhood, other developmental needs remain during this stage. Parent-child activities such as helping, teaching, and reading are particularly meaningful during middle childhood (Åman-Back and Björkqvist 2004; Monna and Gauthier 2008). As children enter school, parents' time spent reading with children and engaging in their learning has significant associations with children's learning (Flouri and Buchanan 2004; Ma et al. 2015; Vukelich 1984). We therefore expect that parental time with children will decline during early childhood; however, we expect parents to continue their involvement in reading time, where parental time investments have positive benefits for children.

3.3. Parent-Child Time in Adolescence

Adolescence is a time of increasing autonomy when youth expand their social networks to more prominently feature peers and nonrelatives (Steinberg 2020). Youths take on more decision making (Eccles 1999), which can result in an adolescent choosing to spend more time alone or away from home. During the transition into adolescence, children may naturally distance themselves from their parents (Catsambis 2001; Dubas and Gerris 2002; Eccles 1999; Steinberg 2020). In fact, past research documents a decline in parent-child shared time from middle childhood through adolescence (Åman-Back and Björkqvist 2004; Lam et al. 2012; Larson and Richards 1991; Larson et al. 1996; Milkie et al. 2015). We, therefore, expect to see a decline in overall parental time with children during adolescence.

Although the amount of parent-child time may decrease as children age, parents may adjust the quality and types of interactions to maintain closeness and warmth as the relationship between parents and adolescents transforms (Offer and Offer 1975; Shumow et al. 2011). Adolescents benefit from positive, encouraging relationships with parents (Catsambis 2001), and these benefits extend into adulthood (Dubas and Gerris 2002). Due to limited time for parent-child interactions during adolescence, families may prioritize one-on-one time, which promotes talking and relational development. In fact, past research confirms that one-on-one time likely remains stable through late adolescence (Lam et al. 2012; Larson et al. 1996). On the other hand, over-involvement (helicopter parenting) that dampens youths' sense of autonomy and competence is linked to worse psychological well-being and coping skills (Milkie et al. 2015). Parents must navigate the delicate balance between providing emotional support and providing appropriate space and independence. Thus, we expected the total time parents spent with adolescents to decrease throughout adolescence; however, we expect to see parental time with children transform in ways that maintain warmth and closeness, such as continued involvement in parent-child one-on-one time.

3.4. Parent Gender Considerations

The developmental course of parental time throughout childhood may differ for mothers and fathers and may yield differential benefits. Having a baby brings additional demands, increases the amount of household labor, and often results in gendered behavioral patterns and roles (Ascigil et al. 2020). Past research shows that mothers spend more time in childcare than fathers on average, although fathers' involvement seems to be on the rise (Åman-Back and Björkqvist 2004; Lankes 2022). Mothers with high levels of education have maintained time devoted to the developmental care of their children while increasingly participating in paid work (Cha and Park 2020; Hsin and Felfe 2014). Past research comparing mothers and fathers has focused on age groupings (Ascigil et al. 2020; Dubas and Gerris 2002; Parke 2013), and it is unclear how the parent-child time of mothers versus fathers evolves differently throughout the developmental course of childhood.

Infants may benefit in unique ways from time spent specifically with mothers (Parke 2013). Breastfeeding, for example, promotes infant health. In addition, mothers release hormones during and after pregnancy that prime them to form healthy attachments to

their children and to engage in affectionate, responsive, and stimulating behavior (Barret and Fleming 2011; Parke 2013), which facilitates beneficial mother-child relationships. Additionally, mothers are good sources and examples of empathy for children (Alderman and King 1998). Outings with mothers are more strongly associated with young adolescents' education than outings with fathers (Hango 2007). Furthermore, a mother's verbal style may positively influence intellectual development, such as memory, problem-solving, and language advancement (Parke 2013). Mothers are also gifted at helping their children label and understand emotions (Parke 2013).

Fathers' time with children likewise makes beneficial contributions to children's development (Parke 2013). Time with fathers commonly results in positive risk-taking, better emotional regulation, improved understanding and use of rules, increased social acceptance, and a greater ability to manage competition or unfamiliar situations (Parke 2013). A father's involvement is particularly useful for psychosocial development and is associated with greater social competence, adaption, acceptance, and popularity (Lam et al. 2012; Parke 2013). Paternal involvement and warmth are associated with children's social acceptance throughout childhood and empathy in social relationships in adulthood (Parke 2013). Fathers' positive involvement in shared activities is associated with fewer behavioral problems and less aggression (Keown and Palmer 2014; Parke 2013). A father's involvement in education serves as a protective factor for educational and economic success (Flouri and Buchanan 2004; Hango 2007; Harris et al. 1998).

Although research analyzing the behavior of mothers versus fathers for each of the specific forms of parental time remains limited, the existing research suggests mothers' time with their children and fathers' time with their children have differential benefits. For adolescents, one-on-one time with mothers correlates with lower levels of depression in sons, and one-on-one time with fathers correlates with higher levels of self-worth in children (Lam et al. 2012). Extensive research highlights the differences between mothers' and fathers' play styles. Fathers spend a greater proportion of their time with children in play activities (Parke 2013). Fathers more frequently engage in outdoor activities, and their play is characterized by arousal, excitement, and unpredictability; mothers' play often centers around indoor activities and uses more conventional motor-skill-development games, toy-mediated activities, and verbal and didactic interactions (Keown and Palmer 2014; Tamis-LeMonda et al. 2004; Parke 2013). Father-child play predicts higher popularity, social adaption, and acceptance, whereas mother-child play enhances intellectual, linguistic, and socioemotional development (Parke 2013). In general, past research suggests fathers are more involved in parent-child play than mothers are, and these interactions highlight greater egalitarian friendships between father and child (Parke 2013). In sum, we expected mothers to spend more time than fathers with children, although playing time may be higher for fathers.

4. This Study

This study evaluated the changes in mothers' and fathers' time with their children from infancy to age 18. We aimed to answer two research questions. How much time do mothers and fathers spend with their children from infancy to age 18 (Q1)? How do mothers and fathers differ in their time investments in children from infancy to age 18 (Q2)? Although extensive research suggests that parent time impacts children's outcomes and that the needs of children change according to developmental progress, no prior research has evaluated patterns of parental time investments across the full span of childhood and adolescence. This study provides new insights by highlighting the value of children's ages as a key contextual factor in mothers' and fathers' contributions to child development across multiple domains. Building on prior research, this study leverages a large, nationally representative sample to assess a range of parent-child interactions over the span of childhood and adolescence. It employs a flexible functional form with minimal restrictions to evaluate these patterns. Understanding how parents spend time with their children at different ages contributes to a deepened understanding of how a child's age shapes the

parental processes governing the intergenerational transmission of skills and human capital to children. Ethical review and approval were waived for this study due to the study being deemed exempt by the Institutional Review Board of Brigham Young University (protocol code 2021-110).

Based on prior literature suggesting that caring for young children is time intensive (Monna and Gauthier 2008) and that caring for children is less time intensive during adolescence (Catsambis 2001), as well as literature suggesting that quality parent-child interactions provide high value at young ages (Attanasio et al. 2020; Fletcher 1984; Milteer et al. 2012; Offer 2013), we hypothesized that parent-child time declines as children age (H1). Because past research suggests mothers spend more time with children than fathers (Ascigil et al. 2020; Dubas and Gerris 2002; Parke 2013; Yeung et al. 2001), we hypothesized that compared to fathers, mothers provide higher levels of parent-child time at each age (H2).

5. Methods

5.1. Participants

This study used nationally representative cross-sectional data from 2003 through 2019 from the American Time Use Survey (ATUS; Hofferth et al. 2020) to explore parent-child time throughout childhood. The ATUS is a time-diary study in the United States. The Bureau of Labor Statistics administered the survey in collaboration with the United States Census Bureau. Selections for the ATUS were made by first sampling households from the outgoing rotation of the Current Population Survey and then randomly selecting one household member aged 15 years or older to participate in the ATUS (Bureau of Labor Statistics 2019). The people administering the ATUS attempted to contact selected individuals several times before dropping individuals who could not be reached from the survey. The overall response rate was 57.8% in 2003 when the survey began and gradually declined over time to 42.0% in 2019; response rates were high enough to provide reliable data (Bureau of Labor Statistics 2019).

Two to five months following the final Current Population Survey interview, the ATUS conducted a single-time-diary interview by phone, which lasted about 30 min. During the interview, participants accounted for their time use from 4:00 a.m. of the previous day until 4:00 a.m. of the interview day (Bureau of Labor Statistics 2019). With computer assistance, interviewers used the Day Reconstruction Method, which has been shown to be effective in prompting high-quality recall (Kahneman et al. 2004). Time-diary data collection using the Day Reconstruction Method has been validated previously; this approach replicates results obtained with experience sampling with high efficacy and provides added detail (Kahneman et al. 2004; Schober and Conrad 1997). Participants were interviewed throughout the year. The ATUS oversampled weekends to provide adequate coverage of days where activity patterns may differ. Sampling weights were corrected for sample nonresponse and adjusted for oversampling on weekends to make sure that following weighting, the average time was reflective of the United States national population. We used weights provided by the ATUS without modification. We maintained a child-level approach to weighting; to ensure estimates were representative of children rather than households, we assigned the household weight to each child.

Our analysis pooled data from 2003 through 2019 and restricted the sample to parents with at least one child under the age of 18 living in their household. We note that our dataset was cross-sectional rather than longitudinal. Although our cross-sectional dataset did not allow us to assess long-term predictors, risk factors, or habit formation, it did not interfere with our ability to estimate average values with contemporaneous predictors. Because our sample was based on people drawn from the same underlying population from year to year, our estimates of average values in the main analysis reflected national patterns despite not being longitudinal. In addition, we conducted cohort analysis to bridge differences between our sample and longitudinal work.

The original ATUS sample included 581,555 individuals in 210,586 households. Because we focused on parental time with each household child, the unit of observation was

a household child aged 18 years or younger than a responding parent. We followed the classification of family relationships in the ATUS to identify the children of respondents. Household children included biological children, adopted children, and stepchildren. The ATUS classified household children of a coresident partner as children of the respondent about half the time. Foster children were not included, and children living with a non-parent guardian were not included. Thus, the study included children from a wide variety of families but also excluded children not living with their parents or living with caregivers or guardians. We dropped 432,979 people in ATUS households who were not classified as household children of a respondent parent in the sample, leaving a final sample of 148,576 children. Table 1 provides a demographic overview of the sample, split by whether the focal child's responding parent was a mother or father. The most notable differences between the two groups were that children of responding mothers were less likely to be White and less likely to live in a two-parent household. These factors were controlled for in adjusted models.

Table 1. Description of Demographic Characteristics.

	Fathers		Mothers	
	Mean	S.D.	Mean	S.D.
	N = 62,922		N = 85,654	
Characteristics of the Focal Child				
Female	0.49	0.50	0.49	0.50
Age	8.85	5.35	8.74 ***	5.37
Race/Ethnicity				
White	0.62	0.49	0.57 ***	0.50
Hispanic	0.22	0.42	0.24 ***	0.42
Black	0.09	0.28	0.13 ***	0.34
Other	0.02	0.13	0.02	0.13
Foreign born	0.04	0.20	0.04 *	0.19
The oldest child	0.52	0.50	0.53 *	0.50
Middle child	0.16	0.37	0.16	0.37
The youngest child	0.52	0.50	0.53 *	0.50
Birth year ^a	2002.10	7.17	2002.22 **	7.21
Characteristics of the Parent and Household				
Two-parent household	0.86	0.35	0.73 ***	0.44
Age of the oldest parent	40.56	8.35	39.58 ***	8.79
Highest educational attainment of parents				
No parent graduated from high school	0.09	0.29	0.11 ***	0.31
At least one household parent graduated high school	0.21	0.41	0.23 ***	0.42
At least one household parent attended some college	0.70	0.46	0.67 ***	0.47
At least one household parent works full time	0.94	0.24	0.88 ***	0.33
Dual earner household	0.53	0.50	0.45 ***	0.50
Family income	83,529.45	49,177.78	76,822.88 ***	49,827.96
Number of household children	2.42	1.17	2.40 ***	1.18
The average age of household children	8.85	4.73	8.74 ***	4.75
S.D. of the age of household children	2.43	1.99	2.42	2.01
Percent female of household children	0.49	0.36	0.49	0.36

Note: These data are from the American Time Use Survey, 2003-2019. Observation is a focal child of responding parent. ^a Estimated birth year = year of survey – age. * $p \leq 0.05$. ** $p \leq 0.01$. *** $p \leq 0.001$.

5.2. Measures

5.2.1. Dependent Variables: Parent-Child time

Our primary dependent variables were measures of parental time with a focal child. Quantifying parental time captured a behavioral marker of intergenerational transmission of human capital. For each activity throughout the sample day, respondents were asked “who was with you?” (Bureau of Labor Statistics 2019). Information about a respondent’s interactions with a particular household child focused on in-person contact only and did not include electronic communication. In households with multiple children, interactions with each household child were measured separately. Once time with focal children from each household was identified, we used detailed activity codes from the data to construct measures of parental time with each household child. Appendix A Table A1 provides more detail on the construction of each parent-child time measure in the ATUS. As a basic measurement of parental time, we included a measure of total shared time (minutes per day), which was not specific to the activity being carried out. One-on-one time with a child facilitates parental engagement (Crouter and Crowley 1990; Price et al. 2021), self-worth for children (Lam et al. 2012), and closeness between parent and child (Larson and Richards 1991; Larson et al. 1996), was also measured. One-on-one time with a child (minutes per day) was not specific to the activity being carried out and was based solely on answers to the “who were you with?” survey question. Because reading time helps with crucial vocabulary and language development (Farrant and Zubrick 2013; Price and Kalil 2019), we measured reading time (minutes per day) with a child using activity codes for reading to or with the focal child. Parent-child play also meaningfully contributes to child development and has been shown to aid the cognitive, physical, social, and emotional well-being of children (Ginsburg 2007). Our measure of playing time (minutes per day) was conservative and included only activities where parents reported a focus on children during that time. The ATUS included specific activity codes for time spent playing with children, which we used for that measure.

To clarify, the only two mutually exclusive measures were playing and reading. Total time included playing time and reading time. One-on-one time focused on the dimension of who was present and was not activity focused; the overlap between one-on-one time and the other measures also occurred. A detailed view of the construction of each parental time measure can be seen in Appendix A Table A1, which defines each dependent variable measure and gives the corresponding activity codes from ATUS. Each parental time outcome was predicted using a separate model.

5.2.2. Primary Explanatory Variables: Child Age and Mother Status

The survey collected the age in years of each household member, including children. Ages were collected at the time of the ATUS interview, which occurred throughout the year. No additional age information, such as birth year or month, was provided. Age was measured categorically; each year of childhood (age 0 through age 18) was modeled as a binary variable. This modeling choice allowed us to detect noncontinuous changes in parent-child time year to year throughout childhood, and we provide more information and justification for using age as a categorical variable in the context of our model in the analytical approach subsection below. Because of the sample-selection criteria, all respondents in the sample were parents. To identify mothers (separated from fathers), we followed the ATUS coding for parents’ reporting that a household member was their child. We then used respondents’ reports of being female (1 = mother, 0 = not mother). This method identified stepparents as parents about half the time but did not identify other parental figures as parents (e.g., Grandparents). The survey did not provide nonbinary response options for sex, and all respondents indicated being either male or female.

5.2.3. Sociodemographic Characteristics and Timing Controls

Additional compositional and contextual factors were measured to ensure that patterns were not explained by factors correlated with a child's age. Individual child characteristics were measured and controlled in regression models. Because the sex of the child may influence parent-child time (Dubas and Gerris 2002; Lam et al. 2012; Lundberg et al. 2007; Mammen 2011; Zick and Bryant 1996), we used a binary variable to control for whether the focal child was female (1 = female, 0 = not female). We measured race and ethnicity using categorical variables to indicate whether the focal child was Hispanic, non-Hispanic Black, or another non-White non-Hispanic race/ethnicity (with non-Hispanic White used as the base category). We also measured whether the child was an immigrant, defined as having been born outside the United States. A child's birth order correlates with parental time (Price 2008); we, therefore, used a categorical variable to control for household birth order (1 = oldest, 2 = middle, 3 = youngest). To account for potential cohort effects, we included children's birth years, calculated as the year of the survey minus the child's age. We measured household characteristics, including a binary variable for whether the responding parent was married and a categorical variable for the age of the oldest household parent (in years). We controlled for the highest level of education attainment by household parents with categorical variables. A binary variable captured whether at least one household parent worked full time, and a binary variable measured whether the household was a dual-income household (Bronfenbrenner 1986; Cha and Park 2020; Keown and Palmer 2014; Milkie et al. 2015; Zick et al. 2001). We controlled for family income as a continuous variable in dollars (adjust to 2019 real values), noting that the ATUS top-coded family income at \$150,000 in nominal terms each year. To control for sibling composition, we included measures of the number of household children, the average age of household children, and the percentage of household children who were female. To control for child spacing, we included the standard deviation of the age of household children. The region of the United States was included as a categorical variable (1 = Northeast, 2 = Midwest, 3 = South, 4 = West). Timing controls included binary variables for each survey year, binary variables for the survey month, and binary variables for the day of the week the survey was taken. The survey provided high-quality data with minimal missing data; however, 6% of observations were missing information on family income, race, and ethnicity. The analyses used multiple imputations with chained equations (with 100 imputed datasets) to account for missing information on these covariates in the sample.

5.3. Analytic Approach

First, we graphically explored raw patterns in the data. We separated the sample by whether the responding parent was a mother or father and calculated the average minutes of parent-child time per day at each age. Confidence intervals (at 95%) were also calculated for mothers and fathers at each age of their children to provide additional insight into the variability of measures at each age.

To account for individual and family demographic and socioeconomic characteristics, we used Ordinary Least Squares (OLS) regression analyses to estimate the model represented in Equation (1).

$$y_i = \beta_0 + \beta_1 mother_i + \sum_{j=1}^{18} \alpha_j age_{ji} + \sum_{j=0}^{18} \gamma_j mother_i * age_{ji} + X\Gamma + \varepsilon_i \quad (1)$$

Our models included four dependent variables, which were estimated as separate OLS regressions. These variables were the minutes per day the parent and child spent in (1) total shared time, (2) one-on-one time, (3) reading time, and (4) playing time. The analysis was not conditioned on having positive time in a dependent variable; observations reporting no time in a particular activity were included. Many of the zero values in dependent variables in the dataset were due to a mismatch between the short sample time period and a longer time horizon needed to detect regular participation (Stewart 2013).

Because zeros were not primarily due to censoring, a Tobit model would produce biased coefficients (Stewart 2013). We, therefore, relied on OLS modeling, which is accepted as the best linear model when working with time-use data (Stewart 2013). We modeled across-family comparisons because our research question was focused on describing demographic patterns rather than exploring within-family differences between siblings. To separate mothers and fathers, we included a binary variable for whether the respondent was a mother rather than a father. The primary explanatory variables of interest were binary variables measuring the age of a child. We were interested in understanding nonlinear changes in parental time from year to year, so including age as a categorical variable (one binary variable for each age) allowed parent-child time to change freely from year to year (just as a typical categorical variable could have discrete differences between groups). The choice to model age as a categorical rather than continuous variable allowed more flexibility in capturing data patterns and minimized the degree that a model's functional restrictions (such as linear constant relationships year to year) explained findings. Finally, to separate mothers and fathers at each age, we interacted with the mother binary variable with each age binary variable. The omitted base group included children aged 0 with a father as the respondent, and all estimates were made in comparison to this group. The base group choice was arbitrary, and using any age as a base group would have been mathematically equivalent in terms of relative differences from year to year. As represented by the X' matrix in Equation (1), all individual, household, and timing controls described in the measures section were included in the regression models, allowing the model to separate age and parent gender from observable confounding factors. Standard errors were clustered at the household level to account for correlations among siblings. Although the measures for reading and playing were mutually exclusive, the other activity-based measures were not. Inferences in adjusted models were made based on a critical value of $p < 0.05$. Cells in the main analysis were well populated and far above the 20 observations needed to detect differences between groups (Harrell 2015), as shown in Appendix A Table A2.

6. Results

6.1. Descriptive Data Patterns on Parental Time with Children

As seen in Appendix A Table A3, when pooling all children of any age together, mothers spent 314 min per day with a child, which was 97 min more than the time fathers spent. However, neglecting to look at patterns by age hid important nuances in how mothers and fathers spent time with children. When breaking out parent time by a child's age, raw data patterns documented in Figure 1 demonstrated that parent-child time changed dramatically throughout childhood for both mothers and fathers. Importantly, most of the raw data patterns showed gradual changes in parent-child time from year to year throughout childhood rather than abrupt discontinuities. Descriptive patterns indicated that both mothers and fathers invested substantial time in children. Mothers invested more total time, one-on-one time, and reading time than fathers during early childhood. Raw data patterns also demonstrated that gaps between mothers' and fathers' parental time narrowed substantially after early childhood.

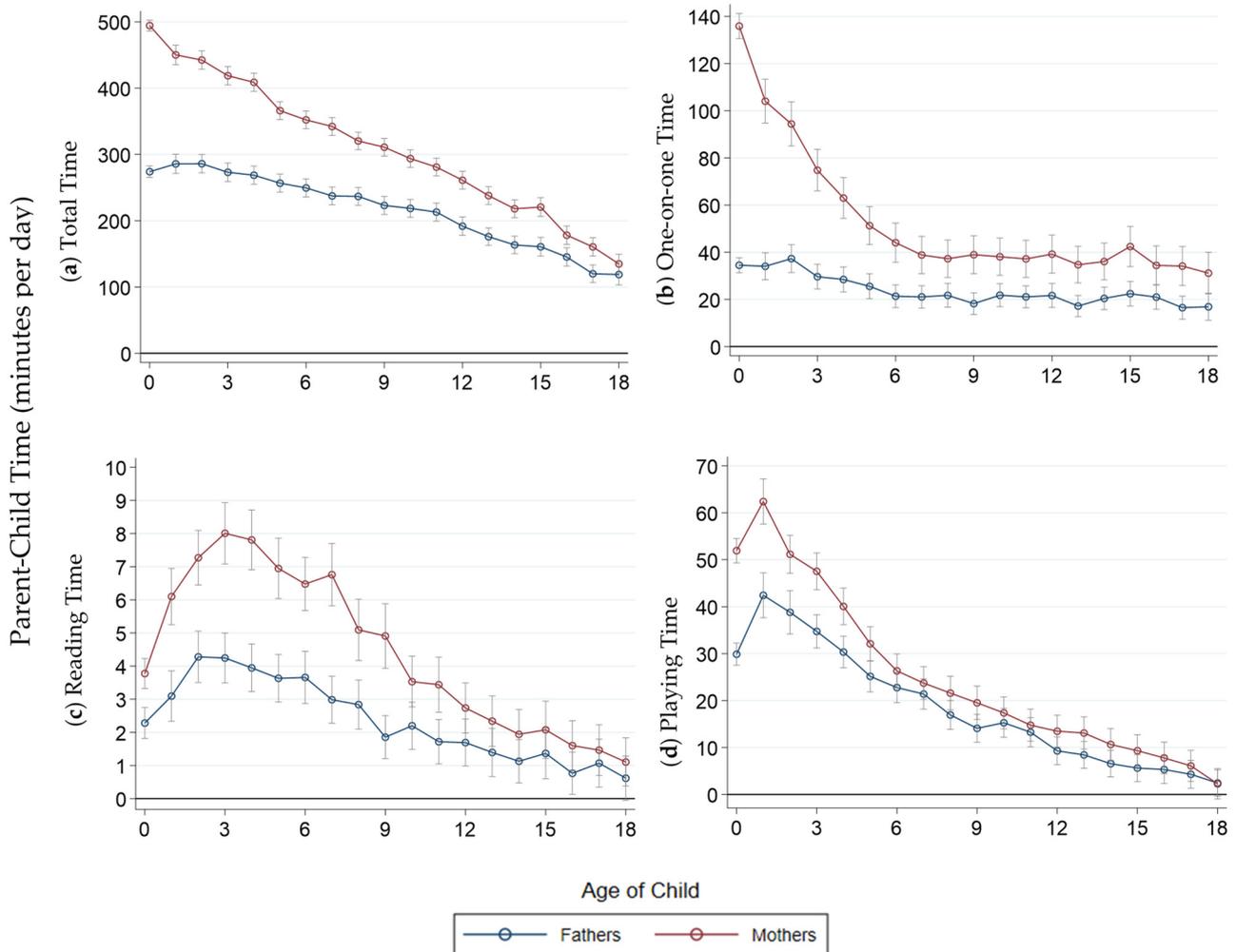


Figure 1. Descriptive Data Patterns of Parent-Child Time.

6.2. Regression Analysis of Parental Time with Children

After parsing out age-by-parent gender patterns from individual and household characteristics, Figure 2 provides a visual representation of the predicted time with children for mothers versus fathers; underlying regression models supporting the figures are reported in Appendix A Table A4. Panel (a) of Figure 2 demonstrates that fathers spent an average of 274 min with children under the age of 1. Fathers’ total time remained stable through early childhood and began a gradual decline when children reached age 5. Fathers’ total time with children gradually continued to decline year by year throughout middle childhood, late childhood, and adolescence. Mothers spent an average of 498 min with young children under the age of 1. Mothers’ time with children declined from year to year throughout childhood and adolescence. The gap between mothers’ time and fathers’ time with children narrowed as children aged and became indistinguishable by the time children reached the age of 16.

As shown in panel (b) of Figure 2, fathers were predicted to spend an average of 35 min of one-on-one time with infants under the age of 1. After accounting for individual and family sociodemographic characteristics, fathers increased one-on-one time spent with children throughout early childhood, middle childhood, and adolescence, with one-on-one time peaking at age 15 and remaining high by age 18. Mothers spent 135 min of one-on-one time daily with infants, much higher levels compared to fathers. For mothers, one-on-one time declined until children reached age 7 when mothers provided 80 min daily. After children passed age 7, mothers gradually increased one-on-one time with them through age 18. Interestingly, both mothers and fathers maintained their levels of one-on-one

time throughout late childhood and adolescence, while most other forms of parental time gradually declined during these times. The gap between mothers' and fathers' one-on-one time with children narrowed until children reached age 11, and the gap was typically indistinguishable at older ages.

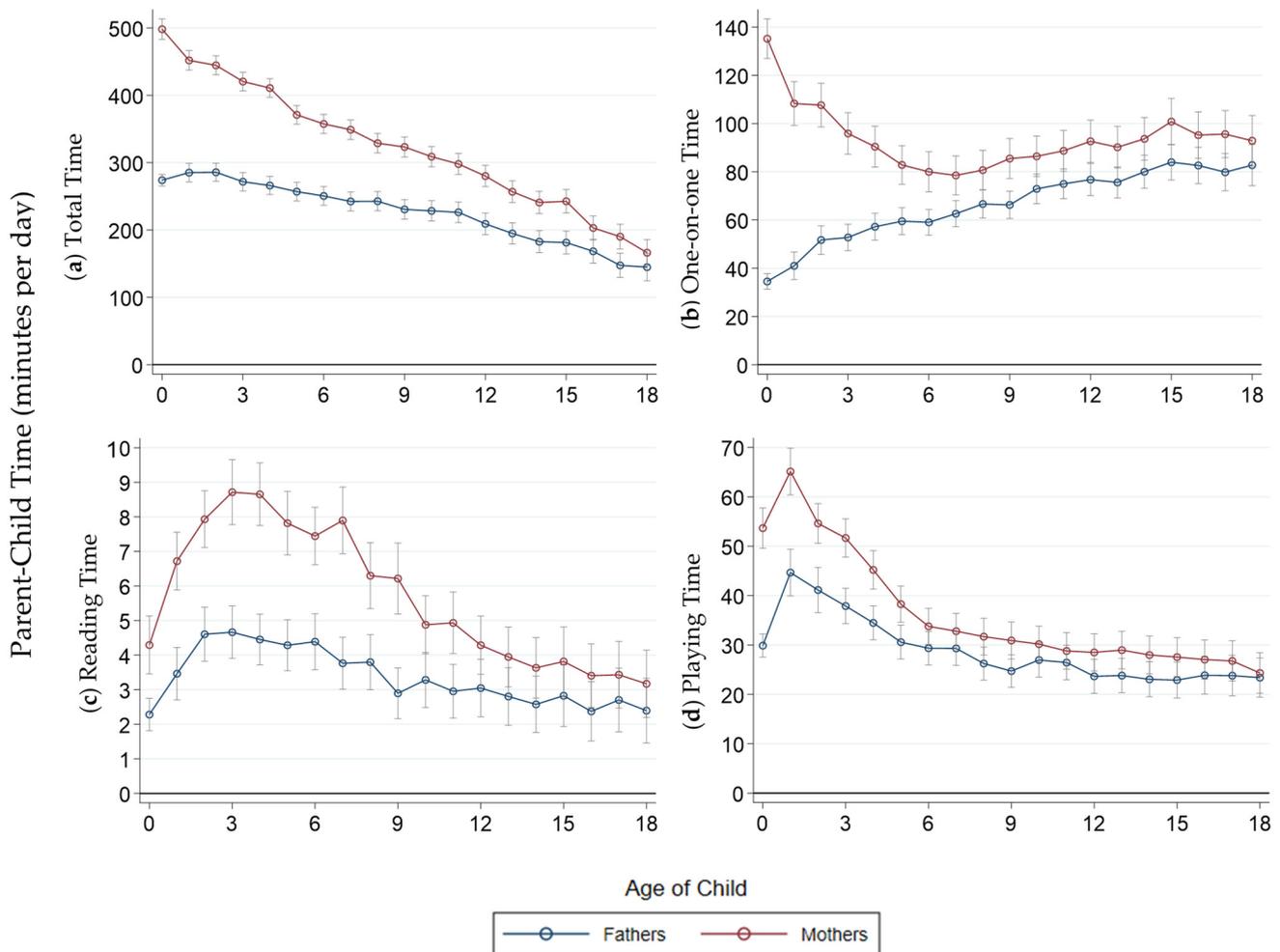


Figure 2. Parent-Child Time Adjusted for Family Characteristics.

Similar to the raw data patterns, Figure 2c shows that fathers' daily reading time with children increased between 0 years and 3 years of age, peaking at 5 min a day. Mothers' reading time also peaked when children were age 3, at 9 min daily. For fathers and mothers, reading time after a child progressed past age 3 gradually declined throughout childhood and adolescence. The gap between fathers and mothers for reading time disappeared by the time children reached age 10, and fathers' and mothers' reading time with children remained similar throughout adolescence. Playing time was highest at age 1, as seen in panel (d) of Figure 2. When children were 1 year old, fathers played with them for an average of 46 min daily, followed by a gradual decline during early childhood to 26 min daily by the time the children were age 8, followed by stable playing time throughout the rest of childhood and adolescence. Mothers' playing time was also higher when the children were 1 year old than during the rest of childhood and adolescence. Mothers' playing time patterns closely mirrored fathers' playing time patterns, with mothers demonstrating higher levels of playing time until children passed the age of 4. When a child was age 4 and older, mothers and fathers spent similar time playing with them. When conceptualizing parent-child play more broadly in line with approaches used in leisure research (Hodge

and Wikle 2021; Wikle and Hodge 2022), Appendix A Figure A1 demonstrates a similar pattern of convergence between mothers and fathers when a child was age 4 and older.

6.3. Birth Cohorts

Our findings were not explained by differences due to a child's birth cohort. First, our main models included controls for children's year of birth to adjust for potential differences across cohorts. Second, as a sensitivity test, we evaluated parental time based on birth cohort, using cohorts of children born in 1995–1999, 2000–2004, and 2005–2009. As seen in Appendix A Figure A2, parent-child time was similar across all cohorts, suggesting that cohort differences were not driving the observed age patterns.

7. Discussion

This paper evaluated patterns in parental time with children throughout childhood and adolescence. Parental time with children impacts children throughout childhood (Attanasio et al. 2020; Breining et al. 2020; Gould et al. 2020) and into adulthood (Bryant et al. 2006; Gertler et al. 2014; Walker et al. 2005). As this study provides a clear description of parental time patterns for both mothers and fathers, we add to research on the importance of a child's age as a contextual factor relating to parent-child time. We draw three main conclusions from this research. First, this research demonstrates that both fathers and mothers make substantial time investments in their children over the entire course of childhood and adolescence. Our findings imply that fathers spend more than a combined 26,000 h with a child between the child's birth and adulthood, while mothers spend nearly 43,000 h with a child during that time frame. Parenting is especially time intensive for the first 5 years of a child's life. In their infancy and early childhood, children require intensive personal and emotional care that lays the foundation for their future development. We did not observe abrupt declines in parental time with children around the onset of elementary school, as some might expect. Instead, we found that total time spent with children declined gradually from year to year, with no sharp drops at the onset of elementary school, middle school, or high school. The continuation of parent involvement likely helps children face new challenges and transition into new situations. Furthermore, the gradual, steady decline in overall parent-child time is consistent with children's gradual need for greater autonomy and independence (Eccles 1999; Steinberg 2020). This research underscores that parents of children of any age spend considerable time providing care and attention to their children.

The second broad takeaway from this research is that fathers' and mothers' time converged as children aged. Prior research suggested that mothers provided more time with children than fathers did (Åman-Back and Björkqvist 2004; Ascigil et al. 2020). Our research is consistent with these prior findings, but the finding masks that most of the difference in parent-child time occurs very early in a child's life. We demonstrated that mothers spent more time with children, primarily during infancy and early childhood. The remarkable narrowing of time differences as children age adds important nuance. For all forms of parent-child time studied in this research, the gap between fathers and mothers disappeared at some point over the course of childhood. Gaps in playing time disappeared by the time children were 5 years old. Reading and one-on-one time converged by the time children were 10 to 11 years old, and differences in total time disappeared by the time children were 16 years old. We found that fathers and mothers remain highly involved in their children's lives and that, at least in terms of parent-child time, their involvement converged rather than diverged as children aged.

Past research has demonstrated the significant and independent benefits to children resulting from the involvement of both mothers and fathers. Our research prompts questions about the extent to which parental time investments at different ages from fathers and mothers optimize the parents' abilities to promote development. For example, mothers provide strong benefit to children in cognitive and verbal domains (Parke 2013), and having mothers provide high levels of time to young children when the children are rapidly developing these skills may benefit children more than if mothers provided this time later in the

developmental course of childhood. Fathers' time with children, on the other hand, can promote social skills, empathy, and the ability to manage unfamiliar situations (Parke 2013). Fathers' contributions in these domains may be most valuable during adolescence as youth expand social networks and increasingly navigate new environments (Steinberg 2020). The convergence of mothers' and fathers' time supports these findings as fathers take on a greater proportion of the parental time as children move through adolescence and approach emerging adulthood. Furthermore, research also suggests that mothers' and fathers' one-on-one time with adolescence have different benefits with mothers' time correlating with lower depression and fathers' time with higher self-worth (Lam et al. 2012); thus, our finding that one-on-one time remains high for both parents suggests important developmental implications of our findings relating to the gendered nature of parental influence on children.

Interestingly, despite stereotypes that fathers play more with children, we found that mothers played with children as much as or more than fathers in terms of absolute measures of time. While fathers devoted a larger fraction of their time playing compared to mothers, this was due to mothers spending more time providing physical care and supervision to children and not due to mothers not engaging in play with their children. The engagement in play by both parents likely contributed to the positive development of their children (Ginsburg 2007; Keown and Palmer 2014; Parke 2013) and the parent-child relationship (Hodge and Wikle 2021). Past research has suggested that high play interactions among fathers may contribute to greater egalitarian friendships between father and child (Parke 2013). Our study suggests that the role of play in developing egalitarian friendships may be less about the absolute amount of play time of parents and children and may be more about the relative share of playtime, considering that mothers and fathers had similar levels of absolute play time in our study. Past research documents the importance of play and leisure as a context for relational development in families (Melton 2017; Zabriskie and McCormick 2001). Our findings demonstrate that parent-child leisure time shifts away from playing to other forms of parent-child leisure as children age. Playing (and shared leisure more generally) remains a significant form of parent-child interaction in adolescence for both mothers and fathers, despite a notable decrease in other forms of parent-child interactions.

The third main takeaway from these results is that even as youths began to spend less time with their parents, parents and children maintained parent-child one-on-one time. Raw data patterns demonstrated steady levels of one-on-one time after children passed the age of 6, and models accounting for observable characteristics predicted increased levels of one-on-one time as children aged. These observations point to one-on-one time as an important and consistent form of parental investment in children throughout childhood and adolescence. Past research speaks to the value of one-on-one time for children's emotional well-being (Lam et al. 2012) and parent-child relational intimacy and development (Larson and Richards 1991; Larson et al. 1996). Our research suggests that as parent-child relationships transform in adolescence (Offer and Offer 1975), parents recognize the helpful role one-on-one time plays in maintaining relationships with children.

Limitations and Future Directions

The ATUS data set facilitated progress in understanding parent-child time as children age, yet limitations of this research remain. The ATUS did not collect time diaries from the perspective of a child, preventing a study of a holistic view of parent-child time by multiple parents. Additionally, although our four measures of parental time usage are meaningful, they are not all-encompassing and can only capture a limited snapshot of parenting behaviors. Our data lacked child-outcome measures, which prevented the further study of age as it interacts with parental time and later child outcomes. Additional data limitations included the cross-sectional nature of the time-diary data. While our cohort analysis provided evidence that cross-sectional approaches are helpful, longitudinal data following the same families over time would further contribute to the understanding of

parent-child time. However, using a cross-sectional approach allowed us to use a very large sample size that offered clear results; although we could not look at levels within specific families, our study provides a strong, meaningful analysis at the population level. Our data only included a limited binary measure of a person's gender, preventing us from exploring patterns among non-binary parents, and this is something that future research could address.

We hope to see future research evaluate children's age gradient for the returns to parental time investments; such studies could inform researchers about the optimal timing of forms of parent-child time, especially as child outcomes related to the efficacy of parental time and the moderating role of a child's age. Our study evaluated average patterns and did not study variation in patterns by family structure. Future research could delineate patterns among single parents, cohabiting parents, married parents, and parents in same-sex relationships. Future research could address the need for in-depth research on parents' perspectives on the time they spend with children. Finally, although family education curricula often promote the value of one-on-one time, surprisingly little research has rigorously evaluated it. Our research points to a need for more research to help understand how one-on-one time in particular relates to positive parenting practices, such as relationship building, attention, and attachment.

This study shed light on the continued importance of parents in children's lives. An important future direction relates to the potential for this research to translate to applied settings to better inform parents. Our research has important implications for child development. Prior research has suggested that parents who understand the impact of their presence often make deliberate efforts to increase their involvement with their children (Monna and Gauthier 2008). Increasing parent awareness about the developmental needs of their children and the types of involvement that meet those needs could empower parents to be more effective in their roles. Educating parents on children's developmental needs and the influence of their presence may be a practical and effective focus for family life education curricula, clinicians, therapists, and others who provide parenting support.

8. Conclusions

Much research addresses the importance of time spent between parents and children, noting the unique needs of different age groups (Attanasio et al. 2020; Breining et al. 2020; Gertler et al. 2014; Gould et al. 2020; Lam et al. 2012; Milkie et al. 2015); this study contributes an important foundation for such research by providing quantitative data and analyses on the amount of time parents spend with a child. This study documented the overall time, one-on-one time, reading time, and playing time parents spend with children ages 0-18. Although each other measure shows consistent, gradual declines across the span of childhood, one-on-one time maintains a meaningful and increasing presence, suggesting a unique need for such interactions as children age. Interestingly, although noteworthy time differences exist between mothers and fathers with young children, these differences disappear as children age, suggesting an ever-changing role of parents as children age.

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Institutional Review Board Statement: Ethical review and approval were waived for this study due to the study being deemed exempt by the Institutional Review Board of Brigham Young University (protocol code 2021-110).

Data Availability Statement: Data used in the study were publicly available and drawn from www.ipums.org, accessed on 3 March 2020.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

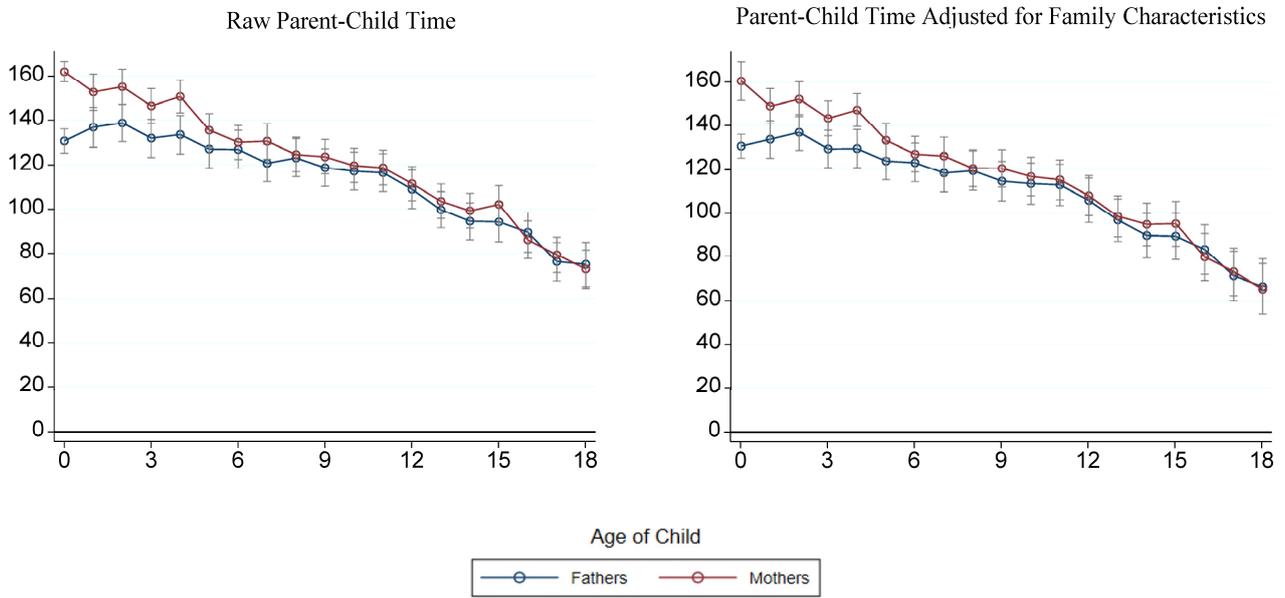


Figure A1. Parental Leisure Time with Children.

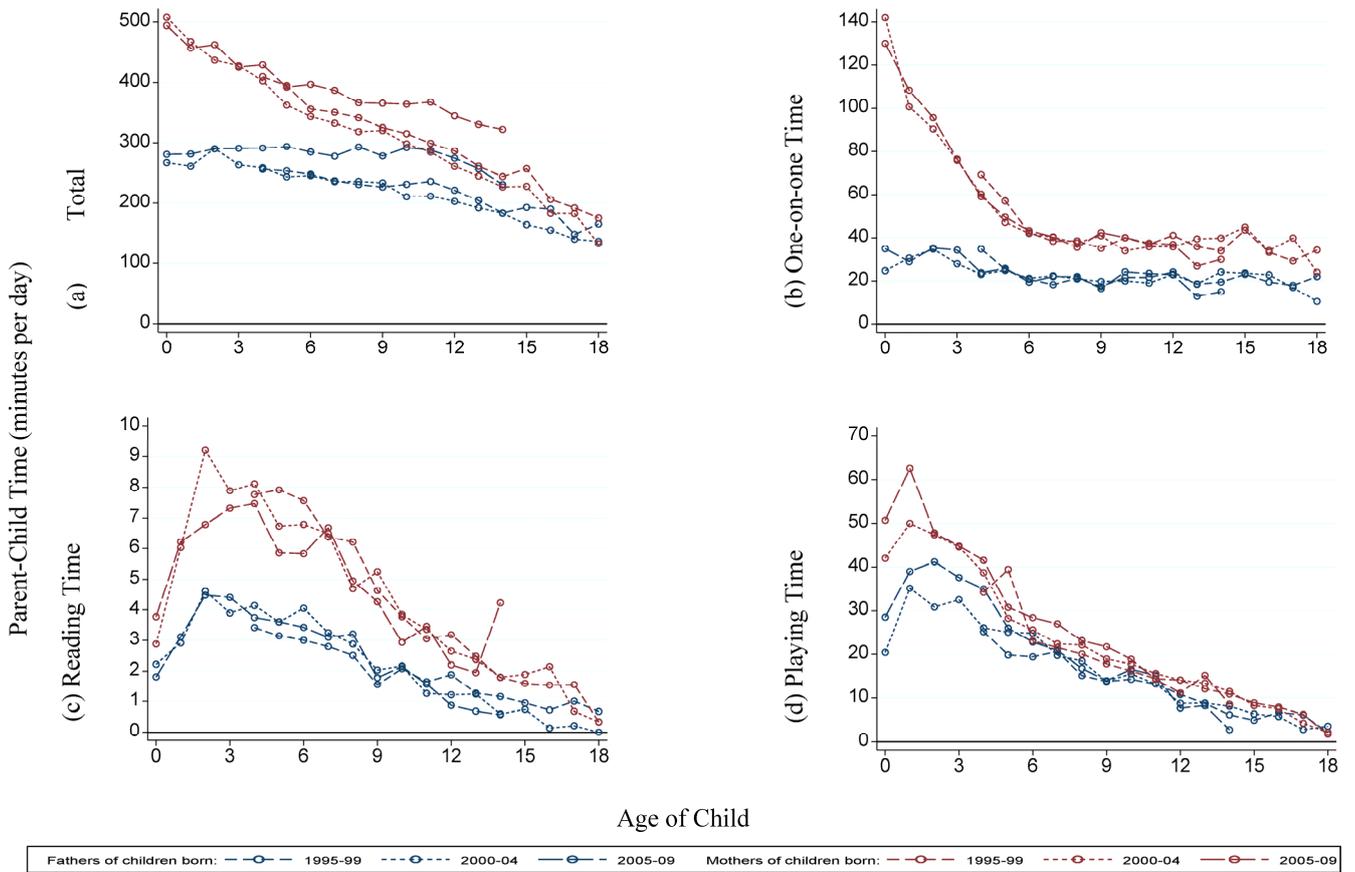


Figure A2. Parent-Child Time, Stratified by Children's Birth Cohorts.

Table A1. Description of the Construction of Parent-Child Time Measures.

	Activity Description	ATUS Activity Codes
Total Time	Any time the parent spends with the focal child.	All activity codes
One-on-one Time	Any time the parent spends with only the focal child and no other people	All activity codes
Reading Time	Reading to or with focal child	030102
Playing Time	Playing with household children not sports, arts and crafts, sports, talking with or listening to, attending children's events	030103-30106, 030110

Table A2. Cell Sizes.

Groups	N	Father Respondent	Mother Respondent
Child Age			
Age 0	6963	2974	3989
Age 1	7886	3327	4559
Age 2	8047	3442	4605
Age 3	8373	3534	4839
Age 4	8525	3557	4968
Age 5	8564	3607	4957
Age 6	8816	3670	5146
Age 7	8959	3759	5200
Age 8	8912	3723	5189
Age 9	9224	3880	5344
Age 10	8835	3761	5074
Age 11	8831	3766	5065
Age 12	8611	3540	5071
Age 13	8488	3627	4861
Age 14	8241	3447	4794
Age 15	6350	2785	3565
Age 16	5643	2482	3161
Age 17	5540	2461	3079
Age 18	3768	1580	2188

Note. Data are from the American Time Use Survey, 2003–2019.

Table A3. Parental Time Investments.

	Fathers		Mothers	
	Mean	S.D.	Mean	S.D.
	N = 62,922		N = 85,654	
<i>Parental Time Investments (minuets per day)</i>				
Total time	217.64	227.02	314.95 ***	248.21
One-on-one time	23.78	75.71	53.66 ***	113.55
Reading time	2.39	12.28	4.50 ***	18.17
Playing time	13.77	47.16	16.02 ***	50.40

Note. Data are from the American Time Use Survey, 2003–2019. *** $p \leq 0.001$.

Table A4. OLS Prediction of Parent-Child Time, Parent-Child Dyads (N = 148,576).

	Total Time	One-on-One Time	Reading Time	Playing Time
Mother	224.18 *** (7.73)	100.67 *** (4.17)	2.01 *** (0.43)	23.80 *** (2.07)
Child Age 0 (reference)	–	–	–	–
Child Age 1	11.17 (7.05)	6.50 * (2.90)	1.18 ** (0.39)	14.77 *** (2.41)
Child Age 2	11.66 (6.81)	17.20 *** (3.02)	2.32 *** (0.40)	11.21 *** (2.33)
Child Age 3	–2.46 (6.98)	18.28 *** (2.78)	2.38 *** (0.39)	7.94 *** (1.83)
Child Age 4	–8.13 (6.86)	22.72 *** (2.84)	2.16 *** (0.37)	4.52 ** (1.75)
Child Age 5	–17.29 * (7.08)	25.01 *** (2.85)	1.99 *** (0.38)	0.59 (1.75)
Child Age 6	–23.73 *** (7.04)	24.56 *** (2.71)	2.10 *** (0.41)	–0.65 (1.74)
Child Age 7	–31.89 *** (7.14)	28.13 *** (2.76)	1.47 *** (0.38)	–0.70 (1.76)
Child Age 8	–31.58 *** (7.24)	32.16 *** (2.97)	1.50 *** (0.41)	–3.78 * (1.71)
Child Age 9	–43.79 *** (7.45)	31.79 *** (2.90)	0.60 (0.37)	–5.32 ** (1.68)
Child Age 10	–46.00 *** (7.64)	38.44 *** (3.12)	0.98 * (0.41)	–3.09 (1.76)
Child Age 11	–48.16 *** (7.76)	40.52 *** (3.15)	0.65 (0.40)	–3.62 * (1.79)
Child Age 12	–65.34 *** (8.14)	42.29 *** (3.39)	0.74 (0.42)	–6.42 *** (1.76)
Child Age 13	–79.63 *** (8.00)	41.12 *** (3.29)	0.50 (0.43)	–6.28 *** (1.78)
Child Age 14	–91.92 *** (8.34)	45.55 *** (3.51)	0.27 (0.42)	–7.06 *** (1.81)
Child Age 15	–93.28 *** (8.73)	49.50 *** (3.75)	0.52 (0.46)	–7.23 *** (1.86)
Child Age 16	–106.29 *** (9.01)	48.16 *** (3.85)	0.06 (0.44)	–6.28 ** (1.94)
Child Age 17	–127.27 *** (9.13)	45.37 *** (3.93)	0.39 (0.47)	–6.36 ** (2.09)
Child Age 18	–129.97 *** (10.40)	48.30 *** (4.36)	0.08 (0.48)	–6.78 *** (2.03)
Mother * Child Age 1	–57.48 *** (10.18)	–33.36 *** (5.45)	1.24* (0.58)	–3.34 (3.40)
Mother * Child Age 2	–65.39 *** (9.76)	–44.74 *** (5.47)	1.32* (0.57)	–10.32 *** (3.09)
Mother * Child Age 3	–75.37 *** (9.64)	–57.56 *** (5.12)	2.04 *** (0.60)	–10.02 *** (2.64)
Mother * Child Age 4	–79.44 *** (9.46)	–67.47 *** (5.04)	2.19 *** (0.58)	–13.07 *** (2.58)
Mother * Child Age 5	–110.10 *** (9.41)	–77.33 *** (4.77)	1.52 ** (0.59)	–16.10 *** (2.47)

Table A4. Cont.

	Total Time	One-on-One Time	Reading Time	Playing Time
Mother * Child Age 6	−117.17 *** (9.34)	−79.74 *** (4.74)	1.04 (0.57)	−19.37 *** (2.42)
Mother * Child Age 7	−117.71 *** (9.31)	−84.78 *** (4.56)	2.12 *** (0.60)	−20.31 *** (2.38)
Mother * Child Age 8	−138.09 *** (9.19)	−86.61 *** (4.64)	0.49 (0.60)	−18.36 *** (2.37)
Mother * Child Age 9	−131.48 *** (9.36)	−81.45 *** (4.58)	1.31* (0.59)	−17.61 *** (2.33)
Mother * Child Age 10	−143.68 *** (9.30)	−87.17 *** (4.60)	−0.42 (0.53)	−20.58 *** (2.32)
Mother * Child Age 11	−152.46 *** (9.34)	−86.96 *** (4.56)	−0.03 (0.54)	−21.46 *** (2.33)
Mother * Child Age 12	−153.22 *** (9.47)	−84.79 *** (4.73)	−0.77 (0.53)	−18.95 *** (2.28)
Mother * Child Age 13	−162.29 *** (9.21)	−86.07 *** (4.47)	−0.87 (0.54)	−18.64 *** (2.26)
Mother * Child Age 14	−165.99 *** (9.24)	−87.01 *** (4.57)	−0.95 (0.51)	−18.87 *** (2.23)
Mother * Child Age 15	−162.91 *** (9.85)	−83.84 *** (4.98)	−1.02 (0.59)	−19.15 *** (2.25)
Mother * Child Age 16	−189.45 *** (9.68)	−88.08 *** (4.87)	−0.98 (0.50)	−20.62 *** (2.27)
Mother * Child Age 17	−181.55 *** (9.51)	−84.89 *** (4.81)	−1.28 * (0.54)	−20.83 *** (2.25)
Mother * Child Age 18	−202.70 *** (10.70)	−90.56 *** (5.30)	−1.23 * (0.51)	−22.86 *** (2.17)
Hispanic Parent	5.05 (2.93)	−4.99 *** (0.96)	−1.90 *** (0.18)	−5.98 *** (0.74)
Black, non-Hispanic Parent	−41.71 *** (3.27)	−1.58 (1.21)	−1.04 *** (0.22)	−8.79 *** (0.78)
Asian Parent	1.97 (4.11)	−1.97 (1.46)	0.55 (0.34)	−2.22 * (0.97)
Foreign born Parent	15.31 ** (4.66)	1.85 (1.56)	0.48 (0.29)	1.71 (0.96)
Youngest Child	−18.84 *** (2.06)	36.42 *** (0.91)	−0.04 (0.13)	−4.69 *** (0.50)
Middle Child	−11.49 *** (1.73)	12.78 *** (0.75)	−0.32 ** (0.10)	−0.47 (0.40)
Parent is married	64.39 *** (2.84)	−7.93 *** (1.03)	1.16 *** (0.17)	6.16 *** (0.70)
Age of oldest household parent	−0.04 (0.16)	0.38 *** (0.06)	0.08 *** (0.01)	0.12 ** (0.04)
No high school degree	9.20 * (4.58)	−4.53 ** (1.48)	−0.84 ** (0.30)	−2.72 * (1.11)
High school degree	−3.57 (2.72)	−2.53 ** (0.94)	−1.21 *** (0.17)	−2.97 *** (0.70)
One household parent works full time	−37.64 *** (4.09)	−5.52 *** (1.52)	−0.32 (0.29)	−2.71 ** (1.03)
Dual earner household	−35.28 *** (2.13)	−8.42 *** (0.68)	−1.00 *** (0.15)	−5.70 *** (0.54)
Household income	−0.00 *** (0.00)	−0.00 *** (0.00)	0.00 *** (0.00)	0.00 *** (0.00)
Number of children in family	4.70 ** (1.47)	−13.91 *** (0.47)	0.28 * (0.13)	−0.38 (0.31)

Table A4. Cont.

	Total Time	One-on-One Time	Reading Time	Playing Time
Average age of children in family	−2.38 *** (0.45)	−3.48 *** (0.21)	−0.21 *** (0.03)	−1.76 *** (0.10)
St. Dev. Of age of children in family	−1.03 (0.62)	−0.16 (0.21)	−0.23 *** (0.04)	−0.88 *** (0.15)
Percent female of children in family	2.83 (2.38)	0.68 (1.00)	0.04 (0.16)	−2.30 *** (0.63)
Mean (Fathers of Child Age 0)	274.00 *** (4.41)	34.51 *** (1.63)	2.28 *** (0.24)	27.60 *** (1.17)

Data: American Time Use Survey, 2003–2019. * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$.

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