Mothers' Time, the Parenting Package, and Links to Healthy Child Development

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ABSTRACT. Assumptions about the importance of mothers' time for children's healthy development permeate policy debates over child care, maternal employment, and family leave. Studies consistently show that mothers' time in particular activities with children relate positively to indicators of child well-being, but results are more mixed regarding associations between child outcomes and the sheer amount of time that mothers spend with children. Using time diary and survey data from the Panel Study of Income Dynamics Child Development Supplement (1997, N = 1,973), we ask whether the benefits of mothers' time may be mediated or moderated by other aspects of the parenting package. We find that mothers' time directly engaged with children is modestly associated with improvements in children's behavioral and cognitive outcomes, but that indicators of parenting quality and socioeconomic status fully account for associations. Further, there is little evidence that associations vary across these indicators.

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Studies have long demonstrated the importance of mothers' time investments for healthy child development. These have often relied on parents' reports of usual time in specific activities, such as reading to a child, eating dinner together, talking, or helping with homework (Amato and Rivera 1999; Astone and McLanahan 1991; Musick and Meier 2012). Time diary data similarly show that "quality" time, for example, in educational activities with children, is strongly linked to child well-being (Fiorini and Keane 2014; Hsin and Felfe 2014; Raley 2014). Studies assessing the total amount of time parents spend engaged in activities with children come to weaker or more mixed results (Hofferth 2006a; Milkie, Nomaguchi and Denny 2015). On the face of it, this is a somewhat puzzling finding; for example, given the importance of mother-child interaction for language development and socialization in early childhood (Hoff 2003), shouldn't the sum total of mothers' time be associated with child development?

In this paper, we examine links between mothers' time with children, other parenting resources, and children's behavioral and cognitive development. Whereas prior research has focused on specific kinds of activities as a way of tapping quality, we focus instead on features of the family context in which activities take place. We explore two propositions: first that the quantity of mothers' time is one piece of a parenting package that correlates with healthy child development, and that accounting for other pieces of that package may explain the weak associations of maternal time and child outcomes found in prior work. Second, we posit that the benefits of mothers' time interact with parenting resources, namely, that the benefits of mothers' time may be greater in the context of high levels of parenting and financial resources. We use

data from a nationally representative sample of approximately 2,000 children coupled with survey responses from their mothers obtained in 1997 as part of the Panel Study of Income Dynamics Child Development Supplement (PSID-CDS). The PSID-CDS is the predominant source of data on children's time use in the United States. It is nested in a panel survey rich with information on child well-being and family context, making it a unique source for understanding how mothers' investments of time and other resources play into child development.

BACKGROUND

Time diary studies suggest that links between mothers' time and children's well-being depend on the activity. In a nationally representative sample of Australian children, Fiorini and Keane (2014) found that parents' time in educational activities with children was predictive of children's improved cognitive skills, but not behavioral problems. Analyses of the PSID-CDS also found positive associations between mothers' time in educational activities and cognitive and behavioral development (Hsin and Felfe 2014; Raley 2014). Hsin and Felfe (2014) further reported that not all types of maternal time benefit children. In particular, time in unstructured activities (like watching TV or playing video games) was *detrimental* to child development. In this context, perhaps it is not surprising that the quantity of mothers' time with children was not associated with children's cognitive or socioemotional attributes (although it was related to less risk-taking among adolescents), net of socioeconomic factors and other controls (Milkie et al. 2015). In sum, existing research suggests that the *quantity* of parents' time with children matters less than the *quality*, as measured in these studies by the kinds of activities parents engage in with children.

Prompted in part by Lareau's (2011) qualitative account of critical social class differences in how parents structure time with children, time diary studies have provided detailed

assessments of the ways in which mothers' time varies by education. Ample evidence demonstrates that more educated mothers spend more time with their children, and they spend it in ways that are more supportive of healthy child development (Guryan, Hurst and Kearney 2008; Kalil, Ryan and Corey 2012; Raley 2014). Maternal education also interacts with mothers' time in predicting child outcomes (Fiorini and Keane 2014; Hsin 2006; Hsin 2009). Hsin (2006; 2009) found that time with mothers in early childhood was associated with higher verbal achievement among school-aged children, but only when those mothers had high verbal achievement themselves. Hsin speculated that parents with higher verbal achievement engaged with children in ways that fostered early learning and school readiness. The notion that mothers' time depends on the quality of parent-child interactions is a compelling one that should extend to other aspects of the family environment.

We suspect that other parenting resources also cluster with time investments in ways that promote child development, although beyond education and employment (e.g., Bianchi 2000), we know of little research linking maternal time to family context. Children's cognitive and behavioral development is supported by socioeconomic resources such as education and income (Duncan, Ziol-Guest and Kalil 2010) and parenting practices such an engagement and warmth (Baumrind 1991; Fiorini and Keane 2014; Musick and Meier 2010, 2012). Children's health and well-being are negatively associated with maternal distress (Kiernan and Huerta 2008; Meadows, McLanahan and Brooks-Gunn 2007).

Many of the factors contributing to children's healthy development are overlapping and mutually reinforcing (Furstenberg 2011). Coleman's (1988) theory of social capital explicitly recognizes the importance of parental involvement for the transmission of parental resources. In this vein, Meier and Musick (2014) reported that the benefits of mealtime depended on the nature

of family relationships, finding that family dinners had little benefit when parent–child relationships were weak but contributed to fewer depressive symptoms and less delinquency among adolescents when family relationships were strong. Other studies have found mixed or null evidence of interactions between parenting and indicators of family structure and status (Amato and Fowler 2002; Berger and McLanahan 2015; Kalmijn forthcoming).

We explore how mothers' time is linked to other parenting and financial resources, and in turn how this parenting package relates to children's behavioral and cognitive outcomes. We also test the idea that mothers' time may interact with family context, for example, proving more beneficial at higher levels of parenting quality. We contribute to ongoing discussions of the importance of mothers' time by looking at how quality time—defined here not by specific activities but by features of the family context in which activities take place—may mediate or moderate links to child well-being. We focus on mothers because of the emphasis on maternal time in the literature and popular press, and because it is here where we might expect the strongest associations to emerge (Hays 1996; Villalobos 2014; Warner 2006). We pay attention throughout to potential differences in the processes predicting behavioral and cognitive outcomes. Prior research, for example, shows that children's behavior is more sensitive to family structure and parenting style, whereas academic outcomes are more highly correlated with socioeconomic resources and parental time in educational activites (Fiorini and Keane 2014; Hofferth 2006a).

Below, we: 1) describe how parenting quality and socioeconomic resources vary across the distribution of mothers' time engaged in activities with children; 2) assess the extent to which parenting is associated with children's behavioral and cognitive development, with and without

controls for parenting and financial resources; 3) test the idea that mothers' time matters more at higher levels of parenting quality and socioeconomic status.

Data and Methods

Data

We used data from the Panel Study of Income Dynamics-Child Development Supplement (CDS). CDS began in 1997 as a cohort study of children aged 0-12 years in a nationally-representative sample of U.S. families. Up to two age-eligible children per household were randomly selected to participate. Children and their families were re-interviewed in 2002 and 2007; however, our analysis uses information from wave 1 only. Children's primary and secondary caregivers completed survey interviews about the child and the child's household, and primary caregivers (usually the child's mother) completed a standardized reading assessment. Nonresident parents were also interviewed. Children 3 years and older completed a battery of cognitive assessments, and 24-hour time diaries from two days were collected for all participating children. All interviews and assessments were completed in-person, and interviewers helped children and caregivers to complete and edit time diaries during the home visit. Eighty-eight percent of eligible families in the Panel Study of Income Dynamics sample participated at wave I (N=3,563 children in 2,380 families), and 82 percent of participating children submitted completed time diaries (N=2,904 children in 1,966 families).

Time diaries. Children were assigned one random weekday and one weekend day during which to record all activities from midnight to midnight. All children within a household were assigned the same diary days. Diaries were most often completed by the caregiver alone or the caregiver and child together, although some were completed by older children alone. In addition to recording the nature of each activity, the diary also recorded the location of the activity, who

else was present, whether those present were actively engaged in the activity, and whether the child was engaged in any secondary activity at the same time. Reporters recorded the start and end times of each activity. After the field interviewer's initial review and edit, time diaries were returned to the University of Michigan for further cleaning and coding. The codeframe includes categories for children's educational activities, work, sport and recreation, leisure, media use, organized activities, and social activities, among many others.

The public release data files include a separate record of each activity in which a child was engaged. Across records for each day, time sums to 24 hours and can be aggregated into time in particular activities, time with a particular individual, or some combination. We use these records to construct two mutually exclusive measures of children's time in activities with mothers: the total time when a mother was directly engaged with her child (e.g., eating dinner together, reading a book together) in a day; and the total time when the mother was present but not directly engaged (e.g., child completing homework while mother paid bills) in a day. Following Milkie et al. (2015), we refer to these as "engaged" and "accessible" time. Time is reported in seconds in the public-use data file. For ease of interpretation, we converted time to hours. Following extant literature, we used these measures to construct a synthetic week of time use. Specifically, we multiplied the number of weekday hours by 5 to estimate the total number of hours a mother was present with her child on weekdays in a given week. Similarly, we multiplied the number of weekend hours by 2 to approximate total weekend hours mothers were with children in a given week. We summed these two figures to construct estimated weekly totals of engaged and accessible time. The theoretical range for each measure is 0 to 168 hours. (Note that for any child, these mutually exclusive measures cannot add up to more than 168 hours.) The observed ranges in our analytic sample were 0 to 92.7 hours for mother's engaged

time and 0 to 86 hours for mother's time when she was accessible. Because our synthetic week requires data from both weekday and weekend days, we exclude children who did not provide diaries for both days from our analysis (N=67).

Some notes about the time diary data are in order. First, these measures do not exhaustively account for the child's or mother's time; in most cases, the child and mother spend some part of each day apart (e.g., while a child sleeps in his or her own bedroom or while the child is at day care or school). Our analysis does not account for how children's other time is expended. Corollary to this, the diaries are child-focused and so do not account for a mother's time when she is not with her child. That is, a mother's time is only observed when she is present with her child, whether or not she is engaged in the child's activity. Thus, to the extent that time spent independently by the child or the mother influences both the quantity of the time they spend together and the child outcomes we consider, our statistical models imprecisely estimate the association between observed time together and child development. We also note that the time diaries capture a thin slice of children's daily lives. The use of data from only two days may inadvertently treat as typical those activities that were actually aberrant, such as caregiving during a sick day, activities on a vacation day, or an occasion when a parent traveled away from home for work. This limited view also cannot account for routine variation in caregiving and activities during a normal week. These two factors may contribute to statistically inefficient estimates of time use, yielding conservative estimates of the association between mothers' time with children and children's well-being. We expect, however, that the assignment of random time diary days to a population-representative sample should produce a description of time use that is indicative of what most people do most of the time. To test this assertion, we controlled

for the time diary reporter's assessment of the typicality of the day in our analytic models and report on sensitivity tests restricted to children whose days were described as "very typical."

Children's behavioral and cognitive development. For children who were three years or older, we used two measures of child behavior reported by the child's primary caregiver (nearly always the mother in our restricted sample) in response to the 30-item Behavior Problems Index (BPI, Peterson and Zill 1986) derived from the Achenbach Child Behavior Checklist: externalizing behavior and internalizing behavior problems. Externalizing behavior is defined as behavior that is disruptive, aggressive, or destructive, and is characterized by low self-regulation. In contrast, internalizing behavior is characterized by expressions of withdrawn, sad, fearful, or anxious feelings or behavior. It is predictive of clinical diagnoses of anxiety and depression. The BPI includes 16 questions pertaining to externalizing behavior (alpha=.86) and 13 items pertaining to internalizing behavior (alpha=.81). (One item overlaps between the two subscales. Two items were not used in creating these subscales but contribute to the total behavior problems scale, which is not used here.) Examples of externalizing behavior indicators include "[CHILD] argues too much" and "[CHILD] bullies or is cruel or mean to others." Examples of internalizing behavior indicators include "[CHILD] feels or complains that no one loves him/her" and "[CHILD] is too fearful or anxious." Children's externalizing behavior is based on a summed score of items included in the Behavior Problems Index. For each item, caregivers indicated whether the behavior is "never true (1)," "sometimes true (2)," or "often true (3)" of the child. Scores on each item are converted to a dichotomous variable coded 1 where the behavior is sometimes or often true for the child, 0 otherwise. These items were summed into separate scales for externalizing and internalizing behavior problems.

Cognitive achievement was measured by the child's performance on three standardized assessments included in the Woodcock Johnson-Revised Tests of Achievement. The Letter-Word assessment (ages 3+) reflects children's skill in recognizing and pronouncing written words. The Passage Comprehension assessment (ages 6+) measures reading comprehension, including skills in word choice, syntax, and inference. The Applied Problems assessment (ages 3+) evaluates quantitative reasoning skills through exercises including diagrams and word problems. Children's scores on each assessment are age-normed and standardized to have a mean of 100 and a standard deviation of 15.

We incorporated three measures of *parenting* quality. The *cognitive stimulation* and *emotional support* subscales from the Home Observations for Measurement of the Environment HOME) Inventory -Short Form (Caldwell and Bradley 2003) include caregiver reports of material resources in the household and the nature and content of usual caregiver activities as well as interviewer observations of the home environment and caregiver-child interactions. The cognitive subscale includes 27 age-specific items pertaining to the frequency of caregiver-child outings, the availability of reading material in the home, the caregiver's attitude and support for child learning, and interviewer observations of children's access to stimulating toys and games during the home visit. The emotional subscale includes 29 age-specific items addressing the frequency of family activities like shared meals and play, the frequency of conversation and verbal and physical expressions of affection or harsh parenting, caregiver support for children's independent decision making and activities, and the interviewer's assessment of positive and negative dialogue and emotional engagement with the child during the home visit. The primary caregiver's *psychological distress* is measured by her responses to the K-6 Nonspecific Psychological Distress Scale (see Kessler et al. 2003). The K-6 included six questions

concerning frequency of primary caregivers' distressed feelings during the preceding four weeks, including sadness, nervousness, and worthlessness. Responses on a 5-point scale range from "none of the time" (0) to "all of the time" (4). Scores were summed and converted to a dichotomous indicator, with values between 7 and 20 were regarded as indicative of at least moderate psychological distress.

We included four indicators of socioeconomic status and household structure. *Income to needs* is measured as the ratio between total household income in the preceding year (1996) divided by the federal poverty threshold for the number of people residing in the household that year. (Because our measures of household income and membership do not take relatedness into account, this should not be treated as a formal measure of poverty status in the child's family.) The continuous income-to-needs ratio was converted to a four-category variable that is dummied out in our multivariate regression models: Household income below the poverty threshold; between 100 and 199 percent of the threshold; between 200 and 399 percent; or 400 percent or more of the poverty threshold. The primary caregiver's self-reported years of education was also converted to a four-category measure of *educational attainment*: fewer than 12 years (i.e., less than a high school diploma), 12 years (high school diploma); 13 to 15 years (some college); and 16 years or more (4-year college degree or higher). The primary caregiver's *union status* at the time of the CDS interview was measured as single, cohabiting, or married. Family structure was represented by whether the child's *biological father* was in the household and the *number of siblings* (full, half, or step) in the household. All models also controlled for the child's race/ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, or other race/ethnicity), the age of the child at his/her interview and the age of the primary caregiver at the 1997 core PSID interview; the child's gender; the average typicality of the two diary days; and whether the

primary caregiver was involved in completing the time diary compared to the child completing the diary alone.

Our analytic sample excluded children not residing with their biological or adoptive mother (N=100); children who did not complete both the weekday and weekend diary (N=67); children younger than 3, for whom no cognitive achievement or behavior problems data were collected (N=645); and older children who had missing values on all of the dependent variables (N=22). Our sample sizes range from 1,257 in models predicting a child's standardized score on the Passage Comprehension assessment (children 6 and older) to 1,958 in models predicting externalizing behavior.

Methods

Our multivariate modeling approach proceeds in four steps. For each indicator of child development, we present a baseline model predicting the outcome as a function of mother's engaged time and accessible time and a set of control variables including race/ethnicity, child and parent age, child gender, the average typicality of the diary days, and whether the mother completed or helped to complete the time diary. The second model introduces socioeconomic resources, household structure and measures of parenting resources. The final model includes an interaction term between mother's engaged time and the HOME emotional support subscale, which was significantly associated with three of the five outcome measures.

The externalizing and internalizing subscales are positively skewed, with the variance exceeding the mean for each variable. Because of this, we use multivariate negative binomial regression to estimate predicted values for those outcomes. We use ordinary least squares regressions in models predicting children's cognitive achievement scores.

For most independent variables, the amount of missing data was trivial – fewer than 10 cases for child age and race/ethnicity and mother's union status. Maternal education was missing for 82 cases. However, information on maternal psychological distress was missing for approximately 30 percent of cases in the analytic sample. At the first wave of CDS, the K-6 scale was included in a self-administered questionnaire that had a lower response rate overall compared to other study components. Correlation analyses indicate that missingness on the psychological distress measures was independent of missingness on other variables in our analytic model, suggesting that an independent process generated nonresponse on the segment of the questionnaire in which the K6 scale was embedded (i.e., data are missing at random with respect to other information in the statistical model). We used multiple imputation to recover cases with missing values on the K6 scale and other independent variables and to maintain the representativeness of the analytic sample. We employed the the *mi* suite of commands in Stata 13 to specify a multivariate normal approach to imputation, requesting 10 imputed datasets each with 300 iterations. Contents of the imputation model included dependent variables, the independent variables included in our full model (except interaction terms), scores on analogous outcome measures from the second wave of the study, measures of maternal psychological well-being from the 1999 and 2001 core PSID interviews, survey design variables including the probability weight and an indicator of whether the household was included in the 1997 immigrant refresher, and indicators of maternal warmth, parental conflict, and parenting stress reported at wave 1. Analyses of the imputed dataset indicate that imputed variables achieved a stationary distribution over successive iterations. Note that we do not use any cases with imputed values on the dependent variables in the analytic models described below.

Results

Descriptive patterns

Table 1 shows mean scores and standard errors for our measures of outcomes, parenting resources, social status indicators, and controls for children who are low, medium, and high on the amount of time they spend engaged in an activity with their mother (as measured by engaged time in the bottom 25th, middle 50, and top 25th percentile of the distribution). Bivariate associations between mothers' engaged time and children's behavioral and cognitive outcomes are weak and not always in the expected direction: mothers' engaged time is associated with fewer internalizing problems and higher scores on passage comprehension, but it is also associated with lower scores on applied problems. Associations with externalizing behaviors and the letter-word assessment are not statistically significant.

Bivariate associations between mothers' engaged time and other key variables are stronger and more in line with expectations. Mothers who rank high on engaged time (in the top 25^{th} percentile) also score high on the cognitive stimulation and emotional support scales and low on maternal distress. In terms of more structural resources, mothers who rank low on engaged time (in the bottom 25^{th} percentile) are disproportionately among the least educated. Perhaps not surprisingly given some inevitability of time trade-offs, engaged time is also lower among employed women and those with more children in the household. Although patterns are as expected, we find no statistically significant variation in mothers' time by income or family structure. Overall, descriptives suggest that time is indeed part of a parenting package: more engaged time is associated with other aspects of parenting resources and social status that reinforce positive child outcomes.

Multivariate findings

Tables 2 and 3 show results of models regressing children's behavioral and cognitive outcomes on mothers' time with children: M1 includes basic sociodemographic controls, M2 adds parenting resources and social status, and M3 adds an interaction between mothers' engaged time and emotional support. We tested a series of interactions between mothers' engaged time and indicators of parenting resources and social status, guided by the notion that the link between mothers' time and child outcomes should depend on the nature of maternal time and potentially other features of the family environment. With the exception of emotional support, we found no consistent moderating role of parenting resources or social status. We thus show results only for the interaction between mothers' time and emotional support.

Negative binomial regressions for counts of externalizing and internalizing problems are presented in Table 2. Coefficients may be exponentiated to produce the expected percentage change in the value of the dependent variable associated with a one-unit change in the value of the independent variable. We find a marginally statistically significant association ($p<.10$) between mothers' engaged time and externalizing behaviors, net of basic demographic controls (M1); there is no evidence of an association between accessible time and child externalizing behavior. When we add parenting resources and social status (M2), the marginally significant coefficient on engaged time drops to insignificance. Scores on the cognitive stimulation scale are negatively associated with children's externalizing behavior, and maternal psychological distress is positively associated. The interaction between mothers' engaged time and emotional support is statistically significant and negative, indicating that mothers' time is associated with reduced externalizing problems when emotional support is high. We find no evidence of a link between mothers' time and internalizing problems; the baseline association is not statistically significant (M1), nor are interactions between mothers' time and parenting resources (M3). Of the parenting

resources, only maternal distress is associated (positively) associated with internalizing behavior. Higher income is associated both with reduced externalizing and internalizing problems.

Table 3 shows ordinary least squares regressions predicting children's cognitive achievement as a function of maternal time. For two of the three outcomes, and net of basic demographic controls (M1), we find an association between mothers' engaged (but not accessible) time and cognitive scores: mothers' engaged time is associated with higher scores on letter-word and passage comprehension assessments. These associations drop in magnitude and become statistically insignificant once parenting resources and social status are controlled (M2). The null association between mothers' engaged time and applied problems, however, *becomes statistically significant* with parenting resources and social status in the model, and contrary to expectation, the association is *negative*. As expected, the HOME cognitive stimulation score is positively associated with all three cognitive assessments (M2). Maternal distress is *not* statistically significant in any of the cognitive achievement models (in contrast to our finding that maternal distress was associated with behavior problems). Emotional support is positively associated with applied problems only. The interaction between time and emotional support is statistically significant and in the expected direction for applied problems. It is also marginally significant for letter-word scores, at $p<.10$. In a similar vein as above, this indicates that mothers' time is associated with better child outcomes when emotional support is high. Higher maternal education and fewer siblings are strongly associated with better scores across assessments; higher income is associated with higher letter-word and applied problem scores.

What do these results indicate about the substantive significance of mothers' engaged time? Here we take scores on the letter-word assessment as an example. In the baseline model (M1), the coefficient on mothers' engaged time is about 0.10. Going from low levels of engaged

time (10 hours per week, approximately the bottom 25th percentile) to high levels of engaged time (30 hours per week, approximately the 75th percentile) is associated with an increase of 2 points on the letter-word assessment (10 x 0.10 subtracted from 30 x 0.10). This is less than 15% of a standard deviation on the letter-word assessment (*std dev* = 15). The association between time and the letter-word assessment is about the same magnitude as that between cognitive stimulation and children's letter-word scores, although in a model with a much fuller set of controls (in M2, the coefficient on engaged time drops to statistical insignificance): A one-point increase on the cognitive stimulation scale is associated with about a one-point change in the letter-word assessment (0.87, M2), and the distance between the 25th and 75th percentiles of the cognitive stimulation scale is approximately 2 points. The magnitude of the association of engaged time (in the baseline model) is much smaller relative to socioeconomic resources; for example, children whose mothers are college (vs. high school) graduates score an average of 6.7 additional points on the letter-word assessment (M2). The interaction term between engaged time and emotional support is positively signed, suggesting that children achieve higher test scores where engaged time and emotional support are both higher than average. Main associations, however, are negatively signed (although not statistically significant), resulting in negative estimates of time's association with letter-word scores across the time distribution.

In sum, we find mixed evidence that the sheer amount of mothers' engaged time is associated with better child outcomes, as measured by reduced behavioral problems and higher cognitive test scores. Net of basic controls, mothers' engaged time is associated with 3 of our 5 outcomes. Engaged time is associated with other pieces of the parenting package that are in turn associated with positive child development, e.g., higher cognitive stimulation, emotional support, and maternal education and lower maternal distress. All associations with improved child well-

being are accounted for by controls for parenting resources and social status. The idea that the link between mothers' time and child outcomes would be moderated by parenting resources and social status received only limited support: only interactions with emotional support were consistently associated with child outcomes. And although interaction terms are in the expected directions, main associations are not. The substantive significance of the interactions terms is small and the interpretation is not straightforward.

Supplementary analyses

We tested alternative specifications of time and sample restrictions to assess the robustness of our results. Alternative specifications included mother's time with child when she was the only adult present compared to mother's time when a spouse/partner was also present; and mother's time with the focal child alone compared to time when siblings or other children were also present. We conjectured that mother's time with children when also shared with a spouse or partner might be indicative of co-parenting, leisure time, or consciously constructed shared family time, all of which might be associated with higher levels of emotional support or cognitive stimulation. Similarly, we considered that one-on-one time between a parent and a child without other siblings present might distill time as a mechanism for transferring cognitive stimulation and emotional resilience to children. We found, however, that these specifications of time were less clearly associated with child development even in baseline models compared to the measure of mother's engaged time, suggesting that the quality of mother's engagement, rather than the compositional element of who else is present, is salient to child outcomes. To address any potential concerns about multicollinearity we also tested models using mother's *total* time with child, combining engaged and accessible time in a single measure and mother's engaged time only, excluding accessible time from the models. The former specification

produced weaker associations between time and child outcomes, while the latter produced results substantively similar to those reported here. We note that the correlation between engaged and accessible time is quite low (-.05).

To address concerns that time diary data is unreliable if it captures days that are atypical for children or mothers, we limited our analysis to the approximately 450 cases that reported both the weekday and weekend diary days were "very typical." The expectation here is that estimates of the association between maternal time with children and child outcomes will be less likely to be downwardly biased toward 0 if observed time is a more reliable and valid indicator of children's usual time allocations. We found that the association between engaged maternal time and externalizing behavior was weaker than what we observed in the full sample. The magnitude and statistical significance of engaged time with the two verbal achievement measures were stronger and more robust compared to the models presented here, remaining statistically significant at $p<.05$ in our full models excluding interactions. We note, however, that these families were distinct from the general sample: that children were more often race/ethnic minorities, mothers were more often single, and mothers reported lower educational attainment when both time diary days were very typical compared to the full sample.

DISCUSSION

In sum, we found weak evidence that the sheer amount of mothers' engaged time is associated with better child outcomes, as measured by reduced behavioral problems and higher cognitive test scores. Net of basic demographic controls, mothers' engaged time was associated with 3 of our 5 outcomes. Engaged time is associated with other pieces of the parenting package that are in turn associated with positive child development, including *higher* cognitive stimulation, emotional support, and maternal education and *lower* maternal distress. Controlling

for these indicators of parenting quality and socioeconomic status fully accounted for the association between mothers' time and child outcomes, i.e., we found no evidence of an effect of total time above and beyond how it relates to other aspects of healthy child development. We also found little support for the idea that the benefits of mothers' time would be higher in the context of higher parenting quality and socioeconomic status. Only interactions with emotional support were consistently associated with child outcomes, and although interaction terms were in the expected directions, main associations were not; the substantive significance of interactions were small and not straightforward to interpret.

Finding an association between mothers' total time and child outcomes that was subsequently accounted for by parenting quality and socioeconomic status was in line with our expectations. Others have reported small or null associations between total time engaged with children and child well-being (Hofferth 2006a; Milkie et al. 2015), and family factors promoting development tend to cluster together in ways we suspected might account for the benefits of time (Furstenberg 2011). Key findings linking mothers' time to children's behavioral versus cognitive outcomes were similar. Differences in the links between these outcomes and particular family factors were in line with prior research: for example, mother's education was more strongly related to academic than behavioral outcomes (Hofferth 2006a reports the same for father's education). We found further that maternal distress mattered more for behavioral outcomes, and that cognitive stimulation was significantly associated with both behavioral and cognitive outcomes.

We were surprised by the lack of any meaningful interaction between mothers' time and other aspects of the parenting package. There is sound theory to suggest that parental involvement should condition the value of parental resources such as time (Coleman 1988;

Kalmijn forthcoming). And on a more intuitive level, it makes sense that maternal time characterized by talking, warmth, and support for learning would be more strongly associated with child well-being than time void of these qualities, whether engaged in homework help or just hanging out. That said, others have found little variation in the association between parenting and other aspects of family life (Amato and Fowler 2002; Berger and McLanahan 2015).

We relied on unique data that links children's time diaries to high quality behavioral and cognitive assessments in the framework of a nationally representative survey with detailed information from mothers on many other aspects of family life. Despite the many strengths of the data for our research question, there are also potential limitations. We have time diary data for one weekend day and one weekday. If these snapshots are not representative of the time mothers typically spend with children, we will introduce noise into our estimated associations between time and child well-being. And to the extent that time is a less reliable measure than parenting quality or family income, for example, our estimates will understate the relative importance of time (Wolfers 2015). These are important concerns, although time diaries do a good job of capturing routine behavior (Robinson 1985), and much of family life with young children is about routines. For example, in our sample, weekday and weekend diary days were rated as typical (scores of 1 or 2 on a 5 point scale with 1 indicating "very typical") by 75 percent and 60 percent of children respectively. As noted, supplementary analyses run on the subset of cases where both days were "very typical" suggested a stronger association with cognitive outcomes but a weaker association with behavior outcomes compared to what we observed in the full sample, suggesting that better precision around what is "typical" does not necessarily yield a stronger statistical association between maternal time and child outcomes. Further, time diary data is less sensitive to social desirability bias and overreporting. Hofferth (2006b) demonstrated

that it is both more valid and more reliable compared to stylized measures when comparing diary versus survey measures tapping the frequency of reading to a child.

Beyond measurement issues, there are other challenges associated with interpreting the processes linking mothers' time and child outcomes. For example, if mothers spend more time with children struggling with behavioral or academic problems, any benefits of time would be underestimated. (Of course if mothers avoid time with problem children, the opposite would be true.) Even with data over time, causal arrows are difficult to sort out, as the reciprocal relationships between parenting and child well-being undoubtedly evolve in nuanced ways over the life course. Our study focuses on children ages 3-12 years, and processes may differ for younger or older children (e.g., Milkie et al. 2015 on adolescents). Despite the caveats, this work adds to ongoing debates about mothers' time: whereas prior research has emphasized the importance of mothers' quality time investments as defined by activity type, we focused on the potential importance of quality time as defined by parenting and socioeconomic resources.

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Table 1. Descriptive statistics by mother's engaged time with children (multiply imputed data)

Panel Study of Income Dynamics Child Development Supplement, 1997

	Mother's engaged time < 25th percentile			Mother's engaged time 25th-75th percentile			Mother's engaged time>75th percentile		
	Mean	SE		Mean	SE		Mean	SE	
Dependent variables									
Behavior problems									
Externalizing behavior (0-16)	5.790	0.181		5.489	0.119		5.486	0.168	
Internalizing behavior (0-13)	2.673	0.130		2.468	0.085		2.157	0.104	b
Cognitive achievement									
Letter-Word	102.712	0.921		103.408	0.632		103.044	0.860	
Passage Comprehension	101.263	0.793	a	104.137	0.619	b	103.825	1.009	
Applied problems	105.379	0.826		105.502	0.612		103.579	0.811	a,b
Independent variables									
Control variables									
Age at child interview (in months)	112.456	1.434	a	97.267	1.119	b	82.937	1.605	a,b
Child is male	0.559	0.022		0.507	0.016		0.467	0.023	
Mother's age at interview	35.381	0.280	a	34.710	0.205	b	33.395	0.317	a,b
Race/ethnicity									
Non-Hispanic white	0.446	0.022		0.527	0.016		0.513	0.023	
Non-Hispanic black	0.447	0.022	a	0.360	0.016	b	0.333	0.022	b
Hispanic	0.062	0.011		0.061	0.008		0.100	0.014	a
Other race/ethnicity	0.044	0.009		0.053	0.007		0.053	0.010	
Typicality of diaries (1-5, 1=very typical)	2.157	0.045		2.081	0.031		2.231	0.048	a
Typicality of weekday diary	1.990	0.055		1.893	0.039		2.131	0.062	a
Typicality of weekend diary	2.320	0.058		2.272	0.039		2.336	0.060	
Mother helped complete diary	0.824	0.017	a	0.865	0.011		0.898	0.014	a,b
Parenting resources									
Cognitive stimulation	9.740	0.086	a	10.287	0.064	b	10.760	0.089	a,b
Emotional support	8.846	0.064		8.752	0.041		8.508	0.061	a,b
Maternal psychological distress	0.138	0.024		0.073	0.015		0.042	0.019	b
Socioeconomic resources									
Income to needs									
<100% Federal poverty level	0.297	0.020		0.202	0.013		0.193	0.018	
100-199% FPL	0.212	0.018		0.236	0.014		0.225	0.019	
200-399% FPL	0.317	0.021		0.327	0.015		0.342	0.022	
400%+ FPL	0.174	0.017		0.235	0.014		0.240	0.020	
Maternal education									

<high school	0.181	0.018	[a]	0.127	0.011	[b]	0.149	0.016	
High school	0.401	0.022		0.373	0.016		0.374	0.022	
Some college	0.271	0.020		0.288	0.015		0.279	0.021	
College degree +	0.125	0.015	[a]	0.196	0.013	[b]	0.186	0.018	
Maternal labor force status									
Employed	0.703	0.020		0.687	0.015		0.571	0.023	[a,b]
Unemployed	0.082	0.012		0.063	0.008		0.070	0.012	
Out of labor force	0.214	0.018		0.249	0.014		0.359	0.022	[b]
Family structure									
Mother is married	0.591	0.022		0.682	0.015		0.684	0.021	
Mother is single	0.347	0.021		0.270	0.014		0.265	0.020	
Mother is cohabiting	0.062	0.011		0.048	0.007		0.051	0.010	
Father in household	0.557	0.022		0.661	0.015		0.692	0.021	
Number of siblings in household	1.687	0.050	[a]	1.403	0.035	[b]	1.118	0.042	[a,b]
N	499			962			471		

[a] different from middle time category at p<.05

[b] different from low time category at p<.05

Table 2. Negative binomial regressions predicting children's behavior problems as a function of mother's time, household socioeconomic resources, family structure, and parenting resources

	BPI externalizing						BPI internalizing					
	M1 Baseline		M2 Family Resources		M3 Interaction		M1 Baseline		M2 Family Resources		M3 Interaction	
	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE
Mother's engaged time	-0.003	0.002 +	-0.001	0.002	0.021	0.009 *	-0.002	0.002	-0.001	0.002	0.015	0.021
Mother present, not engaged	0.000	0.001	0.001	0.002	0.001	0.002	0.001	0.002	0.002	0.002	0.002	0.002
Control variables												
Age at child interview	0.000	0.001	-0.001	0.001	-0.001	0.001	0.007	0.001 ***	0.007	0.001 ***	0.007	0.001 ***
Child is male	0.175	0.039 ***	0.181	0.038 ***	0.182	0.038 ***	0.075	0.062	0.078	0.059	0.076	0.058
Mother's age at interview	-0.022	0.004 ***	-0.015	0.004 ***	-0.015	0.004 ***	-0.020	0.005 ***	-0.012	0.006 *	-0.012	0.006 *
Race/ethnicity												
Non-Hispanic black	0.019	0.055	-0.150	0.054 **	-0.157	0.054 **	-0.087	0.108	-0.271	0.085 **	-0.280	0.082 **
Hispanic	-0.127	0.069 +	-0.269	0.078 **	-0.265	0.079 **	-0.052	0.096	-0.198	0.108 +	-0.199	0.109
Other race/ethnicity	0.090	0.080	0.037	0.088	0.026	0.087	0.069	0.124	-0.028	0.129	-0.036	0.127
Typicality of diaries	0.021	0.021	0.031	0.020	0.031	0.020	0.071	0.030	0.074	0.029 *	0.073	0.029 *
Mother helped complete diary	0.013	0.067	0.031	0.065	0.033	0.063	-0.019	0.130	-0.013	0.120	-0.005	0.111
Socioeconomic resources												
Income to needs												
<100% Federal Poverty Level			-0.019	0.069	-0.005	0.069			0.014	0.096	0.027	0.098
100-199% FPL			-0.057	0.055	-0.054	0.055			-0.066	0.082	-0.060	0.081
400%+ FPL			-0.116	0.053	-0.113	0.053 *			-0.219	0.078 **	-0.215	0.078 **
Maternal education												
<high school			0.035	0.066	0.040	0.065			0.073	0.107	0.077	0.104
Some college			-0.031	0.048	-0.026	0.048			-0.058	0.076	-0.052	0.075
College degree +			-0.039	0.060	-0.037	0.060			0.032	0.085	0.036	0.085
Labor force status												
Unemployed			-0.029	0.090 *	-0.045	0.089			-0.168	0.133	-0.174	0.134
Out of labor force			-0.057	0.046	-0.058	0.046			0.078	0.075	0.079	0.074
Family structure												
Mother is single			0.020	0.083	0.007	0.083			0.087	0.127	0.071	0.124

Mother is cohabiting				0.101	0.100		0.098	0.100					0.228	0.123	+	0.225	0.123	+	
Father in household				-0.109	0.072		-0.114	0.072					-0.141	0.106		-0.147	0.107		
Number of siblings in household				0.011	0.020		0.010	0.020					-0.051	0.034		-0.052	0.033		
Parenting resources																			
Maternal psychological distress				0.282	0.062	***	0.285	0.061	***				0.291	0.109	*	0.294	0.106	**	
Cognitive stimulation				-0.033	0.011	**	-0.035	0.011	**				-0.018	0.017		-0.019	0.017		
# of imputed items in cognitive scale				0.021	0.012	+	0.022	0.012	+				0.028	0.017	+	0.029	0.017	+	
Emotional support				-0.031	0.019		0.023	0.029					-0.036	0.035		0.005	0.045		
Engaged time * emotional support							-0.002	0.001	*							-0.002	0.002		
Intercept	2.434	0.149	***	2.849	0.232	***	2.393	0.303	***	0.825	0.231	***	1.123	0.381	**	0.772	0.467	+	
/lnalpha	-1.111	0.070		-1.225	0.075		-1.233	0.075		-0.414	0.082		-0.514	0.088		-0.516	0.086		
alpha	0.329	0.023		0.294	0.022		0.291	0.022		0.661	0.054		0.598	0.053		0.597	0.051		
N	1958									1973									

***p<.001; **p<.01; *p<.05; +p<.10

Table 3. Ordinary least squares regressions predicting children's cognitive achievement as a function of mother's time, household socioeconomic resources, family structure, and parenting resources (PSID-CDS 1997)

	LETTER-WORD						**PASSAGE COMPREHENSION**					
	Baseline		Family Resources		Interaction		Baseline		Family Resources		Interaction	
	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE
Mother's engaged time	0.097	0.040 *	0.030	0.040	-0.310	0.202	0.106	0.049 *	0.010	0.049	-0.041	0.291
Mother present, not engaged	0.029	0.038	0.004	0.036	0.004	0.036	0.060	0.046	0.027	0.044	0.027	0.044
Control variables												
Age at child interview	0.071	0.018 ***	0.105	0.022 ***	0.106	0.022 ***	-0.058	0.026 *	-0.046	0.028 +	-0.046	0.028 +
Child is male	-1.113	1.080	-0.873	1.053	-0.869	1.051	-2.227	1.116 *	-1.903	1.074 +	-1.903	1.073 +
Mother's age at interview	0.548	0.099 ***	0.278	0.111 *	0.275	0.111 *	0.514	0.109 ***	0.223	0.112 *	0.223	0.112 *
Race/ethnicity												
Non-Hispanic black	-9.828	1.355 ***	-4.918	1.687 **	-4.759	1.668 **	-9.099	1.401 ***	-3.800	1.539 *	-3.794	1.540 *
Hispanic	-3.771	2.216 +	2.799	2.406	2.854	2.402	-8.089	1.881 ***	0.529	2.204	0.548	2.208
Other race/ethnicity	-3.301	2.574	0.102	2.447	0.363	2.408	-5.302	2.821 +	-0.989	2.662	-0.960	2.649
Typicality of diaries	0.290	0.554	-0.133	0.528	-0.112	0.526	0.626	0.522	0.072	0.502	0.074	0.502
Mother helped complete diary	2.570	1.536 +	1.670	1.498	1.650	1.492	0.950	1.560	0.142	1.547	0.146	1.547
Socioeconomic resources												
Income to needs												
<100% Federal poverty level			-0.015	2.034	-0.273	2.026			-2.130	1.944	-2.149	1.937
100-199% FPL			-0.601	1.500	-0.658	1.493			-2.360	1.646	-2.364	1.646
400%+ FPL			2.860	1.416 *	2.785	1.417 *			1.909	1.474	1.901	1.472
Maternal education												
<high school			-2.194	1.908	-2.277	1.912			-2.905	2.210	-2.913	2.208
Some college			3.734	1.461 *	3.711	1.455 *			2.839	1.545 +	2.838	1.545 +
College degree +			6.701	1.813 ***	6.704	1.808 ***			5.701	1.706 **	5.705	1.706 **
Labor force status												
Unemployed			-1.838	2.392	-1.602	2.385			0.778	2.215	0.792	2.216
Out of labor force			1.942	1.191	1.917	1.193			1.095	1.312	1.087	1.312
Family structure												
Mother is single			-1.953	2.561	-1.732	2.526			0.183	2.495	0.186	2.494
Mother is cohabiting			1.191	3.519	1.298	3.526			0.753	2.795	0.753	2.794
Father in household			-0.870	2.401	-0.794	2.384			0.553	2.216	0.553	2.216
Number of siblings in household			-1.801	0.580 **	-1.769	0.578 **			-1.890	0.563 **	-1.889	0.562 **
Parenting resources												
Maternal psychological distress			1.351	1.971	1.334	1.970			-0.210	1.901	-0.215	1.902
Cognitive stimulation			0.874	0.333 **	0.894	0.333 **			1.217	0.347 ** *	1.221	0.348 ***

# of imputed items in cognitive scale				-0.864	0.454	+	-0.890	0.454	+				-0.489	0.441		-0.490	0.440	
Emotional support				0.093	0.525		-0.767	0.835					0.580	0.497		0.482	0.812	
Engaged time * emotional support							0.040	0.024	+							0.006	0.031	
Intercept	76.859	3.837	***	75.816	6.982	***	83.024	8.950	***	92.493	5.286	***	87.683	7.335	***	88.545	8.890	***
N	1824									1257								

Table 3. Ordinary least squares regressions predicting children's cognitive achievement as a function of mother's time, household socioeconomic resources, family structure, and parenting resources (PSID-CDS 1997), continued

	APPLIED PROBLEMS								
	Baseline			Family Resources			Interaction		
	B	SE		B	SE		B	SE	
Mother's engaged time	-0.007	0.037		-0.074	0.036	*	-0.507	0.224	*
Mother present, not engaged	-0.024	0.036		-0.051	0.034		-0.052	0.034	
Control variables									
Age at child interview	0.037	0.018	*	0.048	0.020	*	0.049	0.020	*
Child is male	3.482	0.985	***	3.423	0.924	***	3.424	0.920	***
Mother's age at interview	0.624	0.095	***	0.357	0.094	***	0.352	0.093	***
Race/ethnicity									
Non-Hispanic black	-12.137	1.300	***	-8.366	1.377	***	-8.162	1.361	***
Hispanic	-11.587	1.422	***	-3.744	1.637	*	-3.673	1.637	*
Other race/ethnicity	-6.621	2.597	*	-3.393	2.299		-3.060	2.305	
Typicality of diaries	0.280	0.489		-0.186	0.462		-0.158	0.458	
Mother helped complete diary	2.747	1.661	+	1.579	1.458		1.556	1.423	
Socioeconomic resources									
Income to needs									
<100% Federal poverty level				-1.263	1.618		-1.597	1.623	
100-199% FPL				-1.636	1.252		-1.718	1.240	
400%+ FPL				3.756	1.316	**	3.662	1.307	**
Maternal education									
<high school				-6.527	1.717	***	-6.630	1.716	***
Some college				2.764	1.240	*	2.728	1.227	*
College degree +				5.157	1.646	**	5.157	1.635	**
Labor force status									
Unemployed				4.368	1.966	*	4.671	1.972	*
Out of labor force				2.500	1.041	*	2.467	1.036	*
Family structure									
Mother is single				0.047	2.097		0.332	2.068	
Mother is cohabiting				0.454	3.004		0.594	2.999	
Father in household				-1.259	1.932		-1.164	1.906	

Number of siblings in household				-1.116	0.487	*	-1.076	0.483	*
Parenting resources									
Maternal psychological distress				-0.865	1.555		-0.899	1.544	
Cognitive stimulation				0.680	0.323	*	0.705	0.324	*
# of imputed items in cognitive scale				-0.624	0.367	+	-0.659	0.365	+
Emotional support				0.998	0.478	*	-0.094	0.730	
Engaged time * emotional support							0.050	0.025	*
Intercept	81.731	3.791	***	77.292	6.281	***	86.468	7.581	***
N	1818								

***p<.001; **p<.01; *p<.05; +p<.10