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Work Hours, Schedules, and Insufficient Sleep Among Mothers and Their Young Children

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Abstract

Studies have linked parents' employment, work hours, and work schedules to their own sleep quality and quantity, but it is unclear whether these associations extend to children. The authors used data from the 5-year in-home survey of the Fragile Families and Child Wellbeing Study (N = 1,818) to examine the associations between maternal work hours and schedule and insufficient sleep among disadvantaged mothers and their young children. They found that mothers who worked more than 35 hours per week were more likely to experience insufficient sleep compared to mothers who worked fewer hours, whereas children were more likely to experience insufficient sleep when their mothers worked between 20 and 40 hours. Nonstandard work schedules were associated with an increased likelihood of insufficient sleep for mothers but not their children. The results highlight a potentially difficult balance between work and family for many disadvantaged working mothers in the United States.

Keywords

Fragile Families and Child Wellbeing; health; maternal employment; sleep patterns; work hours; work schedules

Mothers in U.S. families continue to occupy the role of primary caregivers and managers of their children's time whether or not they work outside the home (Bianchi, 2000). As such, a large number of studies across a variety of populations have examined linkages among maternal work, family routines, and child development (Bianchi, Robinson, & Milkie, 2006; Goldberg, Prause, Lucas-Thompson, & Himself, 2008; National Research Council, 2003). A

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number of such studies have shown associations between maternal employment, long hours, and nonstandard schedules and mothers' own reduced sleep hours (Bianchi, 2000; Bianchi, Wight, & Raley, 2005; Knutson, Van Cauter, Rathouz, DeLeire, & Lauderdale, 2010; Perrucci et al., 2007). However, we know little about how these dimensions of maternal employment correlate with children's sleep, whether the same factors that predict mothers' sleep also predict that of children, and how these dynamics operate in more disadvantaged populations. The goal of this study was to address these issues.

The intensity (i.e., number of hours) and timing (i.e., work schedule) of maternal work could influence children's sleep through a number of mechanisms. First, as mothers work more hours, they have less time and energy available to monitor and enforce children's sleep. Mothers who work nonstandard shifts (i.e., evenings and nights) are often working when children are going to bed, asleep, or waking up. In addition, long maternal work hours or nonstandard schedules may cause the mother stress or fatigue (Perrucci et al., 2007). Such stressors may influence her effectiveness in managing sleep routines and supervising bedtimes and wake times. Research has shown that greater parental warmth (a parenting construct that likely varies inversely with parental stress) predicts more hours of young children's weekday sleep (Adam, Snell, & Pendry, 2007). We know of no studies that have examined the associations between the intensity of parental work hours or work schedules and children's sleep. One related study of parental employment status and children's sleep showed that children in dual-worker families get 1 less hour of sleep per week and children in families headed by a single mother get 1.5 hours less sleep per week compared to children in families in which mothers do not work outside the home (Hofferth & Sandberg, 2001). It is unclear from this study, however, whether any maternal employment at all is associated with children's lesser sleep or whether this is true only at higher levels of maternal work intensity.

Maternal employment experiences may also be linked to children's sleep if mothers adjust children's schedules to match their own work schedules or turn the enforcement of sleep practices over to others, resulting in inconsistent routines. As primary caregivers, mothers who start work early in the morning may have to wake children early to get them to child care. Conversely, mothers who work in the evenings may adjust children's bedtimes later to accommodate evening activities such as dinner, children's homework, or simply spending time together. Stewart (2010) used time diary data from the American Time Use Survey to illustrate mothers' efforts at matching their parenting to their own work schedules, showing that mothers who work full time shift their enriching care time with young children to the evenings. This may have the unintended effect of curtailing children's sleep. Mothers who work long or nonstandard hours may also rely on other caregivers to put children to bed or wake them in the morning, which could result in inconsistent sleep habits. The American Academy of Pediatrics recommends that parents maintain specific routines to facilitate children's sleep (Cohen, 1999). Furthermore, maintaining a sleep schedule helps children develop a capacity for self-regulation, which could benefit children's sleep quality (Shonkoff & Phillips, 2000).

There are reasons to believe that the linkage between maternal employment experiences and sleep are especially pronounced in disadvantaged households. Nonstandard work is more

common among low-income individuals and those with less education than among those who are more socioeconomically advantaged (Presser, 2003). Therefore, any impacts of nonstandard work may be particularly salient for low-income populations. In addition, economically disadvantaged mothers may lack the resources that allow them to more effectively balance the demands of their jobs with their children's sleep routines. One such resource is having a spouse or partner in the household, as marriage is less common among mothers with fewer years of education (McLanahan, 2004). Mothers with no additional adult in the household may find it especially challenging to accommodate their children's sleep needs when faced with difficult work conditions. Stewart (2014) found, using the American Time Use Survey, that young children ages 6 to 12 slept less when their mothers were employed (vs. not employed) and that this was particularly true of children in single-mother households. An economically disadvantaged sample is thus central to our analysis because mothers living in such circumstances may find it particularly difficult to balance work and family and, as such, represent a population of interest to policymakers, social scientists, and practitioners.

Previous studies have not considered whether the same factors that predict mothers' sleep also predict children's sleep. If mothers sacrifice their own sleep in order to protect parenting investments in their children (as Stewart, 2010, suggested), then maternal work characteristics may be more strongly linked with mothers' sleep than that of their children. This may be particularly the case in households with more than one adult, because such households may have greater resources available to shape family sleep habits.

In this study, we examined the association between maternal employment characteristics and the risk of insufficient sleep among mothers and children within the same family. To our knowledge, we are the first to focus on an economically disadvantaged sample and to examine the relationship between maternal work conditions and children's sleep. We are able to replicate prior findings on the association between maternal work hours and schedules and mothers' own sleep while at the same time understanding the extent to which these same dimensions of maternal employment correlate with children's sleep. Doing so may provide insights into how well mothers are able to shield children from any adverse correlates of their own work experiences.

Specifically, we addressed the following three research questions:

1. What is the association between maternal work hours and mother and child insufficient nighttime sleep?
2. What is the association between maternal work schedules and mother and child insufficient nighttime sleep?
3. Does family structure moderate these associations?

We addressed these questions using a large sample of employed mothers and their 5-year-old children. This sample, drawn from the Fragile Families and Child Wellbeing Study (FFCWS; <http://www.fragilefamilies.princeton.edu/>), includes an oversample of nonmarital births. As such, it contains a larger share of single mothers and those working nonstandard

schedules compared to other large secondary data sources, and the sample is relatively disadvantaged.

As in all studies that rely on observational data, as ours does, selection effects are an important threat to the interpretation of the findings. Women are not randomly sorted into their work hours or work schedules. It is possible that characteristics associated with mothers' work hours or work schedules are also associated with mother and child sleep. To address this concern, it is important to control for factors that may be associated with the types of jobs mothers have and the nature of their work. These factors include maternal race and ethnicity, education, cognitive ability, financial resources, and depressive symptoms (which may influence her ability to both work and sleep). It is also important to control for characteristics of the child that may influence mothers' employment patterns and child sleep, such as child age and health. Finally, characteristics of the child's father are relevant as well, such as his work behaviors and ability to provide financial and instrumental support to the child and mother.

At the same time, in attempting to account for such confounding factors in a multivariate regression, care must be taken to avoid controlling for factors that are themselves consequences of maternal work characteristics. Doing so would obscure the total effect of maternal work on maternal and child sleep. Therefore, as we note below, our control variables were measured prior to the assessment of maternal employment and maternal and child sleep.

METHOD

Data

The FFCWS is a longitudinal study of 4,898 children born between 1998 and 2000 in 20 large U.S. cities. Using a stratified random sample of all U.S. cities with 200,000 or more people, investigators first sampled cities according to policy and labor market environments, then hospitals within cities, and finally births within hospitals (Reichman, Teitler, Garfinkel, & McLanahan, 2001). The sample includes an oversample of nonmarital births, which resulted in a large proportion of racial/ethnic minority and low-income respondents.

Mothers were initially interviewed in the hospital within 2 days of their child's birth, and follow-up interviews were completed when the child was ages 1, 3, 5, and 9. Of particular interest to our study is that, at each interview, the FFCWS collected information about respondents' employment characteristics, including the timing and regularity of work schedules. Because of budget constraints at the beginning of the in-home survey administration, a subset of the full sample was invited to participate in an in-home component of the study, conducted at Years 3, 5 and 9, which collected additional information about family life (Vu, 2011). At Year 5, this component provides information on mother and child sleep, the key dependent variables in this analysis.

We limited the sample to respondents who completed the in-home component of the Year 5 survey ($n = 3,023$), because this is when the measures of sleep were gathered. We excluded respondents who did not live with their child at least half-time ($n = 43$, 1%). Also, because

we were interested in examining how features of maternal employment influence sleep, we excluded mothers who had not been employed in the past week ($n = 1,133$, 37%). Finally, we excluded respondents who were missing data for both dependent variables on mother and child sleep ($n = 29$, 1%). The resulting analytic sample size was 1,818 (60% of Year 5 in-home survey respondents). Weights were not available for the in-home sample, and therefore our analyses are unweighted.

Approximately 91% of respondents who completed the Age 5 core survey were invited to participate in the in-home component (Reichman et al., 2001). Among those invited to participate, 81% completed the in-home survey. In our sample of mothers who were employed at the Age 5 core interview ($n = 2,161$), 85% completed the in-home survey, and 15% did not complete the in-home survey, either because they were not invited or they declined to participate. We examined descriptive statistics to determine whether employed mothers who did not complete the Year 5 in-home survey differed from mothers who were retained in our sample. Mothers in the excluded and retained samples had a similar likelihood of being married to or cohabiting with the focal child's biological father and reported similar household income and welfare receipt in the year before birth. Mothers in the retained sample were slightly more likely to be Black (52% vs. 42%) and less likely to be Hispanic (24% vs. 33%). They were approximately 1 year younger (25 vs. 26) and had more education on average. Fathers were also 1 year younger on average (28 vs. 29).

Seventy-five percent of the analytic sample had complete data for all independent variables included in the analysis. Missing data were multiply imputed by chained equations using the *ice* commands for Stata, which facilitates statistically valid inference when data are missing at random (Royston, 2004; Rubin, 1987). We followed the strategy of Multiple Imputation, then Deletion (MID), whereby respondents missing the dependent variables were included in the imputation but excluded from the analytic sample to improve the efficiency of estimates (von Hippel, 2007). Most variables were missing for 0% to 4% of the sample, with the exception of father's age, which was missing for 18% of the sample. Because we did not impute missing data for our dependent variables, sample sizes varied by model. Models predicting child's insufficient sleep and mother's insufficient sleep were estimated among samples of 1,815 and 1,814 respondents, respectively.

Measures

Mother and child insufficient sleep.—Our key dependent variables related to the duration of mother and child sleep. Respondents (in 99% of cases, the focal child's mother) were asked, "How many hours of sleep a night do you usually get?" and "How many hours of sleep a night does [child] usually get?" To construct our measures of insufficient sleep, we used widely accepted and scientifically supported guidelines regarding the number of hours of daily sleep needed to maintain good health at different stages of the life cycle: 7–9 hours for adults and 10–11 hours for children ages 5 to 12 (Mercer, Merritt, & Cowell, 1998; National Sleep Foundation, 2012). We decided to use the lower bound of these recommendations as a conservative measure of insufficient sleep and in doing so align our variables with those used by the Centers for Disease Control and Prevention in reporting national health statistics (e.g., Centers for Disease Control and Prevention, 2009, 2011).

Mother's insufficient sleep was coded as 1 if she reported less than 7 hours of sleep and 0 otherwise. Child's insufficient sleep was coded as 1 if the child received less than 10 hours of sleep per night and 0 otherwise. Given the known hazards of insufficient sleep, we were primarily interested in testing whether work parameters affect the odds of mothers and children experiencing this risk and therefore focus on the dichotomous variables. Sensitivity analyses using a continuous measure of sleep duration revealed the same pattern of results (see Appendix Tables A1 and A2).

Although the survey items asked about sleep at night we believe it is likely that respondents reported their average daily sleep (regardless of when it occurred). Virtually no mothers reported getting less than 4 hours of sleep (and 93% reported 5 or more hours), even among those who worked night shifts. At the same time, the question about child sleep is more likely to be limited to nighttime hours (when children get their primary sleep) and may not capture daytime naps, a point we return to in the Discussion section.

Comparisons among self-report survey measures, time diary methods, and physiological measures of sleep suggest that self-reported sleep duration is fairly accurate (Gaina, Sekine, Chen, Hamanishi, & Kagamimori, 2004; Lauderdale, Knutson, Yan, Liu, & Rathouz, 2008), with some evidence that people tend to overestimate the sleep they actually get (Kushida et al., 2001). Less information is available about the validity of parental reports of children's sleep, although a few studies have found strong correlations between maternal reports of child sleep duration and both actigraphic and sleep diary measures (LeBourgeois, 2003; Sadeh, 2004, 2008). Children in our sample received on average 9.36 hours of sleep per night. This is lower than the amount of child sleep found in an analysis of time use data (Hofferth & Sandberg, 2001), which averaged 11 hours per day. However, that study included both daytime and night sleep and was for a younger (children ages 3–5) and more advantaged sample, making results difficult to compare with our study.

Maternal work hours and schedules.—Year 5 employment information was used to construct measures of mothers' work hours and work schedules, using the sample of mothers who had worked for pay in the last week. Mothers reported the number of hours they usually work per week; this was recoded into variables indicating 1–19 hours (the omitted category), 20–34 hours, 35–40 hours, and 41 or more hours. Mothers were asked about work hours only in regard to their primary job; therefore, our measure of work hours may underestimate the total hours mothers worked. About 15% of the mothers in our sample reported working more than one job at some point in the past 12 months before the survey.

Information about work schedule was collected with the question: "At your primary job, do you regularly work ... Weekdays, Evenings (6pm–11pm), Nights (11pm–7am), Weekends, or Different times each week?" Respondents were able to select more than one option. We created a dichotomous variable to indicate whether the respondent worked any nonstandard schedule; respondents were coded 1 if they reported working any of the nonstandard schedules and 0 if they worked a standard schedule only (the omitted category).

Covariates.—We adjusted the analyses for a host of demographic and background characteristics that may be linked both to mothers' work and her own and her child's sleep.

As noted above, we took care to ensure that time-varying characteristics were measured prior to the maternal employment variables when appropriate. Race and ethnicity were measured with indicators that the respondent was non-Hispanic White (reference category), non-Hispanic Black, Hispanic, or some other race. Mother's age at the Year 5 survey was measured in years, and education level was measured with a series of dummy variables indicating whether the mother had less than a high school degree, a high school diploma/GED, some college or technical school, or a college diploma or graduate degree (reference category). Mother's cognitive ability was measured at Year 3 using items from the Similarities subtest of the Wechsler Adult Intelligence Scale—Revised (WAIS-R; Wechsler, 1981). Correct items were summed to create the overall score, with higher scores indicating higher ability (range: 0–16, $\alpha = .60$). Although the reliability coefficient for this standardized measure was relatively low for this sample, we included it as the best available proxy for mothers' cognitive skills. We also controlled for mother's depressive symptoms at Year 3 using a dichotomous variable for whether or not the respondent had a probable case of depression based on the World Health Organization's Composite International Diagnostic Interview Short Form (Kessler, Andrews, Mroczek, Ustun, & Wittchen, 1998).

We relied on baseline measures of the father's characteristics due to high attrition in later waves. Fathers' age was measured in years, and fathers' education was captured with dummy variables indicating less than high school, high school diploma or GED, some college, or college degree or graduate degree (reference). Father's age and education were based on the father's own report when available. If the father was not interviewed or did not provide his own report, the mother's reports of the father's characteristics were used. The term *father* always refers to the focal child's biological father.

We further adjusted the analyses for household composition at Year 5. Constructed variables indicated whether the mother was married to or cohabiting with the biological father of the focal child or with another partner. We also included a continuous variable for the number of children under age 18 in the household. Supplementary analyses, described below, also included a measure of whether the mother was the only adult in the household.

To avoid endogeneity with maternal work measured in Year 5, we included a control for household income at Year 3. This variable measures total household income before taxes, expressed in thousands of dollars. It includes imputed data for respondents who reported a range of income or were missing data for this question. We also included a dichotomous variable that indicates whether the mother had received welfare in the year before the Age 5 interview.

Finally, we controlled for child characteristics that may be associated with maternal employment decisions and family sleep patterns, including gender (coded as 1 if the child is male), age (measured in months) and low birth weight (coded 1 if the child weighed less than 2,500 g at birth). We also controlled for whether the child had any physical disabilities using maternal reports from the Year 1 survey.

Data Analysis

Because the analyses focused on dichotomous outcomes (mother and child insufficient sleep), we used logistic regression and present odds ratios. For each outcome, two analyses were performed, addressing the three research questions listed above. First, we related mothers' work hours and work schedule to mother and child insufficient sleep; the omitted category for work hours was working 1–19 hours per week, and the omitted category for work schedules was working a standard schedule. Next, we examined whether the linkages between maternal employment and mother or child sleep varied by the presence of other adults in the household (e.g., a partner/spouse or the child's grandparent) who might share child care and household responsibilities. It is likely that mothers of young children who have no other adult in the household might find it particularly difficult to balance the trade-offs between work and sleep. To examine this, we interacted maternal employment characteristics (schedule and work hours) with a dummy variable indicating whether the mother was the sole adult over age 18 in the household.

RESULTS

Descriptive Statistics

Descriptive statistics for the key variables in our regression models are presented in Table 1. Of note is that 52% of children and 51% of mothers in this sample reported insufficient sleep. Mothers in our sample reported getting 6–7 hours of sleep at night, on average; 16% got 5 hours of sleep, 29% got 6 hours, 24% got 7 hours, and 19% got 8 hours (not shown in table). Among those who were sleep deprived (getting less than 7 hours of sleep), most mothers reported getting 5 or 6 hours of sleep per night.

In addition, mothers reported intensive work hours: Fifty-three percent worked between 35 and 40 hours per week, and another 19% worked more than 40 hours per week. Slightly more than half of the mothers (55%) worked at least some nonstandard hours on a regular basis. As also illustrated in Table 1, the FFCWS sample was economically disadvantaged relative to the national population. Most of the mothers were Black or Hispanic, nearly 50% did not have more than a high school education, 35% were married, and 11% had received cash welfare in the past year.

Associations Between Maternal Work Characteristics and Mother and Child Sleep

Table 2 contains our key regression results predicting insufficient sleep for mothers, reported in terms of odds ratios. First, we found that very long work hours (more than 40 hours per week) were associated with a 99% increase in the likelihood of mothers' insufficient sleep compared to the omitted category of 1–19 hours ($p < .01$) as well as compared to working 20–34 hours per week ($p < .05$). Working 35–40 hours per week was associated with a 58% increase in insufficient sleep compared to working 1–19 hours per week. We can also express the results in terms of predicted probabilities of low sleep for different work hour categories holding all other variables at their means. The predicted probability of low sleep for a mother with average characteristics was .43 if she worked 1–19 hours, .52 if she worked 20–34 hours, .55 if she worked 35–50 hours, and .60 if she worked 41 or more hours. The results also indicated that mothers who worked a nonstandard shift had a 25%

higher likelihood of insufficient sleep compared to mothers who worked a standard shift ($p < .05$). The predicted probability of low sleep for a mother with average characteristics was .55 if she worked a nonstandard schedule and .49 if she worked a standard schedule.

Other variables consistently associated with insufficient maternal sleep included being non-Hispanic Black (relative to White), having more children in the household, and cohabiting with a partner who was not the child's biological father (relative to being not married or cohabiting). Our finding of racial/ethnic differences in sleep duration concurs with other studies that have shown a higher incidence of short sleep duration among ethnic minorities compared to Whites (e.g., Hale, 2007). The association between cohabiting with a partner other than the child's biological father and higher odds of insufficient sleep may reflect the fact that new romantic partnerships often require time and energy, which detracts from mothers' sleep. At the same time, mothers who live with their child's biological father may be more likely to share caregiving responsibilities, affording more time for sleep. It is interesting that we also found that mothers with some college (but no degree) reported getting less sleep than those with higher levels of education. One potential explanation is that this group of mothers may be simultaneously in school and working, further limiting their time for sleep.

Model 2 in Table 2 examined the interaction between having only one adult in the household and maternal work conditions when predicting maternal sleep. We found no evidence that the associations between maternal work hours (or work schedule) and maternal sleep varied by the number of adults in the household.

Table 3 contains the regression results predicting insufficient sleep for children, again reported in terms of odds ratios. These results provided evidence that, relative to the group of children whose mothers worked 1–19 hours per week, those whose mothers worked 20–34 hours per week or 35–40 hours per week had increased odds of insufficient sleep (a 63% and 98% increase, respectively). Children whose mothers worked 35–40 hours per week also were more likely to have insufficient sleep compared to those whose mothers worked more than 41 hours per week. The predicted probability of low sleep among children with average characteristics was .44 if the mother worked 1–19 hours per week, .57 if the mother worked 20–34 hours, .61 if the mother worked 35–40 hours, and .55 if the mother worked 41 or more hours. Mothers' nonstandard schedules were not linked to children's sleep.

When we examined the other covariates in these models we observed patterns similar to those reported for maternal sleep. We found that children with Black and Hispanic mothers got less sleep than those with White mothers. These findings are consistent with several other studies showing that children from economically disadvantaged and ethnic minority families are at higher risk for a variety of sleep problems, including short sleep duration (Adam et al., 2007; Crosby, LeBourgeois, & Harsh, 2005; Dollman, Ridley, Olds, & Lowe, 2007; Hofferth & Sandberg, 2001; Rosen et al., 2003). At the same time, our results also suggested that, controlling for other demographic characteristics, children with mothers who had a high school degree or some college got less sleep than those with mothers who had a college degree or more education. As noted above, this result may reflect mothers combining work and education, which might influence children's sleep patterns as well.

Column 2 of Table 3 contains the results of analyses that examined whether the linkages between maternal work conditions and child sleep varied by the presence of other adults in the household. We found no evidence of such moderation.

Sensitivity Tests

We performed several supplementary analyses to test the robustness of our results to alternative approaches. Appendix Tables A1 and A2 contain a summary of supplementary analyses predicting mothers' sleep and children's sleep, respectively. Whereas our main analyses used meaningful cutoffs to indicate whether mothers and children obtained less sleep than recommended, we also performed analyses using a continuous measure capturing the total sleep deficit experienced by mothers and children (how many hours less than the recommended amount) as well as a measure of continuous sleep hours. Though not as conclusive as the literature on the hazards of sleep loss, there is tentative evidence that sleep of longer than normal duration (i.e., more than 9 hours) may also be problematic (Patel et al., 2004); however, virtually no one in this sample of working mothers with young children reported getting this much sleep. Results from analyses using alternative measures of sleep were consistent with our main results: Longer work hours were associated with greater sleep deficits and fewer hours of sleep for mothers. Children whose mothers worked 20–34 or 35–40 hours per week got fewer hours of sleep on average.

We also examined linear work hours in relation to mother and child sleep. Our main analysis assumed that work hours are nonlinearly associated with sleep, which seems plausible given that the trade-off between work and sleep likely becomes increasingly difficult with increasing work hours. However, analyses using linear work hours did not substantively change our results. These analyses indicated that greater work hours were associated with less sleep for mothers and children.

Other sensitivity analyses removed the small number of children (2% of the sample) who had a physical disability, given that the health of the child may influence both maternal work patterns and mother and child sleep. Our primary results were based on models that included a control for this measure. Analyses excluding this sample did not alter the results.

We also performed analyses in which maternal work hours and maternal work schedule were examined separately as predictors of both mother and child sleep. Results from these models were substantively unchanged from our main models indicating that work hours and work schedules have independent effects on maternal and child sleep (results not shown but available on request). Finally, to examine whether the association between work hours and sleep varied by schedule type, we also estimated models that included interactions between schedule and work hours. For example, working nonstandard hours on a part-time basis (i.e., less than 20 hours a week) may have less impact on sleep than working this type of schedule for 40 or more hours per week. In these data, we found no evidence of such a relationship, and thus these models are not presented (but are available on request).

DISCUSSION

Most U.S. mothers with young children are employed. Over the past two decades, attachment to the labor force has intensified, in particular for low-educated, single, and ethnic minority mothers. During this same period, the emergence of a 24/7 service-based economy has substantially increased the number of jobs that require night, evening, weekend, and/or rotating hours.

This study aimed to identify how maternal work hours and work schedules are associated with mother and child insufficient sleep and whether these patterns vary by family structure. To our knowledge, this is the first study to do so. As such, it extends the current literature on maternal employment and child health and well-being, which has largely ignored child sleep. Mounting evidence points to the importance of sleep for healthy adult and child functioning.

More than half of the mothers and children in this sample of urban, lower income families slept less than the amount recommended by health professionals and the broader scientific literature. This finding warrants attention. The U.S. government has set as one of the goals of its Healthy People 2020 initiative to increase the proportion of adults getting sufficient sleep (U.S. Department of Health and Human Services, 2012). Our study points out that economically disadvantaged working mothers of young children may be at heightened risk.

Next, we found evidence of a link between mothers' sleep duration and their work hours. As work hours increased above 35 hours per week, so did the risk of mothers' insufficient sleep. In general, the pattern was similar for children's sleep. In this sample that comprised mostly single mothers it is easy to imagine how long work hours, combined with the time demands of household management, leaves mothers with little time to interact with children and could result in mothers "stealing time" from children's sleep (as well as their own sleep) in order to spend time together. Unexpectedly, children whose mothers worked more than 40 hours per week were somewhat less likely to suffer the same sleep deficits. Jobs requiring such extensive hours may also allow for some flexibility (e.g., working at home) that is not available in other jobs. Another possibility is that jobs with very long hours demand work at home and the pattern we observe here represents mothers' stealing sleep from themselves at night while their children are sleeping.

Our results suggest that the timing of work matters as well, but only for mothers' sleep. Mothers who worked nonstandard hours as part of their regular schedule were more likely than those who worked only standard hours to get less than the recommended amount of sleep. Contrary to our expectation, we did not find the same risk for sleep insufficiency among the children of mothers working nonstandard hours. Mothers who worked evenings, nights, or weekends may spend more time with their children during daytime hours than those who work standard weekday shifts, and they may be therefore less likely to keep children awake to spend time together. In this scenario, it is mothers' sleep rather than children's sleep that is sacrificed as a result of nonstandard work, given that mothers who work evening or night hours typically need to get some of their sleep during the day.

The fact that nonstandard work disrupts mothers' but not children's sleep warrants more attention in future research. One potentially fruitful line of inquiry might focus on child care arrangements. For instance, mothers who work nonstandard hours may rely on relatives and friends to help care for their children. Although the presence of another adult in the household did not seem to play a role in protecting children's sleep from mothers' nonstandard work schedules, it is possible that other caregivers' influence plays a role in this association.

Work hours and work schedule appear to exert unique influences on maternal sleep; in these data, controlling for one did not change the estimated effect of the other. This suggests that both of these employment parameters are independently important for mothers' adequate sleep. We also failed to find an interactive effect between work hours and work schedule, providing further evidence of their independent links to sleep. Likewise, with respect to our final question, we found no indication that household composition moderated any of these associations. Thus, contrary to our hypotheses, living with another adult did not appear to provide a buffer against the apparent adverse associations among long work hours, nonstandard work schedules, and the risk of insufficient sleep.

We note several limitations of our study. First, because of data limitations, our analysis was cross-sectional. Despite our inclusion of a rich set of control variables to address concerns about omitted-variable bias, the potential for bias remains. It is also possible that sleep problems or particular sleep needs among mothers and/or their children may influence mothers' work patterns, rather than the other way around. The sleep variables available in the FFCWS data set are also limited. A potential liability in all secondary data analyses is the necessary reliance on existing measures. The FFCWS collected self-reported measures of sleep duration, which may be subject to reporting error.

In addition, the FFCWS survey asked about sleep at "night" and may have failed to capture mother and child sleep that occurred during daytime hours. To the extent that this is true, our estimates of insufficient sleep may be inflated. Mothers who work evenings or nights may need to get much of their sleep during the day. However, we believe this is a less significant concern than would appear at first. It seems that mothers interpreted the question as asking about their amount of daily sleep given that nearly the entire sample (around 95%) reported 5 or more hours of sleep, and virtually no one reported less than 4 hours, including mothers who regularly worked evening and nighttime hours. Also, our estimates of insufficient sleep generally correspond with national figures, which indicate that more than one third of all U.S. adults (and nearly half of Black adults) get less than 7 hours of sleep per 24-hour period, without taking into account parenting or employment status (Centers for Disease Control and Prevention, 2011). Although it seems likely that the FFCWS measure captured mothers' and children's *primary* sleep, it remains possible that children's daytime naps were not included. We believe this has minimal implications for our results given that all of the children in our sample were age 5 and therefore most likely to get all of their sleep at night (Iglowstein, Jenni, Molinari, & Largo, 2003; Touchette et al., 2007).

The results presented here are limited to sleep duration rather than the full range of sleep problems that can affect well-being (e.g., sleep disorders such as sleep apnea and insomnia

or obstructed breathing (as can occur with asthma and other chronic illness), because these were not assessed in the FFCWS.

Finally, the unavailability of sampling weights for the subset of data we used means that our sample is not nationally representative but rather consists largely of disadvantaged women who live in large U.S. cities. Although this may limit the generalizability of our results, it also allows us to examine the balance between work and family life for the women most likely to face challenges: those with fewer economic and social resources, who must often work long hours and nonstandard schedules to support their families. Our findings suggest that these key parameters of parents' work lives may exact costs on family health and well-being.

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Appendix

Table A1.

Summary of Supplementary Analyses Predicting Mother's Sleep

Variable (reference category)	Mother's sleep deficit ^a		Mother's hours of sleep (continuous)		Mother's hours of sleep (continuous)		Mother's low sleep ^b	
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>e^B</i>	<i>SE</i>
Mother's work hours (1–19 hours/week)								
20–34 hours/week	0.11	0.10	−0.17	0.15			1.44	0.32
35–40 hours/week	0.14	0.09	−0.28 *	0.14			1.54 *	0.33
41+ hours/week	0.31 **	0.11	−0.43 **	0.16			1.95 **	0.45
Work hours (continuous)					−0.01 **	0.00		
Mother's work schedule (standard schedule)								
Nonstandard schedule	0.16 ***	0.05	−0.21 **	0.07			1.26 *	0.13

Note: Data are from the Fragile Families Child and Wellbeing Study. All models adjust for mother's race, mother's age, mother's education, welfare receipt in the past year, mother's cognitive test scores, mother's depressive symptoms, father's age, father's education, mother's relationship status, number of kids under age 18 in the household, child's sex, child's age, child low birth weight, child physical disability, and Year 3 household income.

^aThe number of hours less than the recommended 7 hours of sleep.

^bThis model excludes children with physical disabilities (2% of the sample).

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table A2.

Summary of Supplementary Analyses Predicting Child's Sleep

Variable (reference category)	Child's sleep deficit ^a		Child's sleep hours (continuous)		Child's sleep hours (continuous)		Child low sleep ^b	
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>e^B</i>	<i>SE</i>
Mother's work hours (1–19 hours/week)								
20–34 hours/week	0.11	0.09	–0.26*	0.13			1.57*	0.36
35–40 hours/week	0.17	0.09	–0.35**	0.12			1.93**	0.42
41+ hours/week	0.08	0.10	–0.23	0.13			1.53	0.36
Work hours (continuous)					–0.01*	0.00		
Mother's work schedule (standard schedule)								
Nonstandard schedule	0.07	0.05	–0.06	0.06			1.08	0.11

Note: Data are from the Fragile Families Child and Wellbeing Study. All models adjust for mother's race, mother's age, mother's education, welfare receipt in the past year, mother's cognitive test scores, mother's depressive symptoms, father's age, father's education, mother's relationship status, number of kids under age 18 in the household, child's sex, child's age, child low birth weight, child physical disability, and Year 3 household income.

^aThe number of hours less than the recommended 10 hours of sleep.

^bThis model excludes children with physical disabilities (2% of the sample).

*
p < .05.

**
p < .01.

p < .001.

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Table 1.

Descriptive Characteristics of the Sample of Employed Mothers Who Completed the Year 5 In-Home Interview

Characteristic	<i>n</i>	<i>M/%</i>	<i>SD</i>
Mother employed in any nonstandard schedule	1,818	0.55	
Mother's work hours			
1–19 hours/week	1,818	0.07	
20–34 hours/week	1,818	0.21	
35–40 hours/week	1,818	0.53	
41+ hours/week	1,818	0.19	
Mother's race			
White	1,818	0.21	
Black	1,818	0.52	
Hispanic	1,818	0.24	
Other	1,818	0.03	
Mother's age	1,818	30.31	5.94
Mother's education			
Less than high school	1,818	0.20	
High school/GED	1,818	0.26	
Some college/tech school	1,818	0.39	
College or more education	1,818	0.15	
Welfare receipt past 12 months	1,818	0.11	
Mother's WAIS–R	1,818	6.99	2.54
Father's age (at baseline interview)	1,818	27.56	6.91
Father's education (at baseline interview)			
Less than high school	1,818	0.29	
High school/GED	1,818	0.37	
Some college/tech school	1,818	0.23	
College or more education	1,818	0.11	
Mother's relationship status			
Not married or cohabiting	1,818	0.41	
Married to child's biological father	1,818	0.31	
Married to partner (not biological father)	1,818	0.04	
Cohabits with child's biological father	1,818	0.13	
Cohabits with partner (not biological father)	1,818	0.11	
Number of kids < age18 in household	1,818	2.42	1.28
Child is male	1,818	0.51	
Child's age in months	1,818	61.31	2.45
Child had low birth weight	1,818	0.09	
Child has physical disability	1,818	0.02	

Characteristic	<i>n</i>	<i>M/%</i>	<i>SD</i>
Year 3 household income (in thousands)	1,818	38.43	40.33
Mother's depressive symptoms (Year 3)	1,818	0.13	
Child low sleep (< 10 hours)	1,814	0.52	
Mother low sleep (< 7 hours)	1,815	0.51	

Note: Data are from the Fragile Families Child and Wellbeing Study. All variables were measured when the child was age 5, unless otherwise noted. WAIS-R = Wechsler Adult Intelligence Scale—Revised.

Table 2.

Estimates From Logistic Regression Models Predicting Mother Low Sleep (< 7 hours, N = 1,815)

Variable (reference category)	Model 1		Model 2	
	e^B	SE	e^B	SE
Mother's work hours (1–19 hours/week)				
20–34 hours/week	1.44 ^a	0.32	1.47	0.36
35–40 hours/week	1.58 [*]	0.33	1.88 ^{**}	0.43
41+ hours/week	1.99 ^{**}	0.45	2.02 ^{**}	0.51
Nonstandard schedule (standard schedule)	1.25 [*]	0.13	1.22	0.15
One adult in the household			1.51	0.90
One adult × 20–34 hours			0.82	0.51
One adult × 35–40 hours			0.48	0.28
One adult × 41+ hours			0.78	0.48
One adult × nonstandard schedule			1.08	0.24
Mother's race/ethnicity (White)				
Black	1.37 [*]	0.19	1.37 [*]	0.19
Hispanic	0.96	0.16	0.95	0.15
Other	1.20	0.38	1.15	0.36
Mother's age	1.00	0.02	1.00	0.01
Mother's education (college or more education)				
Less than high school	1.17	0.25	1.17	0.25
High school/GED	1.33	0.26	1.33	0.26
Some college/tech school	1.46 [*]	0.25	1.45 [*]	0.25
Mother on welfare in past year	1.10	0.18	1.14	0.19
Mother's WAIS-R	1.04	0.02	1.04	0.02
Father's age at baseline interview	0.99	0.01	0.99	0.01
Father's education at baseline interview (college or more education)				
Less than high school	1.01	0.24	1.03	0.24
High school/GED	1.04	0.23	1.05	0.22
Some college/tech school	1.23	0.26	1.23	0.25
Mother's relationship status (not married/cohabiting)				
Married to child's biological father	0.96	0.13		
Married to partner (not biological father)	1.19	0.32		
Cohabits with child's biological father	1.01	0.16		
Cohabits with partner (not biological father)	1.55 ^{**}	0.26		
Number of kids < age 18 in household	1.17 ^{***}	0.05	1.17 ^{***}	0.05
Child is male	0.91	0.09	0.91	0.09
Child's age (in months)	0.98	0.02	0.98	0.02

Variable (reference category)	Model 1		Model 2	
	e^B	SE	e^B	SE
Child low birth weight	1.07	0.19	1.08	0.19
Child physical disability	0.89	0.34	0.91	0.34
Year 3 household income (thousands)	1.00	0.00	1.00	0.00
Mother's depressive symptoms (Year 3)	1.15	0.17	1.15	0.17
Constant	0.75	0.98	0.80	1.04

Note: Data are from the Fragile Families Child and Wellbeing Study. All variables were measured when the child was age 5, unless otherwise noted. WAIS-R= Wechsler Adult Intelligence Scale—Revised.

^aStatistically significant difference vs. 41+ hours ($p < .05$).

*
 $p < .05$.

**
 $p < .01$.

 $p < .001$.

Table 3.

Estimates From Logistic Regression Models Predicting Child Low Sleep (< 10 hours, N = 1,814)

Variable (reference category)	Model 1		Model 2	
	e^B	SE	e^B	SE
Mother's work hours (1–19 hours per week)				
20–34 hours per week	1.63 *	0.37	1.52	0.37
35–40 hours per week	1.98 *** ^a	0.42	1.98 **	0.45
41+ hours per week	1.52	0.35	1.49	0.37
Nonstandard schedule (standard schedule)	1.09	0.11	1.17	0.14
One adult in the household			1.19	0.75
One adult × 20–34 hours			1.42	0.92
One adult × 35–40 hours			1.09	0.68
One adult × 41+ hours			1.15	0.75
One adult × nonstandard schedule			0.84	0.19
Mother's race/ethnicity (White)				
Black	2.26 ***	0.32	2.28 ***	0.32
Hispanic	1.73 ***	0.28	1.75 ***	0.28
Other	1.51	0.47	1.51	0.47
Mother's age	0.99	0.01	0.99	0.01
Mother's education (college or more education)				
Less than high school	1.13	0.24	1.15	0.24
High school/GED	1.53 *	0.29	1.58 *	0.30
Some college/tech school	1.53 *	0.26	1.54 *	0.26
Mother on welfare in past year	0.78	0.13	0.79	0.13
Mother's WAIS-R	1.00	0.02	1.00	0.02
Father's age at baseline interview	1.02	0.01	1.02	0.01
Father's education at baseline interview (college or more education)				
Less than high school	1.20	0.28	1.24	0.29
High school/GED	1.12	0.24	1.16	0.25
Some college/tech school	1.03	0.21	1.06	0.22
Mother's relationship status (not married/cohabiting)				
Married to child's biological father	0.82	0.11		
Married to partner (not biological father)	0.85	0.23		
Cohabits with child's biological father	1.00	0.16		
Cohabits with partner (not biological father)	0.94	0.15		
Number of kids < age18 in household	1.06	0.04	1.06	0.04
Child is male	0.90	0.09	0.91	0.09
Child's age (in months)	0.98	0.02	0.98	0.02

Variable (reference category)	Model 1		Model 2	
	e^B	SE	e^B	SE
Child low birth weight	0.93	0.16	0.92	0.16
Child physical disability	0.89	0.32	0.92	0.33
Year 3 household income (thousands)	1.00	0.00	1.00	0.00
Mother's depressive symptoms (Year 3)	1.07	0.16	1.06	0.16
Constant	0.49	0.65	0.45	0.60

Note: Data are from the Fragile Families Child and Wellbeing Study. All variables were measured when the child was age 5, unless otherwise noted. WAIS-R= Wechsler Adult Intelligence Scale—Revised.

^aStatistically significant difference vs. 41+ hours ($p < .05$).

*
 $p < .05$.

**
 $p < .01$.

 $p < .001$.