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Toddler Bedtime Routines and Behavioral, Cognitive, and Health Outcomes

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Short Abstract:

Despite interest in promoting sound sleep for toddlers, little is understood about whether advised techniques (e.g., regular bedtimes, routine sleeping arrangements) promote sleep and thereby child wellbeing. Moreover, little is known about the sleep patterns of children who may be at risk for adverse developmental outcomes. We use data from the Fragile Families and Child Wellbeing Study, a sample of children born primarily to low-income, single mothers, to first identify child and family characteristics associated with consistent child bedtimes and sleeping arrangements. We then estimate associations of children's sleep routines with cognitive, behavioral, and health outcomes. We find that children from disadvantaged families have less consistent sleep routines and engage in more co-sleeping with parents than their more advantaged counterparts. These factors are associated with increased behavior problems, but less so with cognitive or health outcomes. This research has implications for interventions intended to reduce behavior problems among disadvantaged children.

Extended Abstract:

Introduction:

Despite enormous interest among new parents on how to get their children to sleep soundly, little is understood about whether advised techniques (e.g., consistent bedtimes, routine bedtime behaviors, regular sleeping arrangements) are associated with improved behavioral, health, and cognitive outcomes among the children (Morganthaler et al. 2006, Mindell et al., 2006). This is of particular interest for children who may be at risk for adverse behavioral, cognitive, and health outcomes. Previous research has identified racial differences in whether children take naps and what time they go to bed (Adam et al., 2007; Crabtree, et al. 2005; Crosby et al., 2005). Yet, little is known about how other family characteristics, such as family structure, income, and education, may be related to children's bedtimes and sleep-related routines. There is also a paucity of research exploring links from children's bedtimes, bedtime routines, and co-sleeping patterns with parents, to behavioral, cognitive, and health outcomes. Research indicates that socioemotional health and cognitive function among children and adolescents are impaired by restricting sleep (Bates et al., 2002, Carskadon et al., 2004; Sadeh et al., 2003). Other research shows a strong connection between total sleep time and weight (Snell et al, 2007; Knutson and Lauderdale, 2007). Generally, however, these studies focus more on older children and on sleep restriction, rather than on bedtime routines that can be influenced by parenting practices. This study begins to address these two related gaps in the literature by: (1) identifying child and family characteristics that are associated with children's bedtimes, bedtime routines, and co-sleeping patterns with parents; and (2) estimating associations of children's bedtimes, bedtime routines, and co-sleeping patterns with parents with multiple cognitive, behavioral, and health related outcomes.

Data:

We use data on approximately 2,350 children from birth to age 3, drawn from the Fragile Families and Child Wellbeing Study (FFCW). FFCW is a longitudinal birth cohort study of children born between 1998 and 2000 in 20 U.S. cities with populations over 200,000. The Study includes a substantial over sample of unmarried births, such that children are more likely to live in low-income families, to have nonresident fathers, to be Black or Hispanic, and to have parents with lower levels of education than children in a nationally-representative sample (see Reichman, Teitler, Garfinkel, & McLanahan, 2001, for a complete description of the sample and study design).

FFCW interviewed families in person shortly after the focal child was born and conducted follow-up interviews by telephone when the focal child was approximately 12- and 36-months of age. Subsequent to the 36-month telephone interview, parents were asked to participate in an in-home module designed to assess multiple domains of parenting, the home environment, mother-child interactions, and child cognitive and emotional/behavioral development through both a questionnaire and a set of interviewer

observed items. Mothers who refused an in-home visit were asked to complete the questionnaire portion of the in-home module by telephone. Our data are drawn from the birth, 12-month, and 36-month interviews, including the 36-month in-home assessment. During each of these interviews, respondents provided extensive information about family/household resources, structure, and functioning; program participation; physical and mental health; and parenting behaviors.

Analysis and Measures:

The first step of our analysis describes sleep-related routines and behaviors of the children and families in our sample focusing on three outcomes: (1) whether a child has a regular bedtime and, if so, what that bedtime is; (2) whether the family engages in a set of routine behaviors such as giving the child a comfort toy, bathing or washing, changing a diaper, or reading a story, when putting the child to bed; and (3) whether the parent(s) and child sleep in the same bed (i.e., co-sleeping with parents). We present descriptive statistics of the distribution of these behaviors across our full sample, as well as bivariate associations between these behaviors and a host of child and family characteristics, including child sex, whether the child was born low birth weight, race/ethnicity, the number of adults in the household, the number of children in the household who are older and younger than the focal child, family structure, maternal education, family income, maternal Peabody Picture Vocabulary Test (PPVT) score (a measure of receptive vocabulary), and maternal depression. Finally, we present bivariate associations between these behaviors and our 7 outcome measures: the child's PPVT score, three subscales (anxious/depressed, withdrawn, and aggressive) of the Child Behavior Checklist (CBCL), and three health measures (a maternal rating of the child's overall health, whether the child is overweight, and whether the child is obese).

In the second step of our analysis, we use probit regressions to estimate multivariable associations of the child and family characteristics with the three primary measures of sleep-related routines and behaviors. We also use an ordered probit model to estimate associations between the background characteristics and the likelihood that a child's bedtime is before 8:00 p.m. (reference category), between 8:00 and 8:59 p.m., between 9:00 and 9:59 p.m., and at 10:00 p.m. or later.

In the final stage of our analysis, we use ordinary least squares (for continuous outcomes) and probit regressions (for dichotomous outcomes) to estimate associations of sleep-related routines and behaviors with cognitive, behavioral, and health outcomes, net of the full set of child and family background characteristics.

Results:

Descriptive evidence suggests that 81.5% of the children in our sample have a regular bedtime. Just over 4% of sample children are put to bed before 8:00 p.m., 38% between 8:00 and 8:59 p.m., 47% between 9:00 and 9:59 p.m., and 11% at 10:00 p.m. or later. For those children with regular bedtimes, 68.5% of mothers report using the bedtime 5 nights a week or more. More than 80% of children have some type of bedtime routine, the most

common of which include teeth brushing (40.9%), saying prayers (26.7%), and having a snack (18.7%). Finally, about 17% of sample children sleep in the same bed as their parent(s).

Bivariate analyses also reveal considerable differences in these factors by family background characteristics. In general, white children and more advantaged children tend to have earlier bedtimes and are both more likely to have bedtime routines and less likely to co-sleep with parents than Black, Hispanic, and less advantaged children. Many of these associations are also supported by estimates from probit regressions estimating associations of family characteristics with sleep-related routines and behaviors vis-à-vis children. Here, we also find evidence that the sleep-related routines and behaviors vary considerably by family structure.

Finally, we present estimates of associations of sleep-related routines and behaviors with the 7 cognitive, behavioral, and health outcomes (described above), net of the full set of child and family background characteristics. On the whole, we find a positive association between bedtime routines and children's PPVT scores, and a negative association between co-sleeping and PPVT scores. Neither whether children have a regular bedtime, nor the time they are put to bed, is associated with PPVT scores among the 3-year old children in this sample. Regular bedtimes are associated with decreased behavior problems, however, with effect sizes ranging from about .10 to .25 standard deviations. Being put to bed later and co-sleeping with parents are both associated with increased behavior problems. Finally, we find little evidence of links between sleep-related behaviors and routines with overall health, being overweight, or being obese in this sample.

Discussion:

The implications of research on the social determinants of children's sleep patterns are numerous. In the short run, differences in sleep behaviors by race, family structure, and socioeconomic status may help explain behavioral differences among groups of children. In the longer run, differences in children's sleep routines might contribute to longer-term habits that are associated with adverse behavioral or other consequence later in life. Indeed, research on older children (age 3-12) has found that children who go to bed later have higher BMIs at a 5-year follow up (Snell et al., 2007). Similar results were found in a population of adolescents aged 10-19 years (Knutson and Lauderdale, 2007). In addition, since sleep is associated with both cognitive function and the capacity to learn, the style in which children are taught to go to sleep may have longer-term implications for performance in school, on cognitive challenges, and self-esteem.

A better understanding of sleep patterns early in children's lives—and, particularly of socioeconomic differences in this area—can help to inform the development of interventions that target the high risk populations and may have implications for improving outcomes for these children. Such interventions may provide an opportunity to reduce disparities in child outcomes between advantaged and disadvantaged children.

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