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Toddler naps in child care: associations with demographics and developmental outcomes

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ABSTRACT

Objectives: The objectives were to characterize the rate, duration, and factors associated with napping in a large, nationally representative sample of toddlers attending child care.

Design: We analyzed a subset of data from the nationally representative Early Childhood Longitudinal Study—Birth Cohort, including parent report, caregiver report, and observational measures.

Participants: Data were limited to the 3050 participants reporting that their 2-year-old routinely spent greater than 1 hour per week in nonparental child care.

Measurements: Interviews were completed to measure child care type (relative, nonrelative, center-based), demographics, bedtime characteristics (eg, presence of a bedtime routine, assistance needed to fall asleep), and naptime. The Bayley Scales of Infant Development—Research Edition was used to measure child outcomes.

Results: Napping was reported to occur in 91% of 2-year-olds, with most naps reported to last 2 hours. Significant racial and ethnic differences were found in nap duration, with black children napping longer and Latino children napping shorter than white children, controlling for socioeconomic status and sex. Children cared for by relatives had longer naps than those in nonrelative child care. There were no significant relationships between naps and child outcomes.

Conclusions: Results highlight racial and ethnic differences in daytime napping duration and interesting differences in nap duration in different child care settings. Child care providers may use these results to adopt appropriate expectations, policies, and practices for 2-year-old napping.

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Children reduce the frequency and duration of daytime sleep during early childhood.^{1,2} Most infants have 2 naps, a shorter morning nap and a longer nap in the afternoon; children give up the morning nap during the second year of life; and most children discontinue napping around 4 years of age.³ A meta-analysis revealed that, on average, 86% of 2-year-olds, 68% of 3-year-olds, 50% of 4-year-olds, and 33% of 5-year-olds napped at least once per week.⁴ Interestingly, the “Sleep in America Poll”⁵ consistently found fewer children napping at each age compared with studies done earlier in the century, mirroring the trend that people are sleeping less over time. The Poll⁵ reported 81% of 2-year-olds nap; a study using a small convenience sample published just 10 years earlier² reported that 100% of 2-year-olds napped. Iglowstein and colleagues⁶ longitudinal analysis of population sleep trends reported that 87% of 2-year-olds napped, whereas only 50% of 3-year-olds did so. It is clear from the existing literature that daytime napping decreases during childhood, as total sleep need decreases. The National Sleep Foundation⁷

recently widened its recommended total sleep duration for toddlers from 12–14 hours to 11–14 hours. This recommendation presumably includes one daytime nap, although napping is not specifically mentioned.

Nap duration also changes with age, with young children across the globe sleeping for shorter durations as they move through the preschool years.^{8,9} Mindell et al⁸ found that age was the best predictor of daytime sleep duration. As expected, older toddlers slept less during the day. Bedtime explained a small, independent amount of variance in daytime sleep duration, with later bedtimes related to longer nap durations. Investigations relying on objective measures of sleep reveal similar trends across the preschool years, with more children becoming “non-nappers” and sleeping for shorter durations as they reach 4 to 5 years compared with 2- and 3-year-old children.^{10,11}

At least 1 study has also identified racial differences in both the frequency and duration of napping within the United States.¹² In particular, the authors found that black children took longer naps compared with white children at 2 years of age despite the same percentage of children napping and the same amount of total sleep across 24 hours in the 2 groups of children. This between-group variability in napping by race deserves further investigation.

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Variations in sleep amount and quality play a critical role in developmental processes, including attentional and affective regulation.^{13,14} Research on adults^{15–18} and older children^{19,20} suggests that napping can improve learning and memory. Less research attention has been given to young children. In addition, although most research has focused on the role of *nighttime* sleep quantity and quality in the development and regulation of neurocognition and affect,^{21–24} there is a growing body of literature on relationships between variability in *daytime* sleep and children's developmental outcomes.

For example, Bernier and colleagues²⁵ reported that toddlers performed better on tasks related to executive functioning when a greater proportion of their 24-hour sleep occurred at night. Lam et al²⁶ also found a negative correlation between daytime napping and neurocognitive function in preschoolers. Interestingly, a recent study by Werchan and Gomez²⁷ found that afternoon *wakefulness* promoted generalizability of word learning in 2-year-olds. In the most recent systematic meta-analysis of published research on daytime sleep, Thorpe et al²⁸ reported an approximately equal number of studies showing a benefit to cognition as those showing a cost to cognition for children who habitually nap. Results regarding the relationship between daytime sleep and cognition are inconsistent and deserve further investigation.

Reduction in daytime napping and duration may be a marker of brain maturation. This reduction parallels increases in working memory, cognitive functioning, and behavioral control. Research does not suggest that it is less sleep that results in better performance. Indeed, experimental data suggest that sleep restriction (through depriving 30- to 36-month-old children of their daytime nap) with no concomitant increase in nighttime sleep has a negative impact on children's emotion responses.²⁹ Coupled with previous naturalistic research showing that nighttime sleep duration increases when young children do not nap,^{10,30,31} it seems clear that it is not less total sleep but the proportion of sleep occurring at night that relates to neurocognitive and affective outcomes in young children.

Much work has been conducted to illuminate the relationships between daytime and nighttime sleep and children's development. Earlier work faced important limitations, including: reliance on parental report; small and homogenous samples; and a lack of concurrent, objective measurement of the child's development, whereas more recent studies have included objective methodology to measure both sleep and behavior. Nonetheless, most studies to date have had small sample sizes, and those with larger samples have not used objective methods of studying sleep and/or child outcomes. Furthermore, a thorough literature search revealed no studies examining toddler napping in different types of out-of-home care, where at least half of toddlers spend some part of their day. The current analysis attempts to address these limitations by using a large, national data set that measured children's outcomes directly through observational assessments.

Using data from a sample of 2-year-old children, we examined the following research questions: (1) What percentage of children enrolled in child care are reported to nap? For those children who do nap, what is the average reported nap duration? (2) Does reported nap duration vary by child care type? (3) Are there socioeconomic, racial/ethnic, or sex differences in reported nap duration? (4) Are bedtime sleep characteristics related to reported nap duration in child care? (5) Is reported nap duration associated with concurrent cognitive development, motor development, and social and emotional development?

Participants and methods

Participants

Participants were part of the Early Childhood Longitudinal Study—Birth Cohort (ECLS-B) begun in 2001. ECLS-B is the first

longitudinal study in the United States to track a nationally representative sample of children from infancy to school entry. It includes an oversampling of traditionally underrepresented populations.³² Data were collected in 5 waves between 9 months and first grade. The analyses presented here use the 2-year restricted-use data from ECLS-B that include interviews and questionnaires completed by parents and child care providers and direct assessments of the children. These data were collected in 2003–2004.

At 2 years, 9840 parent interviews and 9220 child assessments were completed. Nearly all (90%) of the interviews and assessments occurred within 1 month of the child's 2-year birthday. However, only 3050 children of the total sample at 2 years attended a nonparental child care setting for more than 1 hour a week on a regular basis. This subset of children for whom information on napping was available from the child care provider was the focus of the analysis. Although the inclusion criterion for nonparental child care attendance was lenient, on average, children in this sample attended child care for 7 to 8 hours per day.

Measures

Child characteristics

Weighted percent or mean, standard errors, and weighted Ns of all the variables are presented in Table 1. The sample was racially and ethnically diverse (53% white, 18% black, 22% Latino, and 2% Asian). Family socioeconomic status (SES) quintile is a composite score taking into account parents' self-reported education level, occupation, and household income (see Nord et al^{33,34}). Parents reported infant birth weight at the initial 9-month wave. We coded 1 as being very low birth weight or moderately low birth weight, and 0 as being normal birth weight. Child characteristics were used as control variables in the analyses.

Bedtime sleep characteristics

At the 2-year parent interview, parents reported whether or not their child had a regular routine when put to sleep at night (1 = yes; 0 = no) and whether the child needed a lot of help to fall asleep (1 = yes if parents report child "is like this most times"; 0 = no if parents report child "never like this," "used to be like this," or "is like this sometimes"). Nighttime sleep duration data were not collected.

Nap characteristics

At the 2-year child care provider interview, providers were asked the following question: "In a typical day while child is in your care,

Table 1
Sample characteristics.

Variables	Weighted percent or mean ^a	SE
Child characteristics		
Male, %	51.79	1.20
White, %	52.94	2.06
Black, %	17.60	1.37
Latino, %	15.19	1.46
Asian/Pacific Islanders, %	2.26	0.24
Socioeconomic status (range, 1–5) ^b	3.19	0.05
Low birth weight, %	7.64	0.32
Sleep variables		
Take a nap, %	90.62	0.90
Nap duration hours (range, 0–15)	1.94	0.03
No bedtime routine, %	10.15	0.75
Difficulties falling asleep, %	13.49	0.69
Developmental scores		
Mental	50.98	0.26
Motor	50.62	0.31

^a Unweighted total Ns range from 3000 to 3050

^b Five represents the highest SES category.

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