

Children's sleep patterns during the school year and summer break

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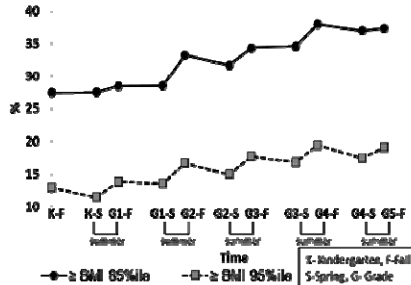


Introduction

- Childhood obesity is a national issue¹ that's cause is not simply and definitely known.
- Though factors contributing to childhood obesity, such as eating habits and activity levels, have been studied extensively it is now apparent that other factors, such as sleep patterns could also be contributing to this problem.²
- Shortened sleep duration is associated with increasing weight in children.²
- The summer break from school has been identified as a time during which children gain at an accelerated rate (see Figure 1).³
- Lack of structure during the summer is thought to contribute to changes in children's sleep patterns which may explain accelerated summer weight gain.
- Yet, little is yet known about seasonal variation in sleep duration among children.⁴
- The school summer paradigm offers an important opportunity to explore the role of sleep in the seasonal differences observed in children's weight gain.

Figure 1

Figure 1. Summer increases in BMI contribute to increased rates of overweight and obesity among children³



Study Objective and Hypothesis

- The objective of this study was to explore potential causes of children's accelerated weight gain during the summer months.
- This study examined differences in children's parent-reported sleep patterns during the school year and summer among 5-8 year-old children

Methods

Participants

- One hundred and ninety-six children and their parents were recruited from schools and online sources (e.g., Facebook) to participate in a longitudinal observational study.

Procedure

- Using questions adapted from validated measures, parents reported their child's bedtime and wake time for a usual weekday and weekend and the previous night once during the school year and once during the summer.
- Sleep duration was calculated based on reported bedtimes and wake times. PROC MIXED with 2 levels (time points nested within subjects) was used to analyze differences between summer and school-year.
- Sex, ethnicity, and recruitment source were included as covariates.

Results

- While no differences were found for usual weekday ($p=.41$) and weekend ($p=.22$) sleep duration between the school year and summer, parents reported differences in timing of sleep.
 - Usual weekday the wake time was 30 minutes later during the summer than during the school year ($p<.001$).
 - Weekday bedtime was 15 minutes later during summer, though this only trended toward significance ($p=.10$).
 - Usual weekend bedtime was 10 minutes later during summer than during the school year ($p<.001$).
 - Usual weekend wake time was 47.6 minutes later during the summer compared to the school year ($p<.001$).
- While parents reported usual sleep durations during the school year and summer did not differ, parent reported sleep duration for the previous night did differ.
 - Children reportedly slept longer during the summer (10.4 hours, $SE=.11$) compared to the school year (10.1hrs, $SE=.12$, $p<.001$).
 - On average parents reported children woke up 47.6 minutes later during the summer than the school year ($p<.001$).
 - Previous night bedtime did not differ ($p=.77$).

Table 1

Variables	Mean (SD) or % (n)
Child Age at Baseline	7.2(0.93)
Child Grade at First Measurement	25.0% (29)
Kindergarten	40.3% (79)
1st grade	28.1% (55)
2nd grade	6.6% (13)
3rd grade	
Child Gender (% female)	48.5% (95)
Race/Ethnicity	
Asian/Asian American	5.6% (11)
African American	11.2% (22)
Caucasian	45.4% (89)
Hispanic/Latino	21.5% (42)
Multiracial	14.8% (29)
Not reported	1.5% (3)
Respondent Relation to the Child	93.3% (181)
Mother	
Household Income	
Less than \$40,000	15.3% (30)
\$40,000-\$69,999	16.3% (32)
\$70,000-\$99,999	13.8% (27)
\$100,000-\$149,000	15.3% (30)
\$150,000 or more	24.0% (47)
Missing	15.3% (30)
Parent Education	
Some High School	3.1% (6)
High School/GED	6.1% (12)
Some College	11.2% (22)
College Degree	32.7% (64)
Graduate School	46.9% (92)
Parent Marital Status	
married	78.1% (153)

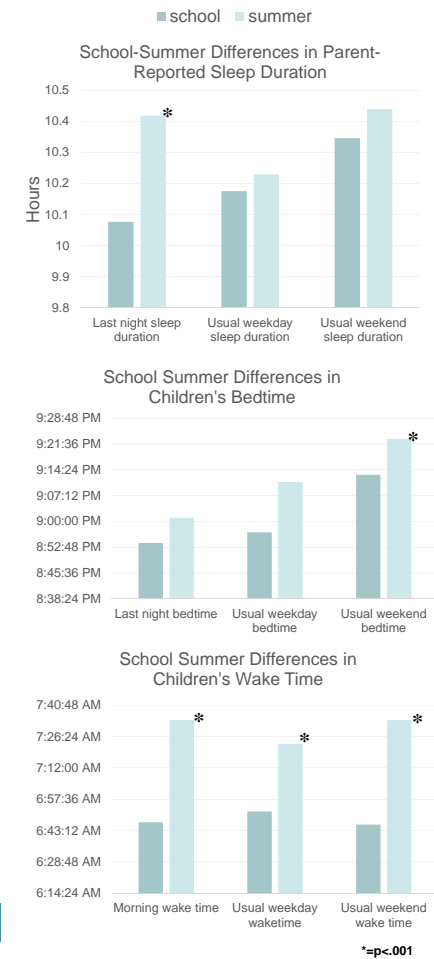
Support

This study was supported by the Boyd and Evelyn Mullen Foundation and by federal funds from the United States Department of Agriculture – National Institute of Food and Agriculture, Hispanic Serving Institution Education Grant Program, Grant # 2015-38422-24080

References

1. Ogden CL, et al. *JAMA* 2012;307:483-490.
2. Hart CN, Jelalian E. *Behav Sleep Medicine* 2008;6:251-267.
3. Moreno JP, et al. *J Sch Health* 2013;83:473-477.
4. Baranowski, T, et al. *Child Obes.* 2014; 10(1):18-24.

Figures 2-4



Conclusions

Overall, we found that usual sleep duration did not differ greatly during the school year and summer; however, differences in previous night sleep duration and the timing of bedtime and wake times were observed. Reporting usual sleep patterns may be more heavily influenced by social desirability than parents' reports of sleep for the previous night. These findings should be replicated using more objective sleep measures and associations with seasonal weight change should be examined.