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Associations Between Sleep and Inattentive/Hyperactive Problem Behavior Among Foster and Community Children

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Abstract

Objective—Sleep disruption has been linked to numerous neural regulatory problems and problems with social emotional and behavioral functioning, and researchers have shown that sleep disruption is prominent in children with symptoms of attention-deficit hyperactivity disorder. These issues are germane to foster children, who have numerous disparities in areas of self-regulation and psychopathology but for whom there has been very little examination of sleep quality or the associations between poor sleep quality and physiological/behavioral dysregulation.

Method—Actigraphy measures were used to examine associations between sleep duration/quality and inattentive/hyperactive problem behavior in a sample of 79 children (ages 5–7 years): 32 foster children and 47 nonmaltreated community children.

Results—Of the sleep variables examined, only sleep duration was significantly associated with inattentive/hyperactive problem behavior. These associations were more significant in foster children compared to community children and in boys compared to girls.

Conclusion—The results have several implications for prevention and intervention research.

Keywords

sleep; actigraphy; ADHD; foster children

Sleep has been referred to as a “window to the central nervous system”¹ owing to its close associations with many other neurophysiological variables. Insufficient or inconsistent sleep is predictive of such regulatory problems as failure to thrive in infancy, poor neurobehavioral functioning in early childhood, and poor academic performance into adolescence.² Sleep affects functioning via 2 primary mechanisms. First, sleep is a restorative mechanism that decreases daytime sleepiness and increases alertness, behavioral regulation, and cognitive performance. Second, sleep is an active state that is integral to such brain functions as memory consolidation, learning, mood and hormonal regulation, and brain development.^{3,4}

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Children are highly vulnerable to sleep disruption in early childhood, perhaps owing to the complexity of the sleep process and the children's reliance on caregivers for achieving and maintaining sleep. Sleep disturbance, identified as early as infancy, is predictive of long-term sleeping problems, which may have negative implications for subsequent cognitive, emotional, behavioral, and physiological development.⁵

Sleep disturbance has been operationalized in such ways as reduced sleep duration, increased sleep fragmentation (ie, multiple awakenings), and problems initiating sleep. Researchers of children's sleep have employed subjective (eg, caregiver-completed sleep diaries or retrospective report) and objective (eg, polysomnography or actigraphy) methodologies. Interestingly, the subjective measures have frequently shown stronger associations with criterion variables than have the objective measures.⁶ One explanation for this is that intermittent sleep disturbance might affect subjective more than objective measures. Specifically, poor sleep on only a few nights per week, referred to as the "pendulum effect,"⁷ might lead to caregiver perceptions of global sleep disturbance that would be picked up by subjective measures. In contrast, objective measures typically aggregate data from 2 or more consecutive nights, so poor sleep on only a few nights per week might not significantly elevate the mean values.

Inconsistent sleep has been described as a stressor. When sleep is irregular, it is difficult to overcome accumulated lost sleep, often referred to as "sleep debt." Bates et al⁸ likened the impact of high sleep variability to the extreme fatigue and cognitive impairment associated with jet lag. Other researchers have found that sleep variability is associated with poor developmental outcomes as early as infancy. Interestingly, Halpern et al¹ found that the degree of stability in sleep time over the course of each 24-h period (but not the average amount of sleep) in infancy was predictive of subsequent developmental status, lower behavioral and medical problems up to age 30 months, lower mortality rates, and psychomotor and mental abilities as measured using the Bayley Scales of Infant Development.⁹

Sleep and Symptoms of Attention-Deficit Hyperactivity Disorder (ADHD)

Sleep researchers have investigated sleep variability as a measure of overall regulation and as a predictor of behavior problems.^{2,7} They have argued that circadian regularity in sleep and arousal states is a marker of developmental maturation and is essential for self-regulation and that poor circadian regularity can lead to ineffective attention modulation and orientation and may compromise other functions such as information processing, learning, and memory. For example, Gruber and Sadeh² found that within-child irregularities in sleep quality, sleep quantity, and sleep schedule were related to poor outcomes on simple and complex neurobehavioral tasks in non-sleep-disordered children. They also found some relationships between mean levels of sleep and neurobehavioral functioning, but the relationships were less consistent and only reached significance for the complex neurobehavioral tasks.

A variety of indicators of sleep disruption have been associated with inattentive/ hyperactive problem behavior. For example, increased sleep latency, decreased sleep duration, and decreased sleep efficiency have each been linked with inattentive/hyperactive problem behavior.^{10,11} The most consistently significant indicator of sleep disruption across studies has been increased night activity (ie, increased restless or nonrestorative sleep). Researchers have also found total sleep duration to be a significant indicator, although these findings have varied with age. In a meta-analysis, Sadeh et al⁶ found that younger children diagnosed with ADHD had shorter sleep duration and that older children diagnosed with ADHD had longer sleep duration compared to age-matched controls. This may indicate that the younger

children were experiencing chronic sleep deprivation that intensified their symptoms. Furthermore, Paavonen et al¹² found that shorter sleep duration in 7- to 8-year-olds (as measured by actigraphy) was associated with increased caregiver reports of inattentive/hyperactive problem behavior.

There is some evidence of a causal relationship between sleep disruption and difficulties regulating behavior, emotion, and attention. However, such associations have rarely been experimentally evaluated, as the majority of sleep studies have employed correlational designs. One exception is Fallone et al's¹³ experimental restriction of sleep in 6- to 12-year-olds. They found that, after restricting sleep in these children, the teachers rated these children more highly on inattention than they did at baseline. Although this study provides some evidence of a potential directional relationship between sleep duration and inattention, further research is needed to more clearly identify causal associations in young children.

Behavioral Dysregulation and Sleep Disruption in Foster Children

Understanding the associations between sleep disruption and behavioral dysregulation is particularly important for the United States foster care population, which currently exceeds 500 000 children¹⁴ who exhibit disparities across a broad range of health and mental health indicators.¹⁵ Most germane to the present study is the very high rate of inattentive/hyperactive problem behavior found among foster children. For example, McMillen et al¹⁶ conducted structured diagnostic interviews with 373 older adolescent foster children. Lifetime rates of psychiatric diagnosis in this sample exceeded 60%, with ADHD being the most common diagnosis. Similarly, Garland et al¹⁷ examined psychiatric diagnoses with 1 618 children receiving public services. ADHD and disruptive behavior disorders were present in more than half the sample and were far more common than any other disorder.

Based on the above studies examining sleep and inattentive/hyperactive problem behavior in the general population, it is important to extend this line of research into the foster care population. In addition to the high rate of inattentive/hyperactive problem behavior observed in foster children, sleep disruption might be expected in foster children given their histories of abuse and neglect, the unstructured environments in which they have lived, and the family transitions that they have experienced. If inattentive/hyperactive problem behavior is associated with sleep disruption in foster children, it will be important to determine the direction or correlational nature of this association to identify potential intervention targets.

In the present study, we examined sleep and inattentive/hyperactive problem behavior (by group and by gender) in 2 same-age groups of young children: foster children and nonmaltreated community children. We hypothesized that the foster children would be especially sensitive to sleep disruption and would exhibit a strong association between the sleep variables and inattentive/hyperactive problem behavior symptoms. Given that boys have higher rates of ADHD than girls,¹⁸ we further hypothesized that the association between sleep disruption and inattention/hyperactivity problem behavior would be greater for boys than for girls.

Several qualities of the present study have the potential to advance the literature. First, we employed objective measures of sleep. As is noted above, the objective measures employed in previous studies have been less associated with outcome variables compared to subjective measures. Objective measures are methodologically advantageous, but it remains unclear whether they can be useful in examining children's sleep and psychosocial functioning. Second, we conducted multivariate modeling (using actigraphy and behavioral data from consecutive days) to examine causal associations between sleep and inattentive/hyperactive problem behavior the following day. This predictive approach has the potential to yield more useful information than correlational analyses.

METHOD

Participants

We assessed 79 children (41 females) between ages 3 and 7 years ($M = 5.25$, $SD = 1.05$). The sample included a foster care (FC, $n = 32$) group and an age-matched, nonmaltreated community children (CC, $n = 47$) group. Group comparisons by age, gender, and ethnicity are shown in Table 1. The FC and CC children did not significantly differ in terms of age ($F_{1,77} = .63$, $P = ns$) or sex (Pearson $\chi^2_1 [N = 79] = .08$, $P = ns$). The FC group did have fewer minority children in it; however, this difference was not significant (Pearson $\chi^2_3 [N = 79] = 6.98$, $P = ns$).

Each FC child was referred by the local child welfare system office and was entering a new foster care placement when they were recruited for a larger study. A subgroup of these children was invited to participate in the current study. The CC children were recruited via flyers at local grocery stores, daycare centers, and Head Start centers and via advertisements in local newspapers and newsletters. The CC children were recruited in 2 waves using the following inclusion criteria: the child consistently lived with at least one biological parent and the family did not have any previous involvement with child welfare services. Child welfare records were reviewed for all children to determine whether there had been any reported maltreatment.

Measures

Actigraphy Variables—Actigraphy is a well-validated measure of sleep quality and duration that can be collected at home. Actigraphs record movement-generated data, which is subsequently scored by computer-generated algorithms. These scoring algorithms differentiate activity into periods of sleep and wakefulness. In recent studies, actigraphy has been validated against polysomnography, with reported correspondence of the measures up to 93 % in adults and 89.9% in children.^{19–21}

In the current study, we used Basic Mini-Motionlogger actigraphs (Ambulatory Monitoring, Inc., Ardsley, NY), which are approximately the size of a wristwatch. The actigraph was fastened with a strap around the child's nondominant wrist as is recommended by Sadeh and Acebo.²² To make the device more child-friendly, it was placed in a terrycloth sleeve shaped like a sea creature.

Data were collected in 1-min epochs and at data amplification of 18, which is the default acquisition setting. After the 5 days of data acquisition, the stored actigraphic data were downloaded to a personal computer with ACT Millennium software and scored with Action W software (Ambulatory Monitoring, Inc., Ardsley, NY) using the Sadeh algorithm.²² The sleep actigraphy variables that were scored with Action W software included measures of *sleep duration* (scored as total minutes between *sleep onset* to *wake onset*), *true sleep time* (scored as total sleep minutes excluding any periods of wakefulness), *sleep percentage* (scored as the ratio of true sleep time:sleep duration), and *night activity* (scored as the percentage of sleep epochs with detected motion). The sleep actigraphy variables that were manually scored included *night wakefulness* (scored as any consecutive 5 min of wake bounded by 15 min of uninterrupted sleep epochs), sleep onset (scored as the beginning of the first 15-min epoch of uninterrupted sleep), wake onset (scored as the last 15-min epoch of uninterrupted sleep), and *sleep latency* (scored as the number of minutes between *lights out time* and sleep onset). The caregivers were trained to indicate lights out time and *rise time* using an event marker button on the actigraph.

Prior to conducting the analyses, each data file was cleaned to ensure data integrity. This involved checking the actigraphy data against a caregiver-reported sleep diary, which

provided a subjective report of sleep quality, daily naps, and night sleep duration. The sleep diary also ensured accuracy with the actigraphic event marks and allowed us to verify that the actigraph was not removed during the night and did not malfunction. The data from nights when the actigraph was removed or malfunctioned ($n = 7$) and when there was noncompliance with the study protocol ($n = 7$) were excluded from the analyses; this excluded 4 children from further analyses. Caregiver-reported illness during the study period was not an exclusion criterion. All 75 children included in the analyses had at least 4 nights of data. All sleep variables were aggregated over the 5 days of data collection to compute mean values, and their variability was computed by taking the standard deviation over the 5 study days.

Stability of the repeated actigraphy and behavior measures was examined through intraclass correlations (ICCs). Reliability estimates generally ranged from 0.70 to 0.89, which is considered to exceed the night-to-night reliability standards (ICCs greater than 0.70) proposed by Acebo et al.²³ The exceptions to this were nighttime wakefulness and sleep duration (0.60 and 0.69, respectively).

Inattentive/Hyperactive Problem Behavior—We assessed inattentive/hyperactive problem behavior via caregiver reports on the Parent Daily Report Checklist (PDR),²⁴ a 52-item measure in which caregivers indicate whether specific problem behaviors occurred in the previous 24 h and the extent to which the behaviors were stressful. Unlike measures that gather information about a child's general behavior, the PDR asks about specific behaviors that occur within a day, making it more sensitive to day-to-day behavioral changes. The PDR has shown good test-retest reliability and concurrent validity with other known problem behaviors.²⁴ It has been found to be associated with measures of child and family functioning, including live observation.^{25,26} In the current study, we used the Inattentive/Hyperactive Problem Behavior scale from a modified version of the PDR that reflected the frequency and intensity of behaviors. The PDR is not a diagnostic tool and is used exclusively to track changes in frequency of specific problem behaviors. The PDR ratings were completed in the morning to capture inattentive/hyperactive problem behavior that occurred during the previous 24-h period, including those occurring after bedtime. Reports were highly stable across days for inattentive/hyperactive problem behavior, with a reliability estimate of 0.83.

Procedure

We scheduled a home visit with each family to explain the study to each caregiver and child and to collect informed consent. For the FC children, caseworker consent was obtained prior to contacting the caregivers and scheduling the home visit. After completing the recruitment and consent procedures, the caregivers were trained on the use of the actigraphs and on the overall study procedures. They were provided with a binder of materials to be completed twice daily, after lights out time and after rise time. The sleep diary was completed on all 5 study days. The children were given 2 days to acclimate to wearing the actigraph at night prior to collecting behavioral data. Therefore, the PDR questionnaire was completed in the morning following study days 3–5. At the end of the study, the children were given a bath mitt version of their terrycloth actigraph sleeve, and the caregivers were compensated with \$100.

RESULTS

Preliminary Analyses

Age (Pearson correlations) and gender (t tests) were preliminarily investigated to determine any relation to the sleep and/or behavior measures. There were gender differences for

inattentive/hyperactive problem behavior; boys ($M = .97$, $SD = 1.23$) displayed greater a frequency of inattentive/hyperactive problem behavior compared to girls ($M = .41$, $SD = .83$; $t_{76} = 2.61$, $P < .05$). Inattentive/hyperactive problem behavior was not associated with age. There were very few age associations and no gender associations with the mean sleep measures or the sleep variability measures. Younger children tended to have a longer sleep latency ($r = -.25$, $P < .05$), increased night activity ($r = -.23$, $P < .05$), a lower sleep percentage ($r = .21$, $P = .06$), and increased variability of wake onset ($r = -.31$, $P < .05$), night activity ($r = -.33$, $P < .05$), and sleep percentage ($r = -.43$, $P < .05$). Thus, age and gender (in addition to group) were controlled for in all subsequent analyses.

Prediction of Inattentive/Hyperactive Problem Behavior From Sleep Measures

For the prediction of inattentive/hyperactive problem behavior from sleep, a generalized linear mixed-effects model for binomial data with an autoregressive error structure was used due to the dichotomization of the measure. Linear mixed-effects models are advantageous for repeated data because they allow for the estimation of participant-specific fixed effects (eg, regression coefficients) and participant-specific random effects (eg, time-varying effects). In this approach, the means and variances are estimated for each participant. Furthermore, linear mixed-effects models can easily manage missing data due to the maximum likelihood fit approach, so participants who have missing data points can be retained in the model. Refer to Bagiella et al²⁷ for a detailed discussion of the use of linear mixed-effects models.

The mixed-effects model was estimated using the GLIMMIX Procedure in SAS (v. 9.1.3; SAS Institute, Inc., Cary, NC), which is designed to be used with binary data. A first-order autoregressive variance structure was selected due to the superior fit for the data. A variety of error structures were compared (e.g., unstructured and compound symmetry), and the -2 residual log pseudolikelihood indicator was the smallest for the autoregressive structure, indicating the best fit. Autoregressive error structures assume that data points closest in time will be the most correlated and that correlations between repeated measures will decrease as the lag time between measurements increases. This approach allows for the estimation of different variances at each time point by not fixing the variances to be equal.

In this model, Day 2, 3, and 4 sleep predicted inattentive/hyperactive problem behavior on the following day by controlling for associations with the previous day. Sleep latency, sleep duration, and night activity, were selected as predictors in the model due to their low intercorrelations and significant associations with the variables from prior studies. Gender, age (median split), and group were entered in the model as independent variables to determine whether some children were more vulnerable to behavioral dysregulation after disrupted sleep.

In the binomial model, shorter sleep duration significantly predicted increased inattentive/hyperactive problem behavior ($F_{1,203.1} = 5.36$, $P < .05$), and the probability of inattentive/hyperactive problem behavior differed by group ($F_{1,114.5} = 23.97$, $P < .001$) and by gender ($F_{1,101.3} = 7.13$, $P < .01$). Thus, the FC children and boys were more likely to display problem behavior at low sleep durations.

The FC children showed much greater vulnerability for inattentive/hyperactive problem behavior at shorter sleep durations than the CC children (see Figure 1). At 400 min of sleep, the odds ratios for inattentive/hyperactive problem behavior were 4.60 for the FC group and 0.20 for the CC group ($t_{73} = 4.22$, $P < .001$). At 700 min of sleep, the odds ratios for inattentive/hyperactive problem behavior were 0.35 for the FC group and 0.02 for the CC group ($t_{73} = .35$, $P < .05$).

A similar pattern emerged for gender (see Figure 2). At 400 min of sleep, the odds ratios for inattentive/hyperactive problem behavior were 1.89 for boys and 0.49 for girls ($t_3 = 1.40$, $P < .08$). At 700 min of sleep, the odds ratios for inattentive/hyperactive problem behavior were 0.14 for boys and 0.04 for girls ($t_3 = .12$, $P < .05$).

In summary, inattentive/hyperactive problem behaviors were reported less frequently for all children with increased sleep duration. However, some FC children and boys were especially vulnerable to shorter sleep durations and were more likely to display inattentive/hyperactive problem behavior after inadequate sleep durations.

DISCUSSION

In the current study, we used actigraphy to examine associations between sleep and inattentive/hyperactive problem behavior. Specifically, we examined potential individual difference factors (ie, group and gender) associated with increased risk for inattention/hyperactive problem behavior following sleep disruption.

The results from this study add to the existing literature by highlighting the impact of sleep on inattentive/hyperactive problem behavior using actigraphic measurement. One of the novel qualities of this study was our inclusion of multivariate predictive approaches to understanding the relationships between variables. Prior researchers have suggested a bidirectional relationship between sleep and behavior problems. Using predictive models helped to clarify the associations between variables and the directionality of the effects by group and by gender.

There were noteworthy results in the logistic model predicting inattentive/hyperactive problem behavior from the sleep measures. The results from the logistic model indicated that shorter sleep duration increased the probability of inattentive and hyperactive problem behavior on the following day. The results from the autoregressive models in this study provided a mechanism to examine changes in behavior from day-to-day variations in sleep. The findings regarding this relationship support prior findings in the sleep deprivation literature linking increased sleep debt with inattentive/hyperactive problem behavior. Given the approach used in this study, it appears that normative variation in young children's sleep duration, rather than experimentally restricted sleep duration, can be sufficient to be associated with inattentive/hyperactive problem behavior.

The results from the current study also build on prior findings that some children are more susceptible to sleep and behavior problems than others by providing a preliminary investigation of whether these associations are stronger in foster children. The FC children were five times more likely to display inattentive/hyperactive problem behavior after shorter sleep durations than the CC children. At longer sleep durations, the probability of inattentive/hyperactive problem behavior converged significantly between groups, although the FC children still displayed more problem behavior. This finding emphasizes the importance of sleep in foster children as a means of regulating behavior. Furthermore, it implicates negative outcomes in domains of learning, school readiness, and behavior management for foster children whose caregivers do not emphasize good sleep hygiene and consistent bedtime routines.

Prior researchers have suggested that foster children exhibit behavioral, emotional, and physiological regulatory problems at a much higher rate than community children.²⁸ This has important implications because children with difficult-to-manage behavioral problems are also at heightened risk for increased placement instability, which also increases risk for negative psychosocial outcomes.²⁹ Ensuring that young foster children receive adequate sleep may be an important first step for decreasing the frequency and intensity of inattentive/

hyperactive problem behavior and related psychosocial difficulties. Other researchers have suggested that behavioral sleep hygiene and caregiver psychoeducation approaches are first-line interventions for sleep problems in young children.^{30,31} Specifically, this may be accomplished by adherence to consistent and structured bedtime routines that allow for sufficient hours of sleep. Furthermore, it is important that caregivers attend to their children's sleep hygiene habits (eg, lights out, quiet environment, removing technology, limiting caffeine).^{30, 31} The purpose of these interventions is to increase the duration, consistency, and quality of nightly sleep, which may in turn reduce the likelihood of daytime behavior problems. Gender was also a determinant of risk for inattentive/ hyperactive problem behavior following shorter sleep durations. This discrepancy has been reported previously in the ADHD literature: It has been estimated that boys are 9 times more likely than girls to receive diagnoses of ADHD and are more likely to display subclinical symptoms.¹⁸ In this study, at shorter sleep durations, boys were more likely than girls to display inattentive/hyperactive problem behavior. Notably, there were no gender differences across any sleep measure, implying that the gender differences were not a function of the boys obtaining less sleep. However, at longer sleep durations, the likelihood of inattentive/ hyperactive problem behavior converged between genders, suggesting that boys may be more susceptible to inattentive/hyperactive problem behavior at shortened sleep durations, which may be a potential contributor to the documented gender differences in the frequency of ADHD diagnoses.

The results from this study suggest that the current literature on inattentive/hyperactive problem behavior in young children should be reconsidered to disentangle the association between such behavior and sleep disruption, an association that is currently unclear. This point is especially germane in light of the growing trend for children in the United States to sleep less per night than is recommended. In the National Sleep Foundation's nation-wide poll,³² toddlers and preschoolers slept approximately 1–2 h less than the recommended 11–13 h. The children in the current study slept even less than the caregiver-reported national average, which is additional cause for concern.

Limitations and Future Directions

Although the PDR was important for detecting day-to-day variability in inattentive/ hyperactive problem behavior, a potential limitation of the current study was the lack of a more comprehensive diagnostic measure. This may be one reason for the limited association found between variability in sleep measures and behavior. Prior studies using diagnostic indicators of ADHD have reported much stronger associations between variables. Further, there may have been important behavioral heterogeneity in our study sample owing to the inclusion of foster children, who may have exhibited clinical levels of behavior problems. We also did not collect information regarding whether stimulant medications were taken during the study and therefore did not control for possible effects of these medications on daytime behavior.

The current study was designed to offer a preliminary understanding of possible directional associations between sleep and inattentive/hyperactive problem behavior, which is a relatively understudied topic. This study is also one of the first to investigate sleep in foster children and, to our knowledge, is the first to study differences in susceptibility to inattentive/ hyperactive problem behavior as a function of sleep. Although the results from this study provide a preliminary understanding of possible associations between day-to-day variability in sleep and daytime behavior problems in foster and community children, future studies will be necessary to more comprehensively understand the complex associations between sleep and behavior in these groups.

A valuable next step for future studies will be to examine differences in the associations between sleep disruption and inattentive/hyperactive problem behavior between children diagnosed with ADHD and children who exhibit inattentive/hyperactive problem behavior within the average range. Specifically, it will be important to more thoroughly investigate whether there is an increased vulnerability for inattentive/hyperactive problem behavior following disrupted sleep in children diagnosed with ADHD. The results from such studies would provide valuable information to caregivers and treatment providers regarding the value of adequate sleep for decreasing behavior problems.

Furthermore, the inclusion of foster children inherently offers the possibility of confounding variables due to the complexity of their histories. Future research will be necessary to identify whether length of time in a foster placement, number of caregiver transitions, and type of prior maltreatment may have unique and additional impacts on the associations between sleep and behavior, since these factors have been associated with negative outcomes in other research.^{33,34} Increasing our knowledge about this group of children is important because there is compelling evidence that, when these children exhibit greater amounts of difficulties, they remain in the foster care system for longer periods of time, thereby increasing their overall risk.³⁵

Due to study design limitations, models predicting sleep disruption from inattentive/hyperactive problem behavior (rather than the opposite causal pathway) could not be tested. Future researchers should use both types of models in analyses to better understand the bidirectional association between sleep disruption and inattentive/hyperactive problem behavior.

Despite these limitations, the results from the current study contribute significantly to our understanding of inattentive/hyperactive problem behavior following sleep disruption. Our results further clarified that boys and foster children may be especially vulnerable to negative effects following shorter sleep durations. Although more research is needed, the results of this study suggest that sleep interventions may be a first-line approach to the treatment of inattentive/hyperactive problem behavior.

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Figure 1. Probability of Hyperactive/Inattentive Problem Behavior as a Function of Sleep Duration and Group. Abbreviations: CC, community comparison; FC, foster care.

Figure 2.
Probability of Hyperactive/Inattentive Problem Behavior as a Function of Sleep Duration and Gender.

Table 1

Comparison of FC and CC Groups on Demographic Variables

	FC Group	CC Group
Age		
M	5.13	5.34
SD	0.91	1.12
Gender (n [%])		
Males	15 (48)	20 (45)
Females	16 (52)	24 (55)
Ethnicity (n [%])		
Caucasian	29 (93)	32 (72)
Latino	0 (0)	6 (14)
Native American	2 (7)	3 (7)
African American	0 (0)	3 (7)
Asian/Pacific Islander	0 (0)	0 (0)

Abbreviations: CC, community comparison; FC, foster care.