Gender differences in the sleep habits of 11-13 year olds
Diferenças nos hábitos de sono entre gêneros nos escolares de 11 a 13 anos de idade

César L. Natal,1 Tânia J. Lourenço,1 Luana A. Silva,1 Rita A. Boscolo,2 Andressa Silva,2 Sergio Tufik,2,3 Marco Túlio de Mello2,3

Abstract
Objective: Sleep plays an important role in the physical and emotional development of adolescents. The aim of this study was to examine gender differences in sleep habits in a sample of 11-13 year olds. Method: The study was carried out in the city of Patos de Minas, Brazil. The study cohort was composed of 200 students (96 boys and 104 girls) attending (in the morning or in the afternoon) the 5th, 6th or 7th grades, with ages ranging from 11 to 13 years. A Sleep Questionnaire developed at the Federal University of São Paulo was used in order to evaluate student sleep habits and schedules, as well as the overall quality of sleep. Results: For the period between Friday night and Sunday morning, girls displayed longer sleep duration than did boys. During the week, students attending only afternoon classes woke up later than did students attending only morning classes. In addition, morning-class students showed more adverse effects on sleep, including irregular sleep/wakefulness circadian rhythms, when compared with afternoon-class students. Conclusion: Sleep habits are affected by gender and school schedule.

Descriptors: Sleep; Sex factors; Habits; Child; Adolescent

Resumo
Objetivo: O sono desempenha um papel fundamental no desenvolvimento físico e emocional de adolescentes. Este estudo teve o objetivo de analisar as diferenças entre gêneros nos hábitos de sono de escolares com idades entre 11 e 13. Método: Este estudo foi realizado na cidade de Patos de Minas-MG, Brasil. A amostra foi composta de 200 alunos (96 meninos e 104 meninas) matriculados da 5ª a 7ª séries (ambos os turnos, manhã e tarde) e com idade entre 11 e 13 anos. O Questionário de sono UNIFESP foi utilizado para avaliar a qualidade de sono, hábitos e horários de sono. Resultados: As meninas demonstraram maior tempo de sono do que os meninos da sexta-feira à noite para o domingo de manhã. Os alunos que estudavam a tarde acordavam mais tarde que os alunos do turno matutino durante a semana; alunos do turno da manhã são mais afetados negativamente em relação ao sono e podem ter um ciclo vigilia/sono irregular quando comparado com os alunos que estudam no turno da tarde. Conclusão: Meninos e meninas têm diferentes hábitos de sono, sendo influenciados pelo turno escolar.

Descritores: Sono; Fatores sexuais; Hábitos; Criança; Adolescente

1 Faculdades COC, Ribeirão Preto (SP), Brazil
2 Department of Psychobiology, Universidade Federal de São Paulo (UNIFESP), São Paulo (SP), Brazil
3 Pesquisador do Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq)

Correspondence
Marco Túlio de Mello
Departamento de Psicobiologia- Universidade Federal de São Paulo
Rua Mareselhesa, 535 - Vila Clementino
04020-060 São Paulo, SP, Brazil
Phone: (+55 11) 5572-0177 Fax: (+55 11) 5572-5092
E-mail: tmello@psicobio.epm.br
Introduction
Sleep plays an important role in physical and emotional development, especially for children and adolescents, who are in a period of intense learning and development. Unfortunately, many students have lifestyles that are not conducive to proper sleep. Factors such as puberty, grade level, and reduced parental control over sleep habits all contribute to irregular and unsatisfactory sleep patterns.

Studies of the sleep habits of adolescents have shown that they tend to go to bed later and sleep fewer hours than do children, consequently exhibiting excessive daytime sleepiness. The reduced sleep quantity is compensated for on weekends, when adolescents have no school commitments, allowing them to sleep longer.

In recent years, adolescent sleep has been studied extensively using a variety of approaches, including descriptive and longitudinal perspectives. Studies of sleep quality and quantity using subjective methods (questionnaires) have found that earlier school start times (morning classes) are associated with less nighttime sleep, and consequently morning-class students display greater daytime sleepiness and more attention problems, as well as poor concentration and cognitive function deficits. Fallone et al. reported that children with irregular sleep schedules on weekdays were more likely to be sleep deprived and showed worse academic performance than did those with normal sleep patterns.

Carskadon et al. studied adolescent sleep patterns in relation to physiological development and found that sleep time varied with gender and, in some countries, with the switch from afternoon to morning schedules among older students. Educational policies encouraging the shift from an afternoon schedule to a morning schedule should be reexamined, as they might interfere with the changing sleep-wake cycles that have been described for this puberty-adolescence age group.

Given the importance of adequate sleep to adolescent development, in the present study we administered a questionnaire to examine sleep habits and gender differences in a sample of 11-13 year olds.

Method
1. Subjects
The sample consisted of 200 students (96 boys and 104 girls), aged 11 to 13 years (mean, 11.8 ± 0.7 years), who were enrolled in the 5th 6th or 7th grades (morning or afternoon schedule).

Study subjects were selected from classrooms at random from students in attendance at the time of administration of the sleep questionnaire. Each grade level contributed approximately 20% of the students in the sample. The study was conducted in the city of Patos de Minas, Brazil, during May and June 2006.

2. Procedures
Researchers visited four schools (public and private) in Pato de Minas with morning and afternoon schedules. The morning classes run from 7:30 a.m. to 12:00 p.m., and the afternoon classes run from 1:30 p.m. to 5:00 p.m. Students attend class daily, Monday through Friday. These represent the standard academic schedules in Brazil.

The project aims and methods were explained to all relevant authorities, including principals, teachers, and parents. All parents were required to give written informed consent before their children were allowed to participate in the study. Written consent was also obtained from the school principals, after which the process of sampling the schools began with a random drawing. The significance of the study and the content of the sleep questionnaire was explained to the selected students.

3. Sleep questionnaire
A questionnaire developed by Pires et al. at the Universidade Federal de São Paulo (UNIFESP), known as the “UNIFESP Sleep Questionnaire”, consists of 34 questions (adapted to 32 items) about sleep patterns to collect subjective reports of sleep quality, sleep habits, and sleep/wake cycles, as well as indicators of the severity of any sleep complaint or problem presented. The questionnaire has previously been adapted to and administered in this type of population. We administered the sleep questionnaires to the sample cohort during class by reading the questions one by one while the room remained silent. The implementation of the protocol took place during the main study hours (from 9 a.m. to 10 a.m. or from 4:00 p.m. to 5:00 p.m.) in three participating schools. At each school, administration of the questionnaire took place for 15 min per day for three consecutive days. Prior to the administration of the questionnaire, the rules and procedures of the study were explained. Students were instructed to pay attention, to be truthful, to provide serious answers, not to speak to other students in the room, and not to copy the answers of others.

4. Statistical analyses
Statistical analysis was performed using Statistica for Windows, version 6.0. Descriptive data were expressed as the number (n) of students and the percentage (%) of the total sample. Gender and academic schedule data were compared using the Student’s t-test and one-way ANOVA, respectively, whereas binary logistic regression was used for the main sleep complaints. The level of significance was set at p ≤ 0.05.

5. Ethics
This study was approved by the Ethics Committee of the Universidade de Patos de Minas (no. 196).

Results
1. Morning-class students and afternoon-class students: sleep habits by gender
Table 1 shows gender differences in sleep habits. There were no gender differences for the time of going to bed, but mean waking times showed significant differences between genders and varied depending on the day of the week (for males and females, respectively: Saturday, 8:20 a.m. ± 94 min vs. 9:00 a.m. ± 82 min and Sunday, 8:39 a.m. ± 94 min vs. 9:10 a.m. ± 81 min; p < 0.05), indicating that girls woke later on Saturdays and Sundays. Consequently, the mean total sleep time (TST) from Friday night to Sunday morning was longer for girls than for boys (625.58 ± 103.34 min vs. 595.10 ± 92.52 min; p < 0.05).

Table 1 also shows schedule-related differences in sleep habits, according to gender. Boys and girls studying during the afternoon woke later on weekdays than did their morning-class counterparts. On Sundays, however, the only significant difference was that morning-class girls reported waking later than did afternoon-class girls (p = 0.03).

In terms of TST, both genders enrolled in afternoon classes reported longer periods of sleep on weeknights than did their morning-class counterparts. For TST from Friday night to Sunday morning, we found significant differences only among boys, afternoon-class boys reporting longer TST in comparison with morning-class boys.
### Table 1 - Student sleeping hours and sleep duration by gender and school shift. Data are reported as the upper and lower limits of the 95% confidence interval for the means of all study subgroups. Monday through Thursday data were pooled due to similarity

<table>
<thead>
<tr>
<th>Variable</th>
<th>Time frame</th>
<th>All students</th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 200</td>
<td>n = 96</td>
<td>n = 48</td>
<td>n = 52</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Morning-class boys</td>
<td>Afternoon-class boys</td>
<td>All girls</td>
</tr>
<tr>
<td>Time going to bed</td>
<td>Mon-Thur</td>
<td>Lower Limit</td>
<td>Upper Limit</td>
<td>Lower Limit</td>
</tr>
<tr>
<td></td>
<td>Sun</td>
<td>21.52</td>
<td>23.06</td>
<td>22.29</td>
</tr>
<tr>
<td>Time waking up</td>
<td>Mon-Thur</td>
<td>6.56</td>
<td>7.17</td>
<td>6.49</td>
</tr>
<tr>
<td></td>
<td>Fri</td>
<td>6.57</td>
<td>7.18</td>
<td>6.52</td>
</tr>
<tr>
<td>Sleep duration (min)</td>
<td>Mon-Fri</td>
<td>535.16</td>
<td>561.40</td>
<td>531.73</td>
</tr>
<tr>
<td></td>
<td>Fri-Sat</td>
<td>596.15</td>
<td>625.75</td>
<td>573.35</td>
</tr>
<tr>
<td></td>
<td>Sat-Sun</td>
<td>586.94</td>
<td>616.66</td>
<td>564.91</td>
</tr>
</tbody>
</table>

*p < 0.05 for a gender difference (girls vs. boys).  
**p < 0.05 for a schedule-related difference (morning vs. afternoon).
References