Validation of a three-dimensional model about sleep: Habits, personal factors and environmental factors

CrossMark

Teresa Rebelo-Pinto[a,*], Joana Carneiro Pinto[b], Helena Rebelo-Pinto[b], Teresa Paiva[a,1]

[a]CENC – Lisbon Sleep Center, Rua Conde das Antas, 5, 1070-068 Lisbon, Portugal
[b]Portuguese Catholic University, Faculty of Human Sciences, Palma de Cima, 1649-023 Lisbon, Portugal

ARTICLE INFO

ABSTRACT

Objectives: The present study aims to test the factor structure of two sleep questionnaires and their internal consistency in a sample of adolescents and their respective parents and to evaluate the validity and robustness of a three-dimensional model about sleep, addressing nine subcategories related to sleep habits, personal and environmental factors.

Methods: Participants were 654 adolescents from Portuguese schools, who completed "My Sleep and I" questionnaire, and 664 parents who completed "My child's sleep" questionnaire; to them confirmatory factor analysis was applied.

Results: Confirmatory factor analysis indicate that a nine-factor model has better fit indices compared with the others tested models for both samples (adolescents: χ^2/df (Chi-square/degrees of freedom) = 2.59, Comparative Fit Index (CFI) = .82, Goodness-of-Fit Index (GFI) = .92, Root Mean Square Error of Approximation (RMSEA) = .049, Expected Cross-Validation Index (ECVI) = 1.416; Parents: χ^2/df = 2.89, CFI = .85, GFI = .91, RMSEA = .053, ECVI = 1.528). Moreover, the comparison of the models through $\Delta\chi^2$ index (chi-square difference between rival models) indicates a better fit for this model, $\Delta\chi^2$ (24) = 186.5, $p < .001$ for adolescents and $\Delta\chi^2$ (24) = 209, $p < .001$ for parents. Also, the three second-order factors have good internal consistency, convergent and discriminant validity for all factors in both samples.

Conclusions: Results postulate that the three factors and their nine subcategories account for correlations between sleep habits, self-perceptions and knowledge about sleep.

1. Introduction

Sleep constitutes a homeostatic mechanism and many of our survival functions depend on sleep and on sleep quality [11]. Although sleep is critical for our general development [4], it is also a social subject, which means that our culture and lifestyles have an important role in sleep quality and duration [10]. It is accepted that social and familiar environments have great impact on sleep, especially regarding daily routines [18]. On the other hand, sleep is constantly neglected in modern societies, particularly between young people who are challenged by social and interactive activities that are called "sleep stealers" [23].

*Corresponding author. Tel.: +351 21 371 5450.
E-mail addresses: trebelopinto@gmail.com (T. Rebelo-Pinto), joanacpinto_@hotmail.com (J.C. Pinto), rebelopinto@sapo.pt (H. Rebelo-Pinto), teresapaiva0@gmail.com (T. Paiva).
[1]Researchers interested in the use of the questionnaires should contact Professor Teresa Paiva.

Sleep is regulated by a complex set of genetic, biological, psychological, cultural and environmental factors [17], but it is also strongly affected by cultural values, habits and beliefs, such as bedtime routines or sleep schedules, sleep environment, sleep literacy and autonomy around sleep [19].

Sleep development across the first years of age is very significant; there are a number of modifications on its macro and microstructure, on its circadian regulation and duration [15,30]. During development, the family context also represents an important issue for children and adolescents' sleep and daytime functioning [22]. Across adolescence, the use of technologies, social and academic compromises can frequently disturb sleep habits and quality. Despite there are different mechanisms that regulate sleep across growth and also distinct sleep problems, it is important to describe a valid model that can be easily adjusted to different persons and age groups [3].

Sleep deprivation is considered a relevant risk factor for health and security [7,8], since it increases the chance of getting cardiovascular diseases, hypertension, obesity, diabetes, depression, mood disturbances, etc. (Landhuis et al. [20], Orzeł-Gryglewska [26], Padez et al. [27,28], Paiva et al. [29]), increases health complaints while having a negative impact upon quality of life [31]. Bad sleep has been related to aggressive behaviors, anxiety, accidents, substance abuse [9,6,30] and academic failure [1,2].

Regarding all these risks it is important to prevent sleep problems and to promote good sleep habits since childhood [24]. The importance of sleep education programs has been well established [3]. According to Noland et al. [25], the central issue of adolescents' sleep relies on their behaviors and attitudes towards sleep, so we should address these issues in sleep prevention and education, more than just spread the basic sleep hygiene rules as most of sleep programs do [16,33], and integrate sleep interventions in a familiar process [22].

Models that can both explain and evaluate sleep, while being usable in sleep education strategies are lacking [34]. These models are often based on sleep questionnaires. In the evaluation of sleep, questionnaires are a valid method to track sleep disturbances and can be used as reliable tools in daily clinical practice, if properly validated for the target population [32]. The existence of questionnaires for parents and children is an approach in the family context, providing important and innovative contributions towards an improved characterization of the children's sleep, while raising parents' awareness.

This work aims to fill these gaps; it proposes a model of sleep education to be used in primary prevention by different professionals, and an assessment tool to be used clinically in medical/sleep consultations.

1.1.   Overview of the study

The present study aims to test the factor structure of two questionnaires "My sleep and I" for adolescents and "My children's sleep" for parents, and their internal consistency. We propose a three-dimensional model about sleep that addresses sleep habits, personal factors and environmental factors. We postulate that those three factors and their subcategories will account for correlations between sleep habits, self-perceptions and knowledge about sleep. Our hypothesis is that a model with three second-order factors and nine first-order factors will fit in the context of sleep in adolescents as assessed by themselves and their respective parents. Additionally, we tested convergent and discriminant validity for those three factors.

2.   Materials and methods

2.1.   Participants

Participated in this study a total of 654 adolescents (321, 49,1% girls and 333, 59,9% boys) with an average age of 11.9 years (SD=1.34, min=10, max=15), who attended the basic education level (219, 33.5% in 5th grade; 19, 2.9% in 6th grade, 164 25.1% in 7th grade, 77, 11.8% in 8th grade, and 175, 26.8% in 9th grade), at schools in the north, center and south of Portugal. Also participated a total of 612 parents (78, 12.8% fathers and 534, 87.3% mothers), with an average age of 38.9 (SD=6.21, min=21, max=68) years.

2.2.   Instruments

The self-report questionnaire "My Sleep and I" and the hetero-report questionnaire "My children's sleep" were used to assess adolescents' and parents' perceptions about the adolescents' sleep, respectively. Both instruments consist of 27 Likert items, on a five-point scale, organized in 3 dimensions and 9 sub-dimensions. The first dimension, named *sleep habits*, refers to what adolescents usually do in terms of duration, schedules and sleep regulation. This factor has three sub-dimensions: *length* (total sleep time), *regularity* (timings sleep pattern), and *autonomy* (ability to regulate the sleep itself). The second dimension, called *environmental factors*, comprises lifestyle impact on sleep and includes three subcategories: the *room* (characteristics and location of sleep features), *activities* (distribution of different tasks throughout the day) and *feeding* (time, quantity and quality of meals and consumption of substances). The latter dimension, called *personal factors*, refers to feelings, knowledge and adolescent problems related to sleep and comprises three subcategories: *knowledge* (relates to adolescent's knowledge about sleep), *feelings* (encompass emotions about sleep) and *problems* (difficulties or distress experienced in relation to sleep). Both questionnaires are adequately adapted and validated to be used in Portuguese population [21].

2.3.   Procedure

This study is part of a broader project "*Sleep More to Read Better*", integrating the Portuguese National Reading Plan. Thus, for the data collection, we requested permission from the school' boards participating in the project, and obtained the informed consent from parents and students for their participation in this research.

Some criteria were considered for inclusion in the sample, such as Portuguese as native language, to be a student of 2nd or 3rd academic cycles (5th and 6th grades or 7th, 8th and 9th

grades, respectively), or to be a parent of a student attending one of these academic cycles, and to possess a level of reading and writing to allow the filling of the respective assessment instrument.

The students fulfilled their questionnaires in the classroom, supervised by teachers; fulfillment was optional and voluntary. The average time for completing the questionnaire was 20 min. Teachers were asked to explain the importance of the project, not to give any directions to students before the application day, to avoid that some would miss classes, and to prevent communication between students during the task. The completion of the parents' questionnaire was done at home, by the parent (mother or father) who had a closer knowledge of the habits and routines of the teenagers' life.

All participants were informed about the research' goals, the voluntary nature of their participation, and the assurance of confidentiality of the data collected. Data were subsequently included in the statistical software – SPSS for Windows, version 21.

2.4. Statistical analysis

To test the hypothesis about the factor structure of the two questionnaires, "My sleep and I" for adolescents and "My children's sleep" for parents, we performed a confirmatory factor analysis (CFA). CFA allows to test the hypothesis that a relationship between observed variables and their underlying latent constructs exists. We also tested alternative models to assess alternative hypotheses for "My sleep and I" and "My children's sleep" factor structure. The first alternative model (AM1) is a one-factor latent model with all items. The second alternative (AM2) is a three-factor model in accordance with the three second-order factors in the proposed model. A third alternative (AM3) is a nine-factor model based in the subcategories from each second-order factors. Another alternative model (AM4) is a two factors second-order model with nine first-order factors, where one of the second-order factors were composed by *sleep habits* and *personal factors* (individual aspects) and the other by *environmental factors*.

The estimation method used was the ML (Maximum Likelihood), using the variance-covariance matrix. Missing data were imputed by maximum likelihood estimation, such as implemented by the EM algorithm in the SPSS. We employed the following indices to test the general fit of the proposed and alternative models: (1) the ratio of chi-square to degree of freedom (χ^2/df), where a value ranging of 2–3 indicates acceptable fit; (2) the goodness of fit index (GFI) and the comparative fit index (CFI) at values equal or higher than.95; (3) forth root mean square error of approximation (RMSEA): values above.06 indicate a good fit [5]; (4) values higher than .90 for GFI and CFI, and lower than .08 to RMSEA indicate an acceptable fit; and (5) we used the χ^2 difference ($\Delta\chi^2$) between models and the expected cross-validation index (ECVI) to assess significant improvement over competing models. Significant values of $\Delta\chi^2$ and lower values of ECVI reflect the model with better fit.

Composite Reliability (CR) was used as measure of internal consistency of the factors, where values greater.70 indicate good reliability. To compute convergent and discriminant validity we used the procedure proposed by Fornell and Larcker [12]. In this method, we obtained discriminant validity if average variance extracted (AVE) is greater than maximum shared squared variance (MSV) or average shared squared variance (ASV). For convergent validity, AVE should be equal or greater than .50 and lower than CR. That is, variance explained by the construct should be greater than measurement error and greater than cross-loadings.

2.5. Ethical considerations

Permission to conduct the study was obtained at the General Direction of Education, Ministry of Education, who found that all procedures and ethical considerations were taken in the research. Furthermore, it was ensured that all researchers involved in the project rigorously followed the ethical considerations associated with the data collection, processing and analysis.

3. Results

The proposed model (PM) had values of fit indices near of those used as cut-off point. As can be seen in Table 1, PM and the nine-factor model (AM3) have better fit indices compared with the other tested models, for both samples (adolescents and parents). The comparison of the models through $\Delta\chi^2$ index indicates a better fit for AM3 compared with the proposed model, $\Delta\chi^2(24)=186.5$, $p<.001$ for adolescents and $\Delta\chi^2(24)=209$, $p<.001$ for parents. Chi-square differences indicate that PM had better fit compared to the other alternative models in both samples, excluding the parents' sample, where the AM4 and the PM do not differ significantly.

The nine-factor model (AM3) had the following reliability indices, respectively, for adolescents and parents: knowledge (CR=.61; .70), length (CR=.55; .48), regularity (CR=.23; .40), autonomy (CR=.45; .49), room (CR =.41; .22), activities (CR= .41; .41), feeding (CR=.34; .33), feelings (CR=.39; .69) and problems (CR=.61; .59).

Taking into account the lower internal consistency of the nine factors, indices of internal consistency, convergent and discriminant validity were computed for the three second-order factors. All indices are presented in Table 2.

CR indices indicate a good reliability for all factors in both samples. Indices of convergent validity indicate that the three factors have a good convergence validity in both samples (AVE greater than .50 and less than CR). Moreover, for the adolescents' sample, all the three factors presented discriminant validity (AVE values are greater than MSV and ASV); in the parents' sample, the factors *sleep habits* and *personal factors* have a lack of discriminant validity (AVE values are greater or equal to ASV but less than MSV).

Thus, Fig. 1 shows the results of the confirmatory factor analysis of the PM (three second-order factors and nine first-order factors), for adolescents and for parents, considering the values of the standardized factor weights and the individual reliability of each item of the model. The estimated regression coefficients for this model, in both samples, are high for all components, and have statistical significance ($p<.001$). The coefficients of the error variances and the latent

Table 1 – Confirmatory factor analysis: comparison between alternative models for adolescents (n=654) and parents (n=612).

Model	χ^2	df	χ^2/df	GFI	CFI	RMSEA (CI 90%)	ECVI	$\Delta\chi^2$ (Δdf)
Adolescents								
AM1	1281.2	324	3.95	.86	.62	.067 (.063–.071)	2.127	349.9*(12)
AM2	1140.6	321	3.55	.87	.67	.063 (.059–.066)	1.921	209.5*(9)
AM3	744.8	288	2.59	.92	.82	.049 (.045–.054)	1.416	186.5*(24)
AM4	980.9	314	3.12	.89	.74	.057 (.053–.061)	1.698	48.7*(2)
PM	931.3	312	2.98	.90	.76	.055 (.051–.059)	1.628	–
Parents								
AM1	1383.3	324	4.27	.84	.70	.070 (.066–.074)	2.249	341*(12)
AM2	1333.7	321	4.15	.85	.71	.069(.065–.073)	2.184	291.7*(9)
AM3	833	288	2.89	.91	.85	.053(.049–.058)	1.528	209*(24)
AM4	1045.8	314	3.33	.89	.79	.059(.055–.063)	1.770	3.8(2)
PM	1042	312	3.34	.89	.79	.059(.055–.063)	1.771	–

Table 2 – Indicators of internal consistency and validity (n=654 adolescents; n=612 parents).

	CR	AVE	MSV	ASV	1	2	3
Adolescents							
Sleep habits	.98	.95	.51	.48	.97		
Environmental factors	.87	.69	.45	.45	.67	.83	
Personal	.89	.74	.51	.47	.72	.66	.86
Parents							
Sleep habits	.92	.79	.97	.68	.89		
Environmental factors	.86	.69	.38	.33	.62	.83	
Personal	.83	.62	.97	.62	.98	.53	.79

Note: Cronbach's Alpha (**α**), composite reliability (CR), average variance extracted (AVE), maximum shared variance (MSV), average shared squared variance (ASV).

variables are also moderate and statistically significant ($p < .001$).

4. Discussion

This study examined various factor structures of the questionnaires "My sleep and I" for adolescents and "My children's sleep" for parents, where the relative fit of a model with three second-order factors and nine first-order factors (PM), a one-factor latent model with all items (M1), a three-factor model in accordance with the three second-order factors (M2), a nine-factor model based in the subcategories from each second-order factors (M3), and a two second-order model (*sleep habits* and *personal factors* (individual aspects) and the other by *environmental factors*) with nine first-order factors (M4), were compared. We chose a confirmatory approach, rather than an exploratory factor analysis, based in our hypothesis about the factor structure of both questionnaires. As mentioned by Furr [13], a CFA is useful when researchers have clear (or competing) hypotheses about a scale – the number of factors or dimensions underlying its items, the links between specific items and specific factors, and the association between factors.

Both the three second-order factors and nine first-order factors model (PM) and the nine-factor model based in the

subcategories from each second-order factors (AM3) provided a good fit to the data, in the adolescents and parents samples. However, considering the lower internal consistency of the nine factors model, we agreed that the three second-order factors and nine first-order factors model (PM) represented better the adolescents' and parents' perceptions about sleep. We used the CR instead Cronbach's alpha because this has a tendency to over- or under-estimate scale reliability, and therefore CR is now preferred and may lead to higher estimates of true reliability [14].

Accordingly, the theoretical model derived from both questionnaires is structured in three dimensions and nine sub-dimensions, constituting itself as a generator matrix of specific targets for intervention programs in schools.

Thus, sleep habits relate to a description of what the children usually do, in terms of sleep cycle length/time and sleep-wake cycle, and ability to self-regulation of sleep. Any educational intervention at this level should teach parents and children about: (i) the total age-appropriate length of sleep: sleep duration appropriate to age, wake up naturally by themselves, walking awake during the day and sleep just enough; (ii) the importance of compliance and organized regular bedtime and waking up throughout the week schedules: have a certain bedtime and rising schedule, avoid compensating at the weekend the sleep curtail during the week, keep identical schedules each day, and establish and
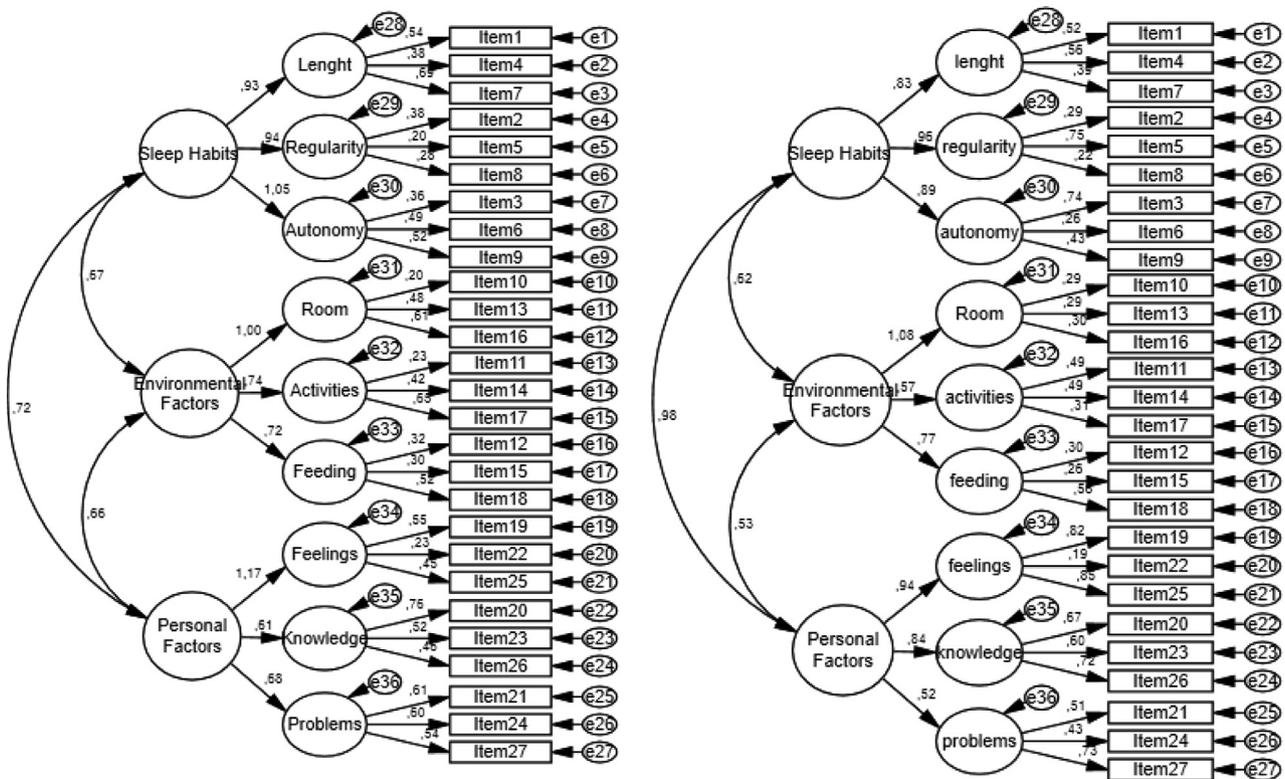
Fig. 1 – Three-dimensional model about sleep: sleep habits, personal factors and environmental factors, for adolescents (left; $n=654$) and parents (right; $n=612$).

enforce a standard age-appropriate sleep-wake cycle; and (iii) the need for gradual independence in the preparation and regulation of sleep and waking up: getting to bed alone, sleeping in own bed, falling asleep alone, to be left alone to sleep without calling, and wake up and stand up alone.

Environmental factors correspond to a description of life-styles that impact on sleep, in terms of organization (local, rules and routines), food (time, quantity and quality of meals) and activities (distribution of different activities throughout the day: study, exercise, fun, family interaction). In this sense, an educational intervention in this area should include: (i) the relevance of the child to have favorable environmental conditions for a good sleep, such as sleeping alone in own bed, not having a TV in the room, have a place of study outside the room, have silence to fall asleep and follow rules and routines for bedtime and waking up; (ii) have regularity and quality in their food, according to their age and characteristics: take a good breakfast, eat adequate amounts to age and personal characteristics, eating different types of food, at certain hours every day; and (iii) balancing time for school, play and rest, finishing homework before dinner, avoid rushing and stress, avoid overeating (light, noise, games) before bedtime, and have regular physical activity throughout the week, but not at the end of the day.

Personal factors relate to the assessment of what is noticed in children in relation to feelings (emotions reveal about the child's sleep), knowledge (what children know about what we need to do to sleep well) and related sleep problems (awareness and identification of difficulties that the child has in relation to sleep). An educational intervention should focus on aspects such as: (i) the importance of

learning to enjoy sleep: making quiet and pleasurable bed-times, prevention of sleep fears, etc.; (ii) the basic knowledge of what to do to sleep well: (i) importance of sleep to growth and development, need of proper sleep duration, understanding the risks of poor sleep (health, school, humor, etc.); and, (iii) learn about sleep problems and disorders (e.g., night terrors, restless sleep, difficulty falling asleep).

Conclusively, both questionnaires were found to be psychometrically valid instruments that allow a screening about adolescents' and parents' perceptions about sleep, according to three dimensions and respective nine sub-dimensions, materialized in a model of education which includes sleep behavioral, cognitive and affective aspects in the construction and modification of attitudes in this area [32]. This model (PM; three second-order factors and nine first-order factors) proved to be superior to the remaining models tested. The use of confirmatory analysis was therefore important and the internal consistency measured by the composite reliability indicated a good model reliability. It can lead to a variety of theoretical and practical work-shops and trainings, using both expository and dynamic methodologies, audiovisual media, and/or games development, aiming not only to the general population, but in particular to children and adolescents as well as educators, parents, pediatricians and other educational agents. The objective is to disseminate information to enable increased knowledge about the indisputable importance of sleep for own well-being and quality of life, promotion of good practices related to sleep, and change of habits and mala-daptive beliefs which are harmful to the human well-being and healthy development [11,32].

5.   Conclusion

After testing psychometrically various factor structures of the questionnaires "My sleep and I" for adolescents and "My children's sleep" for parents, the three second-order factors and nine first-order factors model (PM) represented better the adolescents' and parents' perceptions about sleep. The theoretical model derived from these questionnaires can be used as a valid generator matrix of specific goals in school/community intervention based programs.

Acknowledgments

R E F E R E N C E S

[1] Allen-Gomes A, Tavares J, Azevedo MH. Sleep and academic performance in undergraduates: a multimeasure, multipredictor approach. Chronobiol Int 2011;28:786–801.

[2] Beebe D. Cognitive, behavioral, and functional consequences of inadequate sleep in children and adolescents. Pediatric sleep medicine update. Pediatr Clin N Am 2011;58:649–65.

[3] Blunden S, Kira G, Hull M, Maddison R. Does sleep education change sleep parameters? Comparing sleep education trials for middle school students in Australia and New Zealand. Open Sleep J 2012;5:12–8.

[4] Bruni O. Sleep in children: key points and hot topics. In: Paiva T, Andersen M, Tufik S, O Sono e a Medicina do Sono. São Paulo: Ed. Manole Ltda; 2014. p. 593–5.

[5] Byrne BM. Structural equation modeling with AMOS: basic concepts, applications and programming, second ed.. New York: Taylor and Francis; 2010.

[6] Carskadon M. Adolescent sleep patterns: biological, social and psychological influences. Cambridge: Cambridge University Press; 2002.

[7] Center of Disease Control, 2011. Morbidity and Mortality Weekly Report. ⟨http://www.cdc.gov/mmwr/PDF/wk/mm6008.pdf⟩ [accessed 03.07.14].

[8] Chen X, Beydoun MA, Wang Y. Is sleep duration associated with childhood obesity? A systematic review and meta-analysis. Obesity 2008;16:265–74.

[9] Dahl R. The consequences of insufficient sleep for adolescents. Phi Delta Kappan 1999;80:354–9.

[10] Dahl R. Foreword. In: El-Sheikh, Sleep and development – familial and socio-cultural considerations. New York: Oxford University Press; 2011.

[11] Dement W. Foreword. In: Carskadon M, Adolescent sleep patterns: biological, social and psychological influences. Cambridge: Cambridge University Press; 2002.

[12] Fornell C, Larcker DF. Structural equation models with unobservable variables and measurement error: algebra and statistics. J Mark Res 1981;18:382–8.

[13] Furr RM. Scale construction and psychometrics for social and personality psychology. London, UK: Sage Publishing; 2011.

[14] Garson DG. Hierarchical linear modelling. Thousand Oaks: Sage; 2013.

[15] Geraldes R, Paiva T. Mecanismos circadianos de regulação do sono. In: Paiva T, Andersen M, Tufik S, O Sono e a Medicina do Sono. São Paulo: Ed. Manole Ltda; 2014. p. 35–44.

[16] Gruber R, Cassoff J, Knauper B. Sleep health education in pediatric community settings: rationale and practical suggestions for incorporating healthy sleep education into pediatric practice. Pediatric sleep medicine update. Pediatr Clin N Am 2011;58:735–54.

[17] Guindalini C. Aspectos genéticos do sono. In: Paiva T, Andersen M, Tufik S, O Sono e a Medicina do Sono. São Paulo: Ed. Manole Ltda; 2014. p. 135–46.

[18] Hart AD. Sleep, it does a family good. Colorado, USA: Focus on the Family; 2010.

[19] Jenni O, Wener H. Cultural issues in children's sleep: a model for clinical practice. Pediatric sleep medicine update. Pediatr Clin N Am 2011;58:755–63.

[20] Landhuis CE, Poulton R, Welch D, Hancox RJ. Childhood sleep time and long-term risk for obesity: a 32-year prospective birth cohort study. Pediatrics 2008;122:955–60.

[21] Loureiro HC, Pinto TR, Pinto JC, Pinto HR, Paiva T. Adaptation and validation of the children sleep habits questionnaire and the sleep self report for Portuguese children. Sleep Sci 2014;6(4):151–8.

[22] Meltzer L, Montgomery-Downs H. Sleep in the family. Pediatric sleep medicine update. Pediatr Clin N Am 2011;58:765–74.

[23] Machado MC. O sono na adolescência: pontos-chave e desafios. In: Paiva T, Andersen M, Tufik S, O Sono e a Medicina do Sono. São Paulo: Ed. Manole Ltda; 2014. p. 596–8.

[24] Mindell J, 2004. Services and programs proven effective in managing infant/child sleep disorders: comments on Wiggs, Owens, France and Blampied. In: Tremblay R, Barr R, Peters R. (Eds.) Encyclopedia on Early Childhood Development. ⟨http://www.child-encyclopedia.com/documents/MindellANGxp.pdf⟩ [accessed 03.07.14].

[25] Noland H, Price J, Dake J, Telljohann S. Adolescents' sleep behaviors and perceptions of sleep. J School Health 2009;79:224–30.

[26] Orzeł-Gryglewska J. Consequences of sleep deprivation. Int J Occup Med Environ Health 2010;23(1):95–114.

[27] Padez C, Fernandes T, Mourão I, Moreira P, Rosado V. Prevalence of overweight and obesity in 7–9-years old Portuguese children. Trends in body mass index from 1972 to 2002. Am J Hum Biol 2004;16:670–8.

[28] Padez C, Mourão I, Moreira P, Rosado V. Long sleep duration and childhood overweight/obesity and body fat. Am J Hum Biol: Off J Hum Biol Counc 2009;21(3):371–6.

[29] Paiva T, Cunhal A, Cunhal M. Sleep schedules and academic success in Technical University students. J Sleep Res 2008;17:51–2.

[30] Paiva T, Rebelo-Pinto H. Clínica do sono da criança e do adolescente. In: Paiva T, Andersen M, Tufik S, O Sono e a Medicina do Sono. São Paulo: Ed. Manole Ltda; 2014. p. 599–624.

[31] Paiva T, Gaspar T, Gaspar de Matos M. Sleep deprivation correlations with risk behaviors in adolescents: results from a portuguese national survey. Sleep Med 2014;14:33–4.

[32] Rebelo-Pinto T, Loureiro H, Pinto JC, Rebelo-Pinto T, Paiva T. Sono e Família: contributos da Psicologia para a investigação e para a intervenção educativa e terapêutica. In: Francisco R, Pinto JC, Rebelo-Pinto H, Família & Psicologia, Contributos para a investigação e para a intervenção. Lisboa: Universidade Católica Editora; no prelo, 2014.

[33] Rebelo-Pinto T. Hábitos de sono em adolescentes. In: Paiva T, Andersen M, Tufik S, O Sono e a Medicina do Sono. São Paulo: Ed. Manole Ltda; 2014. p. 631–9.

[34] Wolfson A. Adolescent sleep update: narrowing the gap between research and practice. Sleep Med 2007;5:194–209.