

Assessing sleep-wake complaints in school-aged children: Portuguese properties and norms of the SWEL¹

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Abstract

The present paper aims to analyze psychometric features of the Portuguese Sleep Wake Experience List (SWEL), to obtain norms and data about key sleep complaints for children. This questionnaire evaluates chronic sleep problems categorizing them into six categories of sleep complaints. A total of 900 elementary school students (2nd to 4th grade), 485 girls (53.9%) and 415 boys (46.1%), aged between 7 and 10 years ($M = 8.63$; $SD = .82$) were included in this study. The results indicated a good reliability and validity of the questionnaire, making him suitable as a screening tool for epidemiological purposes. The study shows that sleep complaints (14.7%) are a frequent syndrome in school-aged children, and often not reported to the parents and/or physician. In conclusion, the results revealed that the SWEL is a reliable and valid screening instrument for identifying potential sleep problems in Portuguese school-aged children population.

Keywords: Epidemiology; Sleep assessment; Sleep complaints; Sleep-Wake Experience List (SWEL); School-aged children.

Avaliação dos problemas de sono-vigília em crianças em idade escolar: normas e propriedades para a população Portuguesa do SWEL

Resumo

Este estudo pretende analisar as propriedades psicométricas da versão portuguesa do Questionário de Experiências de Sono-Vigília (SWEL) e a obtenção de normas e dados relativos às queixas de sono-chave nas crianças. Este questionário avalia os problemas de sono crónicos, classificando-os em seis categorias de queixas relativamente ao sono. Foram avaliadas 900 crianças do 1º CEB (2º-4º ano), 485 delas são meninas (53,9%) e 415 meninos (46,1%), com idades entre os 7-10 anos ($M = 8,63$; $DP = 0,82$). Verificou-se uma boa fidelidade e validade do questionário, tornando-o uma ferramenta adequada para estudos de carácter epidemiológico. O estudo mostra que as queixas relativas ao sono (14,7%) são síndromes frequentes em crianças que 1º CEB que na maioria das vezes não são referidas pelos pais e/ou médicos. Assim, o SWEL é um instrumento de detecção válido e fiável para a identificação de potenciais problemas de sono nas crianças em idade escolar.

Palavras-chave: Epidemiologia; Avaliação do Sono; Queixas do Sono; Questionário de Experiências de Sono-Vigília (SWEL); Crianças em idades escolar.

Introduction

Sleep disturbances are among the most common complaints throughout childhood. According to clinical paediatricians they are the fifth leading concern of parents, following illness, feeding, behavioral problems and physical abnormalities (Mindell & Owens, 2003; Mindell, Moline, Zendell, Brown & Frey, 1994). Epidemiological studies have shown that almost one third of all children suffer from sleep problems (Blader & Gallagher, 2001; Kahn & cols., 1989; Owens, 2005; Rona, Li, Gulliford & Chinum, 1998; Simonds & Parraga, 1984). Furthermore, various surveys have indicated that

chronic sleep complaints in children vary between 17% and 41% (Manni & cols., 1997; Owens, 2004; Paavonen & cols., 2001; Pollock, 1994; Spruyt, O'Brien, Cluydts, Verleye & Ferri, 2005; Zuckerman, Stevenson & Bailey, 1987). Different sleep problems are characteristic of different ages, but sleeplessness seems to be the most common sleep disorder at all ages (Wiggs & Stores, 2001). Toddlers typically display behavioural sleep disturbances, whereas by school age, different forms of insomnia, such as prolonged sleep latency, night-waking and early-morning waking predominate (Blader, Koplewicz, Abikoff & Foley, 1997; Kahn & cols., 1989; Owens, Spirito & McGuinn, 2001). Estimates of the prevalence of different sleep problems have varied largely, particularly with regard to school-aged children, ranging from less than 5% up to 42% (Blader & cols., 1997; Kahn & cols., 1989; Simonds & Parraga, 1984; Rona & cols., 1998; Smedje, Broman & Hetta, 1999).

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Sleep quality is also closely related to well-being (Härmä & Sallinen, 2000). Children's sleep disturbances often accompany various somatic illnesses as well as psychiatric and neurological disturbances (Ferber & Kruger, 1995; Paavonen, Solantaus, Almqvist, Fredrik & Aronen, 2003; Stores & Wiggs, 2001). Poor sleep can also have a negative impact on mood (Poelstra, 1984) and behaviour (Chervin, Dillon, Archbold & Ruzicka, 2003; Dahl & Puig-Antich, 1990; Wiater, Mitschke, Widdern, Fricke, Breuer & Lehmkuhl, 2005), and latent sleep disorders can in some cases manifest as psychiatric symptoms (Ivanenko, Barnes, McLaughlin Crabtree & Gozal, 2005; Reite, 1998). Therefore, previous sleep studies have mainly focused on different clinical populations, while normative samples and population-based studies are rare. Accurate and objective normative data with regard to questions such as how much sleep is sufficient at a certain age or how many night wakings constitute a significant sleep problem are still lacking. This information is crucial importance to support clinical judgment and to improve efficacy of interventions throughout lifespan (Asplund, 1999; Bixler, Kales, Jacoby, Soldatos & Vela-Bueno, 1984; Owens, 2000).

The concerns with sleep disorders, as one of the main psychopathological concerns of the childhood's population, sharpened the attention for clinicians and researchers for the use of accurate assess methods which would both be useful for clinical and research purposes. Here in the past decades, despite recognizing the "gold standard" of clinical interviews in setting diagnosis, the need for easily administered and cost-effective measures for screening and establishing the diagnoses of sleep disorders direct most clinicians and researchers to paper-stencil methods. While questionnaires are easy to develop and analyse, this is also their disadvantage; their validity and reliability are often poorly characterized. Subjective sleep estimates may be considered too inaccurate and unspecific for research purposes, as compared with objective methods, polysomnography and actigraphy (Paavonen, 2004; Sadeh, Raviv & Gruber, 2000). This problem can be overcome using standardized questionnaires. Numerous sleep questionnaires aimed for completion by parents have been reported and widely used. However, most of these questionnaires have been validated. Yet, several authors have used either its own non-validated questionnaires (e.g.

Blader & cols., 1997; Kahn & cols., 1989; Smedje & cols., 1999), or other standardized questionnaires including some sleep items or an undefined questionnaire (e.g. Rona & cols., 1998). Only few questionnaires have been designed to be filled out by children themselves (e.g. Owens, Spirits, McGuinn & Nobile, 2000).

All sleep complaints occur within a 24-h period and as such they are interwoven with the sleep-wake system. This system is one of the first markers of early biobehavioral organization and adaptation (Paavonen, 2004; Thoman, 1990) which involves complex biological, physiological, and psychosocial mechanisms that commonly lead to the achievement of consolidated sleep-wake patterns. The development of the sleep-wake system involves two leading processes: (a) a shift from multiphasic sleep distributed across the day and the night to a monophasic event of consolidated sleep concentrated during the dark hours of the night and (b) a gradual reduction of sleep needs accompanied by a significant increase in waking time. The continuous shifts along development periods between sleep phase and wake phase and the way how the individuals adapt to changes through these stages accounts for the vulnerability in developing a sleeping problem. Based on this assumption, sleep assessment questionnaires should take into account complaints of the sleep-wake system and monitoring them as they occur during a 24-h period. Additionally, such measure should be developed on a basis of a classification system (e.g. ICSD, 2001), measuring frequency and etiology, and not only focus on symptoms or complaints that are specific of a sample or age-related group, but scope sleep symptoms that occur along life-span. The advantage of such model states in the ability to compare prevalence rates of different age and developmental phase groups according to the same standards.

A questionnaire that meets some of the mentioned features is Rob van Diest's (van Diest, Milius, Markusse & Snel, 1989) Sleep-Wake Experience List (SWEL), developed on literature based questionnaires (e.g., Sleep Disorders Questionnaire, SDQ, Fehler! Keine gültige Verknüpfung. Mini Sleep Questionnaire, MSQ, Zomer, Peled, Rubin & Lavie, 1985) to foster improvement and selection of items. The final version of this questionnaire comprises 15 items, answered on a five-point adjective rating scale that cover six types of complaints - Early Morning Awakening, Difficulty Waking Up, Tiredness Upon Waking Up, Initiating Sleep, Maintaining Sleep,

Daytime Sleepiness - as they occur within a 24-hour sleep-wake cycle, during the past three months. These scale have both been used with normal (e.g., van Dijk & cols., 2004) and clinical (e.g., van Kralingen, Ivanyi, van Keimpema, Venmans, de Visser & Postmus, 1996) samples, proving to be an adequate screening tool and as so suitable for epidemiological studies.

In Portugal, as far as we know, no questionnaire is available that systematically evaluates sleep complaints and simultaneously matches suitability for screening the epidemiological issues, prevalence and incidence, of sleep complaints in general and/or clinical population. Therefore, the aim of the present paper was to determine psychometric features of the SWEL and to obtain norms for children of elementary schools. These norms allow shaping classification groups defined by the addition of relevant clinical categories for each of the questionnaire's items. Although some studies have established reliability and validity of these measures, (see, van Diest, 1990) there was no study that established them either for the Portuguese translation or for children. These aims are of value in the interpretation of test scores for both clinical and research purposes. Further, data about key symptoms and behaviors assessed by the SWEL are also presented.

Method

Sample

A total of 978 elementary school pupils were randomly assigned to explore aims of the present study, although 78 were excluded for the following reasons: 53 (5.42%) returned the questionnaire uncompleted or with incomprehensible answers; and 25 (2.56%) had medical and/or psychiatric problems/diagnosis. Herewith, the remaining sample (92.02%) comprises a total of 900 elementary school students (2nd to 4th grade), 485 girls (53.9%) and 415 boys (46.1%), aged between 7 and 10 years ($M=8.63$; $SD=.82$). Data was collected from two cities of Portugal, one from of the north and one of the south, namely Braga (50.4%) and Faro (49.6%). Students were required to submit signed parental consents and youth assents prior to participation.

Questionnaire

The SWEL has been developed as a self-report measure to study chronic (e.g. periods of

more than three weeks), sleep-related complaints, during a 24-hour period, that persisted (or not) over the last three month. The initial Portuguese SWEL version (Azevedo, Silva & Paz-Ferreira, 1988) assessed no reliable psychometric properties had been assessed, and in a prior study only had been used with adult samples (e.g. Melo, 2000). It was modified (e.g., rephrasing, correction of word translation, changes in item structure, new items to substitute old ones exclude by low loadings in reliability analysis) and submitted to judgment of 25 elementary school children, aged between 7 to 11 years, which verbally commented the contents and phrasing of the items. Based upon the responses of these children, we mainly made minor changes in phrasing and altered item 13 formulation from "How often did you sleep a nap", to "How often did you need a nap because of the sleepiness that you felt during your daily activities?" because this made more explicit and clear the items daily sleepiness character.

The final questionnaire consists of 14 items addressing seven sleep problems: initiating sleep, maintaining sleep, early morning awakening, difficulty in waking up, tiredness upon waking up, sleepiness during the day, and snoring. A question concerning sleep time was added to the questionnaire. All items as they occur during 24-hour sleep-wake cycle are to be answered on a four-point Likert rating scale with a lower score indicating fewer sleep disorders. A four-point Likert scale was preferred to the five-point in original version because it excluded the mid-point. Both the occurrence and severity of the complaints were assessed, except for daytime sleepiness. Sleepiness questions could only be answered by the frequency of their occurrence. The occurrence items could be answered as "never", "seldom", "often" or "always". The severity items could be answered as "not at all", "a little", "severe" or "very severe".

Procedure

In first place, the Regional Educational Boards of North and Algarve were asked for authorizations and considerations about ethical proceedings. After their agreement, we established contacts with the schools and teachers in order elaborate a data collection plan that would not interfere with regular teaching activities inside the classroom. The teachers received training in the instrument appliance and sleep symptoms implied within, especially because of some doubts that might arise given the subject's age. Moreover, one

researcher was always in contact and available if the teacher had any necessity regarding any appliance and/or fulfilment procedure. Further, data were collected from students using a confidential process administered by the classroom teacher. Teachers assigned a code number to each student in their class and marked each student's instrument with that number. Teachers administered the questionnaire anytime during a specific week, but not first thing in the morning or right after a recess. Students took about 15 minutes to complete the questionnaire. Once they completed the questionnaire, it was placed in an envelope and returned to the school's main office, where it was picked up by researchers from the school secretaries.

Statistic analysis

Data collection instruments were checked for completeness and only those instruments that were fully completed were included in the analysis. The data analyzed using SPSS 14.0. First, a principal component analysis was performed in order to determine de factor structure and items with loading value below of .25 were excluded. Second, a reliability analysis was performed in order to determine the alpha of the total scale and subscales. Finally, frequencies and percents were calculated for descriptive purposes. T-tests tested the differences for gender and geographical sites of school location. Level of significance was set *a priori* at 0.05.

Table 1- Structure matrix of the Portuguese SWEL

Items	factor	
	1	2
10 – how often were you too tired to rise?	0,705	
9 – are you tired on final waking, even if you have slept enough?	0,701	
7 – do you have problems with waking up easily in the morning?	0,697	
8 – how often was it difficult for you to wake up?	0,664	
5 – is it a problem for you when you wake up too early in the morning?	0,487	
6* - how often did you wake up earlier than you wanted?	- 0,386	
2* - if you wanted to go to sleep, did you fall asleep quickly?		- 0,704
3 – did you usually fall asleep quickly again, if you woke up from your sleep?		0,608
1 – is it a problem for you to fall asleep?		0,552
11 – how often were you troubled by sleepiness during your daily activities?		0,483
4* - if you wake up at night, is it a problem for you to fall asleep again?		- 0,459
13 – how often did you need a nap cause of the sleepiness that you felt during your daily activities?		0,309
12 - do you snort during your sleep?		0,307
Eigenvalues	4,37	3,96
% of variance	30,23	25,07
excluded item: item 14* - during the last 3 month, how many sleep hours did you had per night?		- .102

* items that are scored inverted

Results

Factor structure

An exploratory factor analyses was performed to verify underlying dimensions of the Portuguese SWEL. The *scree test* and *eigenvalues* greater than one criteria was applied and suggested a five-factor solution that account for a total of 73% of the total variance. However, the first factor accounted for 30% of the variance, whereas factors 2 through 5 accounted for additional 43% (25%,

12% and 5% respectively). Although we assumed that the factors would to some degree be related, and therefore an oblique rotation (Direct Oblimin) was used. Further data examination and analysis of the items formulation and theoretical constructs indicated that a two-factor solution (55% of total variance explained) may provide the most meaningful interpretation for this sample. Except for item 14 (“During the last 3 months, how many hours of sleep did you get per night?”), which showed a very low factor loading (.102), and therefore it was not

considered for additional analyses. All other items showed factor loadings ranging from .31 to .705 (see Table 1.). Herewith the final factor structure for the Portuguese SWEL were as followed: *Factor 1*

– Sleep related complaints – comprises 6 items (items: 5, 6, 7, 8, 9 and 10), and *Factor 2* – Wake related complaints aggregate 7 items (items: 1, 2, 3, 4, 11, 12 and 13).

Table 2 - Internal consistency of the SWEL global score and subscales

<i>SWEL global score</i>	<i>sleep complaints</i>	<i>wake complaints</i>
$\alpha = 0,73$	$\alpha = 0,75$	$\alpha = 0,70$

Reliability analysis

Based on the two-factor solution of the internal consistency, item means and item-scale correlation of the SWEL Global Score and their subscales (sleep complaints and vigil complaints) were calculated. These results, summarized in Table 2, showed quite acceptable internal consistency values, exceeding the level recommended by Nunnally (1978). The two items that demonstrate the lowest item-total correlations were items 12 and 6, which were .21 and .26, respectively. These items ask “Do you snort during your sleep” (.21) and “Do you have problems with waking up easily in the morning?” (.26). The item-scale correlations for the remaining items ranged from .31 to .53.

Sleep time

Regarding the sleep time 494 pupils (54.8%) slept more than 9 hours, 214 (23.8%) slept between 8 and 9 hours, 77 (8.6%) ranging between 7 and 8 hours as 115 (12.8%) reported to sleep less than 7 hours. No statistically significant ($p > .05$) differences for gender or geographical differences were found.

SWEL norms criteria

In order to determine the SWEL Global score, which indicates the sum of the sleep complaints severity, the items were computed into key symptoms, as followed: Initiating Sleep (item 1 x item 2), Maintaining Sleep (item 3 x item 4), Early Morning Awakening (item 5 x item 6), Difficulty Waking Up (item 7 x item 8), Tiredness Upon Waking Up (item 9 x item 10) and Daytime Sleepiness (item 11 x item 13).

The normative data was based on clinical and the statistical criteria. Regarding the clinical criteria, we asked 10 experienced clinicians (more than 10 years of practice), unaware of the sample data, to rate the scale according to what they might expect to be a score range for the following conditions: *symptom not present*, *symptom is mild*, *symptom meets criteria for diagnosis*, and

symptom is extreme. Thus, SWEL Global Score concerning the mentioned conditions were: *symptom not present* (score = [6 – 27]), *symptom is mild* (score=[28 – 35]) *symptom meets criteria for diagnosis* (score=[36 – 42]), and *symptom is extreme* (score \geq 43). These expected scores were to somewhat consistent with the obtained sample descriptive statistics, mean (20.38) and standard deviation (7.57); thus, if we successively sum to the mean a standard deviation similar to the clinician’s criteria of symptom severity class ranges will be obtained. The clinicians agreed also that a SWEL score \geq 8 for each of the key symptoms would be a value in the clinically significant range. Further, the clinicians suggested not considering the snoring complaint (item 12) cause of his relative unusual prevalence among young children. From a statistically point of view, these findings matched our sample data analyses, in the way that the snoring item was the one that had the lowest item-scale correlation (.21). In view of this assumption the snoring symptom will not be taken into account for forthcoming analysis of this article, although it should be considered for studies with older-aged samples.

The emerged factor structure of two subscales was presented for appreciation to clinicians in a joint meeting in order to promote a verbally commented discussion about their utility and external validity (e.g., clinical utility and significance). In these discussion, subscales were viewed far more as an informational tool, about how the symptoms distribution impair more the sleep related stages and/or wake states during the 24h-period, than as severity marker of sleep stages and/or wake states. To establish the SWEL Subscales score, which indicates the sum of the sleep complaints severity for each of the subscales, the items were computed into key symptoms, as followed: 1) subscale SWEL Sleep comprises the Early Morning Awakening (item 5 x item 6), Difficulty Waking Up (item 7 x item 8) and Tiredness Upon Waking Up (item 9 x item 10) symptoms; and 2) subscale SWEL Wake includes the Initiating Sleep (item 1 x item 2), Maintaining

Sleep (item 3 x item 4), and Daytime Sleepiness (item 11 x item 13) symptoms. Adopting the clinical criteria as expressed by the clinician's ratings we determined the score ranges for the following conditions: *symptom not present*, *symptom is mild*, *symptom meets criteria for diagnosis*, and *symptom is extreme*. Thus, given the fact that the considered items of the two subscales were similar in number of items and scoring, both SWEL's Subscales Score concerning the mentioned conditions ranged: *symptom not present* (score = [3-13]), *symptom is mild* (score=[14-17]) *symptom meets criteria for diagnosis* (score=[18-21]), and *symptom is extreme* (score \geq 22).

Of note, no statistically significant differences for schools sited in different regions were found, although some gender differences were found which will be presented next, both for global and subscale scores of the scale as for the key symptoms.

SWEL global and subscales scores

The scale's raw scores are presented in Table 3. Considering the scale global score, most children (85.3%) did not exhibit any significant symptoms associated with sleep problems. Moreover, comparing both subscales, it were especially those complaints regarding wakefulness and vigil states (28.9% of clinical significant cases) that were pointed as prominent complaints compared with those regarding sleep stages (12.2% of cases).

Gender differences were only found for SWEL global score scale [$t(639.502)=4.824$; $p<.001$] and SWEL Wake subscale [$t(715.615)=3.006$; $p=.003$]. In both dimensions, boys obtained higher scores ($M=21.80$; $SD=8.71$; and $M=16.05$; $SD=4.05$, respectively) than girls ($M= 19.16$; $SD=6.19$; and $M=15.27$; $SD=3.22$ respectively).

Table 3 - Raw scores for the SWEL and his subscales

	SWEL global score	SWEL wake complaints score	SWEL sleep complaints score
Symptom not present	768 (85,3%)	310 (34,5%)	494 (54,9%)
Symptom is mild	94 (10,4%)	329 (36,6%)	296 (32,9%)
Symptom meets criteria for diagnosis	27 (3,0%)	187 (20,8%)	99 (11,0%)
Symptom is extreme	11 (1,3%)	74 (8,1%)	11 (1,2%)

Initiating sleep

Eight children (0.89%) scored inside the clinical significant range (e.g., SWEL score \geq 8) on the key symptom of Initiating Sleep which means that for they experience considerable difficulties in falling asleep. Seven of these children were boys as only one were a girl. The boys had also higher mean scores ($M=4.15$; $SD=1.91$) in comparison to the girls [$M=3.78$; $SD=1.52$; $t(896)=3.224$; $p<.001$].

Maintaining sleep

About the issues of night waking and problems of falling asleep again, forty-six (5.1%) argued to have this symptom of which thirty-five were boys and eleven were girls. The boys had also higher mean scores ($M=4.75$; $SD=2.35$) than girls ($M=3.89$; $SD=1.88$) [$t(761.099)=5.712$; $p<.001$].

Early morning awakening

Forty-seven cases (5.2%) met clinical significance criteria, thirty-two boys and fifteen girls. There is a significant difference between

males and females [$t(613.744)=5.843$; $p<.001$], being that the boys are those who had higher scores ($M=4.42$; $SD=3.55$) than the girls, which implicates that they might feel more trouble out of frequent morning awakening and more difficulties in trying to sleep again.

Difficulty waking up

When asked about how easily the children dealt with waking up in the morning, seventy-seven (8.5%), thirty-five boys and thirty-six girls, reported to have troublesome with this symptom. No significant gender differences [boys ($M=3.70$; $SD=3.02$); girls ($M=3.63$; $SD=2.83$) were found for this complaint [$t(893)=.392$; $p=.695$].

Tiredness upon waking up

Thirty-nine (4.3%) children argued to feel sleepy and tired as they waked up. Twenty-nine were boys ($M = 3.14$; $SD = 2.66$) and ten were girls ($M = 2.97$; $SD = 2.05$), although both groups did not differ significantly [$t(771.106)=1.085$; $p=.278$].

Daytime sleepiness

Sixty-eight (7.56%) referred to have had the necessity for napping during the day and that they felt sleepy and/or asleep at daytime. This were specially frequent among boys, with forty-three cases, which had higher scores ($M=2.95$; $SD=3.37$) than the girls having twenty-five cases [$(M=2.05$; $SD=2.58$); $t(736.072)=4.273$; $p<.001$].

Discussion

Epidemiological studies are most important and necessary, as they provide valuable information on how a clinical description fits into the general population and they help to point out the strengths and the gaps in existing classifications (Ohayon, 2002). There is a need for valid diagnostic tools of sleep disorders that can be used in the general population, but such tools need to show sensible and discriminate between clinical from normal samples.

The aim of the present study was to determine the SWEL's psychometric features as a screening instrument of sleep complaints for school-aged children. This endeavor is crucial with regard to sleep research; elementary school-aged children are one of the least studied groups. Research in this area is needed to better understand the nature of sleep in children and how their quality of sleep may be improved. The results revealed to be a reliable and valid screening instrument for identifying potential sleep problems in Portuguese school-aged children's population. Our findings replicate those of van Diest and cols. (1989) regarding the epidemiological suitability and extended them in terms of psychometric properties. Furthermore, as the epidemiological aptness and clinical value, his easy application properties, make this instrument a practical tool for research and practice in sleep studies.

A considerable number of children (12.8%) reported to sleep less than 7 hours, which is considered to be an insufficient sleep time regarding age. Therefore, these results are of concern for sleep quality. Some reasons for this may be found in Thorleifsdottir, Bjomsson, Benediksdottir, Gislason & Kristbjarnarson (2002) article on sleep patterns and sleeping habits of infants and adolescents over a 10-year period. They showed that both endogenous and cultural factors are responsible for the sleep-wake schedule changes. Factors as working mothers, school schedules, morning TV programs, and video and

computer games are pointed out as influencing the sleep-wake schedule of infants.

Gender differences were found for some sleep complaints (that is, initiating sleep, maintaining sleep, early morning awakening, daytime sleepiness), but not for the scale's global score. Such differences have been addressed elsewhere (e.g. Tsai & Li, 2004), showing that some complaints are more prevalent for girls as others for boys, although this issue is complex and further research is needed for the Portuguese children.

Finally, the SWEL may be used as a suitable instrument for screening and selection of school-aged children. Although, future research is needed to compare clinical and non-clinical children to determine cut-off points between those groups. Additionally, the scale ratings should be confronted with an interview based analysis to assess concurrent validity and exclude false-positives. The issue of temporal stability should also be taken into account. In accomplishing these aims an accurate and well studied epidemiological measure, useful to determine sleep-wake schedule norms in the general and clinical population, will be available.

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