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Arabic versions of the sleep timing questionnaire and the composite scale of morningness

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Abstract

Objectives—To develop Arabic versions of English language questionnaires to estimate morningness/eveningness and sleep variables.

Methods—We translated the Composite scale of morningness (CSM) and the Sleep Timing Questionnaire (STQ) [with added siesta questions] into Arabic; the Arabic versions were then back translated. The revised Arabic and the original English versions were next administered to bi-lingual Egyptians using a crossover design ($n = 25$). The Arabic versions of both scales were subsequently administered to an independent Egyptian sample ($n = 79$) and the siesta variables examined in relation to the CSM.

Results—Satisfactory correlations were present between the English and Arabic versions for total CSM scores (Spearman's $\rho = 0.90$, $p < 0.001$). All but one of the STQ variables were significantly correlated (Spearman's $\rho = 0.45 - 0.88$, $p < 0.05$). In the Arabic version, the frequency of siesta naps per week was significantly correlated with the total CSM score, with evening types taking more naps (Spearman's $\rho = -0.23$, $p < 0.05$).

Conclusions—Arabic versions of the STQ and CSM have been developed in Egypt, and are freely available. They can be used for behavioral research related to sleep and circadian function and can be adapted for use in other Arab speaking populations.

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Keywords

Circadian; siesta; morningness; eveningness; sleep

1. INTRODUCTION

Circadian variation entrained to the 24 hour rotation of the planet is a fundamental property of many biological systems in most living organisms (Korf et al., 2003). In humans, the sleep wake cycle is closely regulated by, and is related to circadian processes (Shaw and Franken, 2003) (Zavada et al., 2009). Detailed evaluation of these processes ideally requires lengthy evaluations in carefully controlled settings, such as sleep laboratories to reduce the influence of external factors or zeitgebers that may affect these rhythms. (Monk et al., 2003). On the other hand, it may be desirable to retain the impact of zeitgebers in certain field settings, e.g., the design of work schedules (Harma, 1993), athletic performance (Smith et al., 1997), academic performance (Testu, 1992), and to ensure health and psychological well-being (Bohle and Tilley, 1989). Sleep laboratory studies may also be simply impractical in many situations. Hence, investigators have developed convenient pen and paper tests that reflect preferred circadian timing and are also correlated with sleep variables. These scales estimate variables that should be considered as proxies for circadian variation as would be estimated using more costly and time consuming physiological measures (Rogers et al., 1993).

One of the most popular ratings scales is based on the notion that individuals belong to a continuum from 'morningness' to 'eveningness', with reference to their preferred times of day for optimal efficiency. 'Morning' type individuals arise fully alert in the early morning but are tired in the evening and go to bed early. In contrast, 'evening' type individuals are more active in the later part of the day and prefer to go to bed late. Eveningness is associated with higher heart rate, systolic blood pressure (Roeser et al., 2012) and suppression of nocturnal melatonin levels (Reiter et al., 2007). eveningness has been linked with lower endurance (Jankowski, 2012), life satisfaction (Diaz-Morales et al., 2013), and mood (Jankowski, 2014). Morningness on the contrary is associated with life satisfaction (Randler, 2008a), less stress (Buschkens et al., 2010). This variation is partly governed by heritable factors (Hur et al., 1998) (Klei et al., 2005). It is correlated with circadian phase and reflects important physiological and psychological variables (Carrier and Monk, 2000; Folkard et al., 1985; Kerkhof, 1985; Webb, 1982). The morningness-eveningness (M/E) continuum can be conveniently evaluated using pen and paper, as well as web based questionnaires (Greenwood, 1994; Horne and Ostberg, 1976; Natale et al., 2003; Zavada et al., 2005). The Morningness-Eveningness Questionnaire (MEQ), popular questionnaire comprises a 19 item rating scale (Horne and Ostberg, 1976). Smith, et al (1989) created the Composite scale of morningness (CSM) by using the most validated questions from the MEQ and the Diurnal Type Scale (Smith et al., 1989). Subsequent studies have corroborated its reliability and validity (Bohle et al., 2001; Brown, 1993; Caci et al., 2005; Caci et al., 1999; Diaz-Morales and Sanchez-Lopez, 2005; Greenwood, 1994). We have found that it discriminates circadian variation among patients with bipolar disorder from control individuals in the US (Mansour et al., 2005; Wood et al., 2009); others have reported similar results from Korea (Ahn et al.,

2008). The CSM has been translated into several languages, including French (Caci et al., 1999), Korean (Ahn et al., 2008), Spanish (Diaz-Morales and Sanchez-Lopez, 2005), Italian (Natale et al., 2005), Thai (Pornpitakpan, 1998), Argentinean (Gil et al., 2008), German (Randler, 2008c), Romanian (Voinescu et al., 2010), Norwegian (Thun et al., 2012), Hindi (Bhatia et al., 2013), and Turkish (Onder et al., 2013).

The Sleep timing questionnaire (STQ) is another self-report instrument (Monk et al., 2003) that conveniently estimates sleep timing, sleep duration, sleep latency and wake after sleep onset (WASO). Separate estimates are derived for work-nights (work-week) and rest-nights (weekends). The STQ is a useful single administration questionnaire for accurately assessing the habitual timing of a person's sleep. STQ measures of sleep timing showed good reliability and validity, correlating well with both wrist actigraphy-based and two week diary-based measures (Monk et al., 2003).

Trans-cultural factors are likely to be important zeitgebers that may contribute to differences in circadian function (Randler, 2008b). A particularly important cultural variant is the siesta, which is commonly used in countries with very hot climates. Whether siestas contribute to human health is unclear (Monk et al., 2001). A recent study suggested that a 30 minute siesta at least three times a week lowers the risk of heart-related death by 37% (Naska et al., 2007). On the other hand, Stang et al (Stang et al., 2007) suggested that daily napping for more than one hour leads to a higher prevalence of coronary artery disease risk factors. Among men, an increased risk for sub-clinical atherosclerosis was reported. Additionally, long siesta naps are associated with depressed mood, nocturnal sleep disturbances and poor self-perceived health status (Stang et al., 2007). It is possible that the duration and the timing of the siesta nap determine its usefulness (Dinges et al., 1987). Others have reported beneficial effects of siesta naps on cortisol levels in the blood (Vgontzas et al., 2007).

Most studies of circadian behavior or sleep using pen and paper rating scales have been conducted in developed countries and in English. To enable similar studies to be performed in the Middle East, we aimed to develop Arabic versions of the CSM (Smith et al., 1989) and the STQ (Monk et al., 2003). Further, we report basic estimates of siesta nap patterns in an urban Egyptian setting.

2. METHODS

The study was carried out by faculty psychiatrists at the Department of Psychiatry, Mansoura University Hospitals (MUH), Mansoura, Egypt. It was approved by the Institutional Review Boards (IRB) at Mansoura University and the University of Pittsburgh. Verbal consent was obtained from all participants, per Mansoura University IRB regulations.

2.1. Phase I

The CSM and STQ were translated into Arabic by bi-lingual faculty psychiatrists at MUH. The scales were then back translated by other bilingual psychiatrists who had not been involved in the initial translation. The original and the back translated English versions were compared for discrepancies, which were then corrected. Next, the revised Arabic and the

original English versions of the CSM and STQ were administered to bi-lingual adult Egyptian individuals with 1–2 weeks gap between the administration of each rating scale (n = 25 participants).

2.2. Phase II

The Arabic versions of the CSM and STQ were completed by Arabic speaker participants from Mansoura, Egypt. This sample was independent of the participants in phase I (N = 79; age range 17–62, mean age 32.0 ± 10.4 ; males n = 31; females n = 48). All participants were professionals with over 14 years of education.

2.3. Statistical analysis

The Statistical Package for Social Sciences (SPSS, version 19.0 for Windows) was used for all analyses.

3. RESULTS

No participants dropped out of the study. Among the participants in phase I (n = 25), ten individuals completed the Arabic versions of the STQ and the CSM first, followed by the English version, while the rest completed the English versions first. The average lag between the first and second administration was 12 days (range 7 to 19).

3.1. CSM

The total scores of the Arabic and English versions of the CSM obtained from phase I were very highly correlated (Spearman's $\rho = 0.90$, $p < 0.001$). These analyses were repeated using intraclass correlation (ICC), and similar results were obtained (see supplemental data).

3.2. STQ

A total score cannot be derived for the STQ, hence individual variables were compared. The variables in the Arabic and English versions were significantly correlated (Spearman's $\rho = 0.47 - 0.90$, $p < 0.001$ or better) (Table 1). Only the first question was not significantly correlated (On the night before a work day or school day, what is your earliest Good Night Time and what is your latest Good Night Time?) ($\rho = 0.33$, $p = 0.1$)

3.3. Order effects

There were no significant order effect (which version is used first) as regards the lag period, age, total scores or score of individual questions except for one item (work night good night time, difference between earliest and latest, data not shown). This item also did not show significant correlation between the English and the Arabic versions.

3.4. Siesta variables

The frequency of siesta naps per week was significantly correlated with the total CSM score (Spearman's $\rho = -0.23$, $p < 0.05$) in the Arabic version indicating the greater the number of siesta naps, the lower the CSM score, i.e., greater tendency towards eveningness.

4. DISCUSSION

We have developed Arabic versions of the STQ and the CSM that may be useful for research into circadian and sleep variables in Egypt. We administered the Arabic and the English versions to bi-lingual Egyptians and compared each variable in both scales to improve their reliability. As we favored colloquial Arabic terms popular in Egypt during the translation, our scales can also be used in other Arab nations with suitable adaptation.

The total score on the CSM was highly correlated in the English and the Arabic versions. All except one variable in the STQ were significantly correlated between the Arabic and English versions. The reason for the low correlation in one item may be because the two versions were administered separately with a two-week time interval, so participants might have referred to different time periods when responding. It is also possible that the instruction (a recent “normal average week”) might have lead participants to rate different weeks when completing the English and Arabic versions. Nevertheless, we recommend caution when analyzing this item individually with the Arabic STQ.

The Arabic scales may also be useful for research related to siestas. As siestas are uncommon in many western countries (except possibly in older individuals), their popularity in Egypt provides an opportunity to evaluate circadian function among individuals who have siestas. As it was not a primary aim, comprehensive data regarding siestas were not gathered in the present study. Our limited analyses suggest that individuals with more frequent siestas are more likely to be ‘evening’ types. It is not clear from our analyses whether evening types prefer siestas inherently or whether having siestas alters one’s M/E preferences.

In conclusion, we have translated Arabic versions of the CSM and STQ. The Arabic version of the STQ appears to provide reliable measures of sleep timing variables. The scales will be useful in sleep and circadian research in Egypt, and with some modification in other Arab countries across the Middle East. The Arabic scales are freely available for non-commercial research use at our website (www.pitt.edu/~nimga).

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Highlights

- Most studies of circadian behavior/sleep are conducted in English
- We report developed Arabic versions of CSM and STQ to be used in the Middle East
- We also report basic estimates of siesta nap patterns in an urban Egyptian setting

Table 1

Correlations for individual items in in the Arabic and English versions of the Sleep Timing Questionnaire (phase I).

	N	Correlation
<i>Work night good morning time, difference between earliest and latest (wGNTdiff)</i>	24	0.33
<i>Rest night good night time, difference between earliest and latest (rGNTdiff)</i>	25	0.67 *
<i>Work night good morning time, difference between earliest and latest (wGMTdiff)</i>	25	0.82 *
<i>Rest good morning time, difference between earliest and latest (rGMTdiff)</i>	25	0.74 *
<i>Work night time in bed (wtib)</i>	24	0.65 *
<i>Rest night time in bed (rtib)</i>	25	0.60 *
<i>Work/rest night time in bed difference (tibDiff)</i>	24	0.73 *
<i>Work good night time (wgnt)</i>	24	0.75 *
<i>Rest night good night time (rgnt)</i>	25	0.46 *
<i>Work good morning time (wgmt)</i>	25	0.70 *
<i>Rest good morning time (rgmt)</i>	25	0.88 *
<i>Average sleep latency (avg_latency)</i>	25	0.80 *
<i>Average wake after sleep onset (avg_waso)</i>	25	0.72 *
<i>Average night time in bed (avg_tib)</i>	24	0.59 *
<i>Average sleep efficiency (avg_efficiency)</i>	24	0.73 *
<i>Number of siestas (nap num)</i>	23	0.81 *
<i>Duration of siestas (nap duration)</i>	23	0.60 *

* Statistically significant $p < 0.05$