Sleep Hygiene and Sleepiness

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Sleep Hygiene
Why should we care?

- Sleep Hygiene Index
- Construct is virtually ubiquitous clinically
- Demonstrated direct and mediational relationship to sleepiness and QoL
- Disappointing as an intervention target
- Losing diagnostic relevance

What to expect?

- Questioning why are we sleepy?
- Defining sleep hygiene
- Administering the Sleep Hygiene Index (SHI)
- Scoring the SHI
- Understanding SHI scores
- Reviewing SHI research
- Predicting the future of sleep hygiene

Why are we sleepy?

- Sleep Disorders
- Insufficient Sleep/Sleep Debt

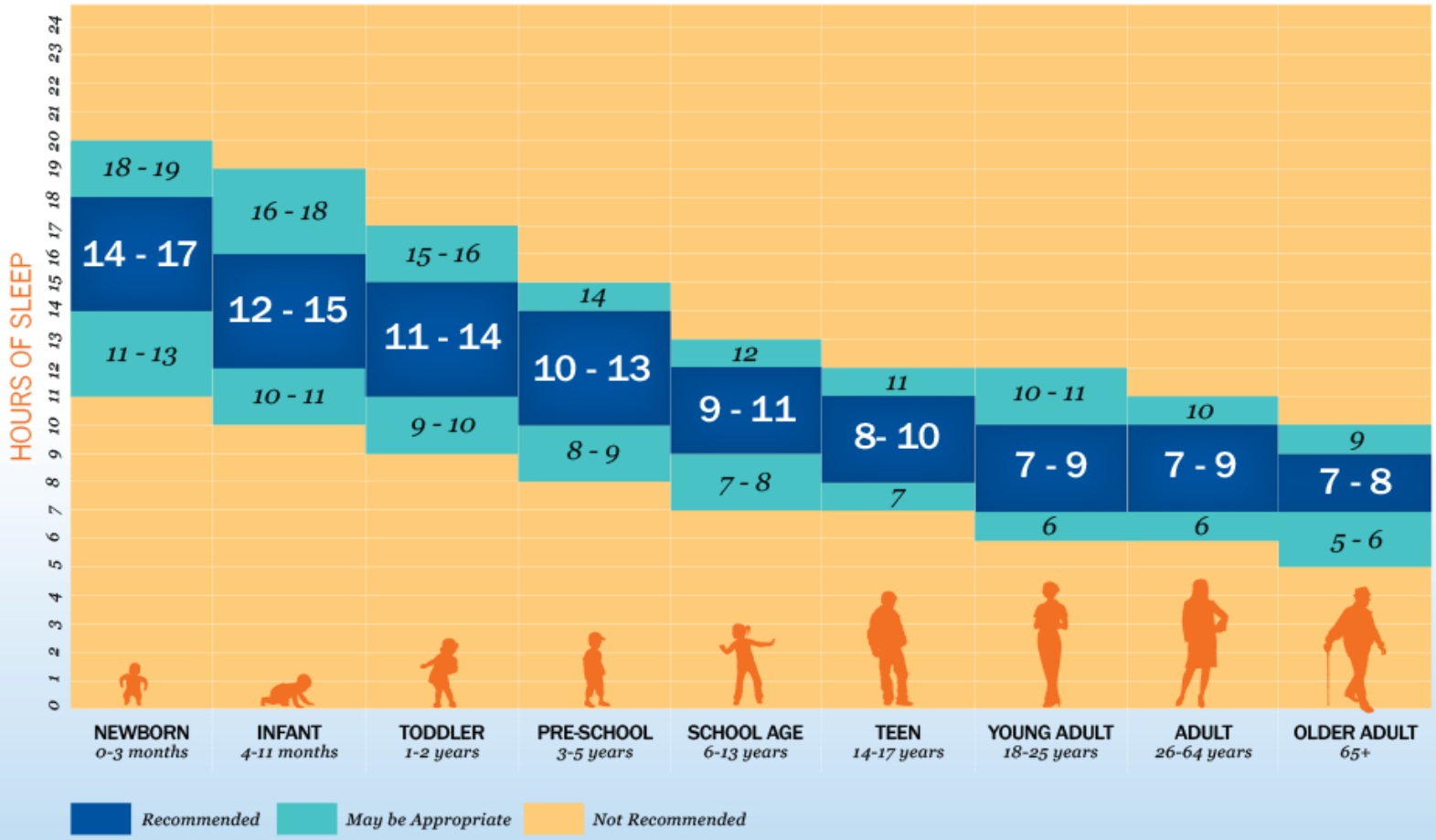
Insufficient Sleep/Sleep Debt

National Sleep Foundation's sleep time duration recommendations: methodology and results summary

Hirshkowitz, Max et al.
Sleep Health: Journal of the National Sleep Foundation (2015) , Volume 1 , Issue 1 , 40 - 43

NATIONAL SLEEP FOUNDATION

SLEEP DURATION RECOMMENDATIONS



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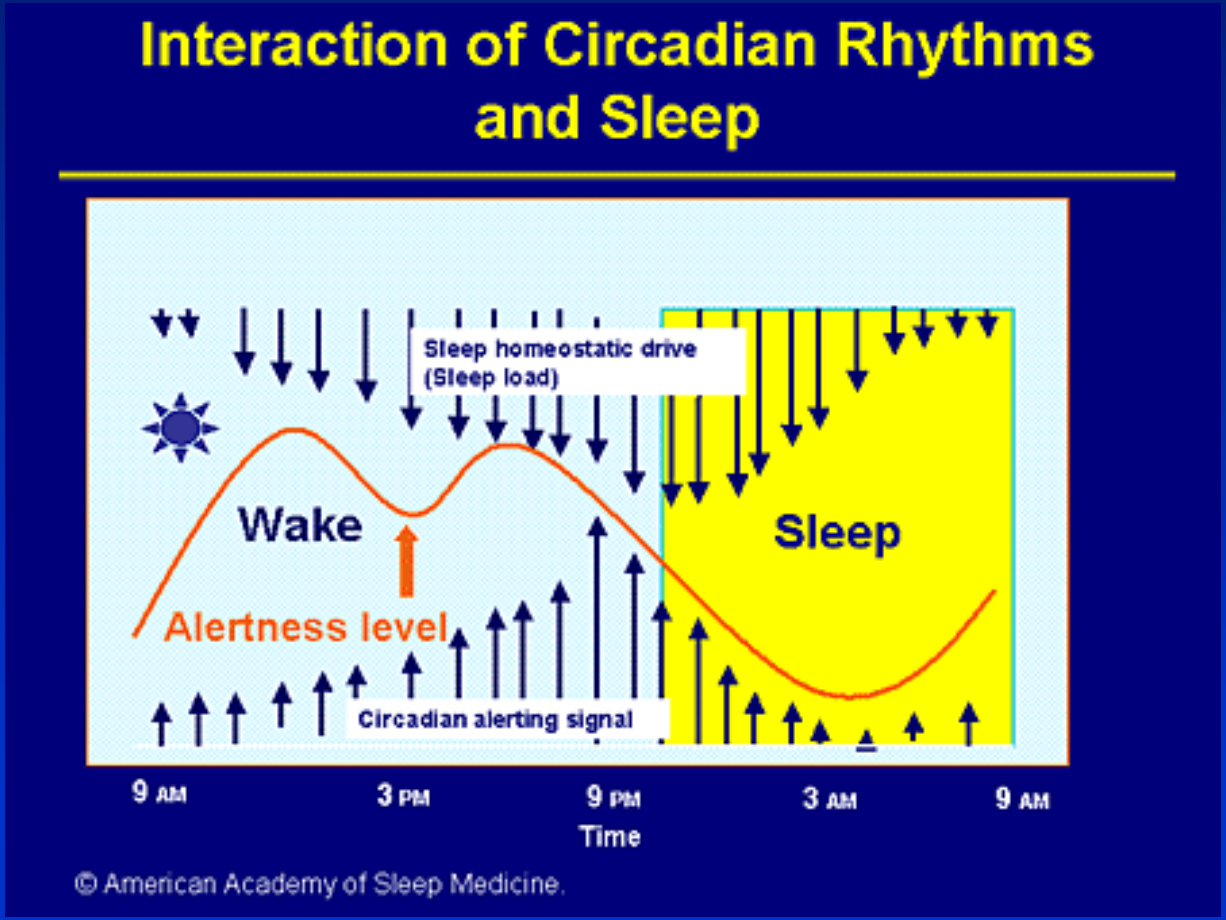
Our culture puts low priority on sleep

- Over the last century, sleep time reduced by 20%
- Since 1969 annual work hours have ⇧ by 158
- Social & economic pressures create 24/7/365 culture

Why are we sleepy?

- Sleep Disorders
- Insufficient Sleep/Sleep Debt
- Other…

Why are we all so sleepy?



Why are we all so sleepy?

- Sleep Disorders
- Insufficient Sleep/Sleep Debt
- Other…Sleep Hygiene

Sleep Hygiene Definition

- "Sleep hygiene" originally referred to the cleanliness of the sleeping environment.
- In the 19th Century many beds even had the posts sit in pots of oil to prevent insects/bed bugs from crawling up into the bed.
- Mattresses were manually pulled tight with draw-strings, to provide firmness.
- “Sleep hygiene" literally referred to how clean and hygienic the sleeping space was.

Who coined the term?

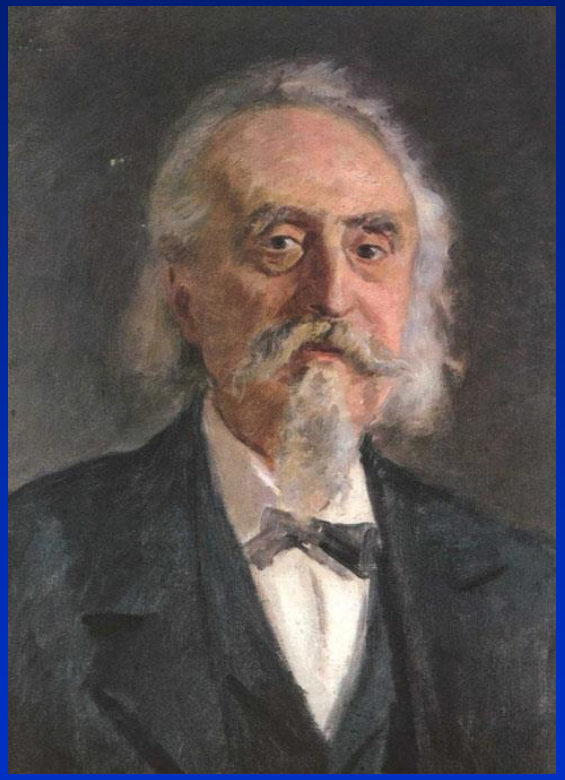
- In 1939 Sleep and Wakefulness by Nathanial Kleitman wrote about practices that interfere with normal sleep and contribute to the insomnia complaint in his chapter: The **Hygiene of Sleep** and Wakefulness

Who coined the term?

- In 1977, based on the findings of existing sleep literature, Peter Hauri developed a set of sleep-promoting rules. These rules have been considered the basis for sleep hygiene techniques and led to Hauri being acknowledged as the father of term sleep hygiene.

Who coined the term?

- More recently (2012) it has been argued that credit should go to Paolo Mantegazza who first used the term Sleep Hygiene in his book Elements of Hygiene (Elementi di Igiene) in 1865.



Sleep Hygiene Definition

- Sleep hygiene may be conceptualized as practices relating to sleep routine, stimulus-control, health, environmental, and cognitive/affective variables that impact the quality and quantity of sleep (Mastin, 2001).

Sleep Hygiene Definition

- Sleep hygiene may be described as practicing behaviors that facilitate sleep and avoiding behaviors that interfere with sleep (Riedel, 2000).

Sleep Hygiene Index

Name: _____ **Date:** _____

Please rate all of the following statements using the scale below:
5 Always, 4 Frequently, 3 Sometimes, 2 Rarely, 1 Never

Situations	Score
1. I take daytime naps lasting two or more hours.	_____
2. I go to bed at different times from day to day.	_____
3. I get out of bed at different times from day to day.	_____
4. I exercise to the point of sweating within one hour of bedtime.	_____
5. I stay in bed longer than I should two or three times a week.	_____
6. I use alcohol, tobacco, or caffeine within four hours of going to bed or after going to bed.	_____
7. I do something that may wake me up before bedtime (for example: play video games, use the internet, or clean).	_____
8. I go to bed feeling stressed, angry, upset, or nervous.	_____
9. I use my bed for things other than sleeping or sex (for example: watch television, read, eat, or study).	_____
10. I sleep on an uncomfortable bed (for example: poor mattress or pillow, too much or not enough blankets).	_____
11. I sleep in an uncomfortable bedroom (for example: Too bright, too stuffy, too hot, too cold, or too noisy).	_____
12. I do important work before bedtime (for example: pay bills, schedule, or study)	_____
13. I think, plan, or worry when I am in bed.	_____
Total out of 65	_____

Scoring: Higher scores are indicative of more maladaptive sleep hygiene status.

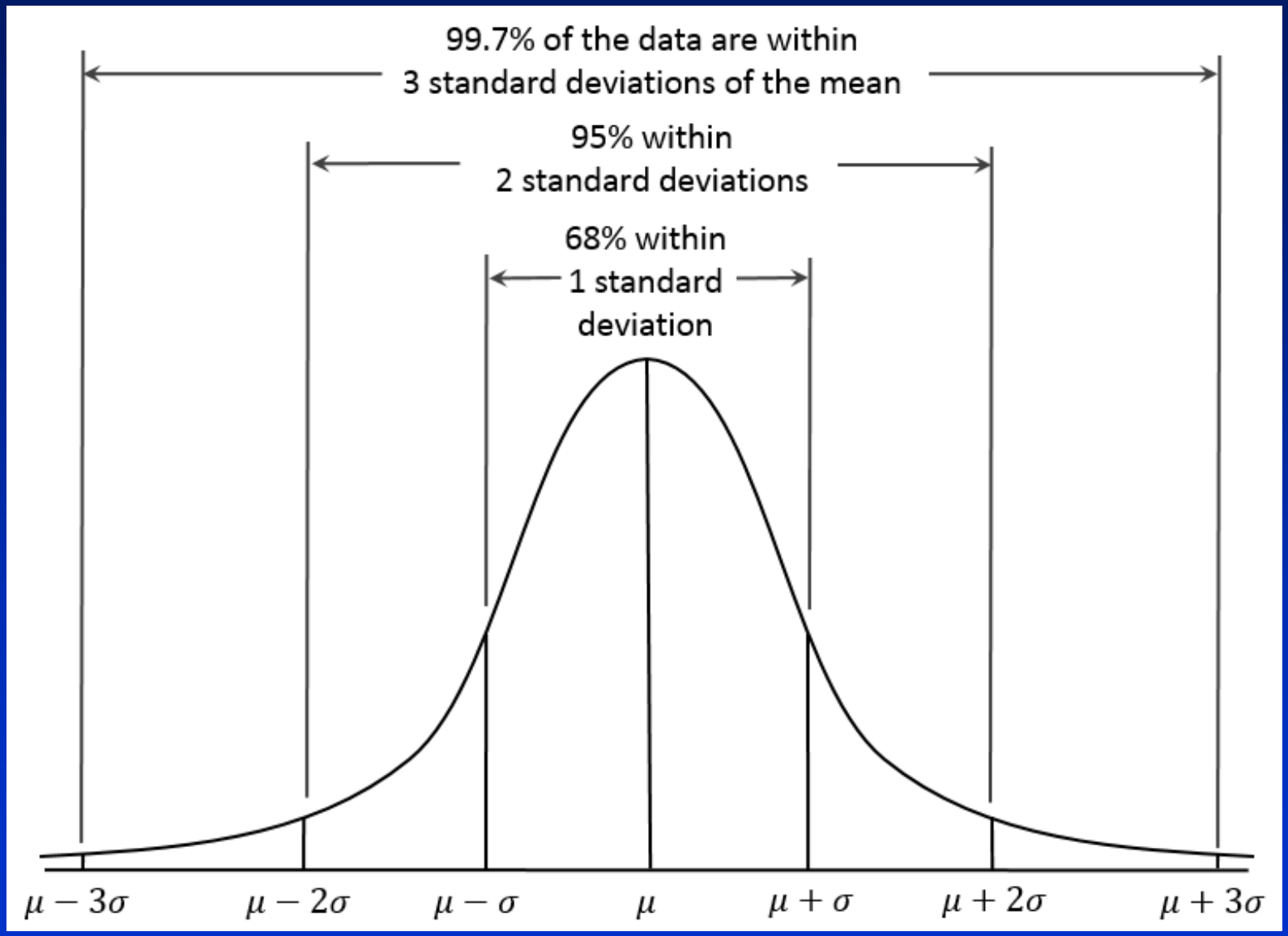
Freecall 1800 155 225 or
(07) 3870 2144 e-mail
sleep@sleepspecialists.com.au

Experts in Sleep Health Management

David F. Mastin, Jeff Bryson and Robert Corwyn, Assessment of Sleep Hygiene Using the Sleep Hygiene Index, Journal of Behavioral Medicine, Vol. 29, No. 3, June 2006.

Sleep hygiene scores

- Normative data (higher scores mean more maladaptive)
  - UALR sample (N= 603) mean 34.7 (SD = 6.6) range 17-55


99.7% of the data are within
3 standard deviations of the mean
95% within
2 standard deviations
68% within
1 standard
deviation
$\mu - 3\sigma$
$\mu - 2\sigma$
$\mu - \sigma$
μ
$\mu + \sigma$
$\mu + 2\sigma$
$\mu + 3\sigma$

Sleep hygiene scores

- Normative data (higher scores mean more maladaptive)
  - UALR sample (N= 603) mean 34.7 (SD = 6.6) range 17-55
  - Hendrix College sample (N=133) mean=35 (SD=4.5)
  - Methodist Ministers (N=176) mean=29 (SD=6)

Sleep hygiene scores

- Physicians
  - Physicians Data were solicited from 430 volunteering junior resident doctors (M=26.6 years, SD=2.2 years; 80.6% male, 16.4% female) from an urban teaching hospital in India over the course of 12 months.

(David F. Mastin, H. S. Siddalingaiah, Amarjeet Singh and Vivek Lal (2012). Excessive Daytime Sleepiness, Sleep Hygiene, and Work Hours Among Medical Residents in India. Journal of Tropical Psychology, 2, e4 doi:10.1017/jtp.2012.3)

Sleep hygiene scores

- Normative data (higher scores mean more maladaptive)
  - Residents/India (N=350) mean=32 (SD=6)

TABLE 7

Item Wise ratings of SHI by Study Participants

Sleep Hygiene Index						
Please rate all of the following statements using the scale below.						
5=Always						
4=Frequently						
3=Sometimes						
2=Rarely						
1=Never						
Sleep Hygiene Index		N=(%)	N=(%)	N=(%)	N=(%)	N=(%)
Please circle the letters or blacken the box by using the scale above.						
1.	I take daytime naps lasting two or more hours.	103 (29.5)	142 (40.7)	80 (22.9)	16 (4.6)	8 (2.3)
2.	I go to bed at different times from day to day.	23 (6.6)	74 (21.3)	89 (25.6)	100 (28.7)	62 (17.8)
3.	I get out of bed at different times from day to day.	40 (11.5)	101 (28.9)	103 (29.5)	73 (20.9)	32 (9.2)
4.	I exercise to the point of sweating within one hour of going to bed.	274 (78.7)	50 (14.4)	17 (4.9)	1 (0.3)	6 (1.7)
5.	I stay in bed longer than I should two or three times a week.	96 (27.5)	110 (31.5)	85 (24.4)	41 (11.7)	17 (4.9)
6.	I use alcohol, tobacco, or caffeine within four hours of going to bed or after going to bed.	224 (64.2)	45 (12.9)	49 (14)	19 (5.4)	12 (3.4)
7.	I do something that may wake me up before bedtime (for example: play video games, use the internet, or clean).	142 (40.7)	70 (20.1)	94 (26.9)	33 (9.5)	10 (2.9)
8.	I go to bed feeling stressed, angry, upset, or nervous.	71 (20.3)	100 (28.7)	113 (32.4)	57 (16.3)	8 (2.3)
9.	I use my bed for things otherthan sleeping or sex (for example: watch television, read, eat, or study).	37 (10.6)	45 (12.9)	88 (25.2)	111 (31.8)	68 (19.5)
10.	I sleep on an uncomfortable bed (for example: poor mattress or pillow, too much or not enough blankets).	126 (36.2)	109 (31.3)	68 (19.5)	28 (8)	17 (4.9)
11.	I sleep in an uncomfortable bedroom (for example: too bright, too stuffy, too hot, too cold, or too noisy).	105 (30.1)	128 (36.7)	65 (18.6)	34 (9.7)	17 (4.9)
12.	I do important work before bedtime (for example: pay bills, schedule, or study).	32 (9.2)	56 (16)	95 (27.2)	127 (36.4)	39 (11.2)
13.	I think, plan, or worry when I am in bed.	43 (12.3)	84 (24.1)	127 (36.4)	68 (19.5)	27 (7.7)

Sleep hygiene scores

- Excessive sleepiness, as detected by the ESS was found in 47.4% of participants (26% were classified as mildly sleepy, 9.4% as moderate, and 12% as seriously sleepy).Maladaptive sleep hygiene, as measured by the SHI, was prevalent among 85.7% of residents.

Sleep hygiene scores

- Normative data (higher scores mean more maladaptive)
  - UALR sample (N= 603) mean 34.7 (SD = 6.6) range 17-55
  - Hendrix College sample (N=133) mean=35 (SD=4.5)
  - Methodist Ministers (N=176) mean=29 (SD=6)
  - Residents/India (N=350) mean=32 (SD=6)

Sleep Hygiene
What is it Good For?

David F Mastin, PhD

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at Little Rock

What is it good for?

- Inadequate sleep hygiene became a distinct nosological entity in 1990 and is included in the International Classification of Sleep Disorders

ICSD1: Inadequate Sleep Hygiene 1990

- “Inadequate sleep hygiene is a sleep disorder due to the performance of daily living activities that are inconsistent with the maintenance of good quality sleep and full daytime alertness.”

dent sleep disorder, central sleep apnea syndrome, short sleeper, delayed sleep phase syndrome, irregular sleep–wake pattern, restless legs syndrome, periodic limb movement disorder, limit-setting sleep disorder, sleep-onset association disorder.

Diagnostic Criteria: Inadequate Sleep Hygiene (307.41-1)

A. Complaint of either insomnia or excessive sleepiness.
B. Presence of at least one of the following:
   1. Daytime napping at least two times each week;
   2. Variable wake-up times or bedtimes;
   3. Frequent periods (two to three times per week) of extended amounts of time spent in bed;
   4. Routine use of products containing alcohol, tobacco, or caffeine in the period preceding bedtime;
   5. Scheduling exercise too close to bedtime;
   6. Engaging in exciting or emotionally upsetting activities too close to bedtime;
   7. Frequent use of the bed for nonrelated activities (e.g., television watching, reading, studying, snacking, etc.);
   8. Sleeping on an uncomfortable bed (poor mattress, inadequate blankets, etc.);
   9. Allowing the bedroom to be too bright, too stuffy, too cluttered, too hot, too cold, or in some way nonconducive to sleep;
   10. Performing activities demanding high levels of concentration shortly before bed;
   11. Allowing to occur in bed such mental activities as thinking, planning, reminiscing, etc.
C. Polysomnography demonstrates one or more of the following:
   1. Increased sleep latency;
   2. Reduced sleep efficiency;
   3. Frequent arousals;
   4. Early morning awakening; or
   5. An MSLT that shows excessive sleepiness.
D. No evidence of psychiatric or medical disorder that accounts for the sleep disturbance.
E. Absence of other sleep disorder either producing difficulty in initiating or maintaining sleep or excessive sleepiness.

Minimal Criteria: A plus B.

Severity Criteria:

Mild: Mild insomnia or mild sleepiness as defined above.
Moderate: Moderate insomnia or moderate sleepiness as defined above.
Severe: Severe insomnia or severe sleepiness as defined above.

Principles and Practice 2nd ed 1994

- Sleep hygiene is thought to play a role as a mediating variable with regard to the effects of sleep disorders and may be seen as an integral component of treatment. (V Zarcone, 1994)
- Regardless of the model employed or the complaint of the patient, sleep disorders physicians almost always counsel patients about sleep hygiene. (V Zarcone, 1994)

ICSD2: Inadequate Sleep Hygiene 2005

- ICSD2 essential features of inadequate sleep hygiene
  - The essential feature of inadequate sleep hygiene is an insomnia associated with daily living activities that are inconsistent with the maintenance of good quality sleep and full daytime alertness…practices that are under the individual's behavioral control.

Not applicable or known.

Polysomnographic and Other Objective Findings

The polysomnographic features of patients with inadequate sleep hygiene have not been well documented but are presumed to include such findings as elevated wakefulness and reduced sleep efficiency. Recording in the sleep laboratory environment may correct some inadequate sleep hygiene practices and, therefore, may mask the severity of the problem.

Diagnostic Criteria

Inadequate Sleep Hygiene

A. The patient's symptoms meet the criteria for insomnia.
B. The insomnia is present for at least one month.
C. Inadequate sleep hygiene practices are evident as indicated by the presence of at least one of the following:
    i. Improper sleep scheduling consisting of frequent daytime napping, selecting highly variable bedtimes or rising times, or spending excessive amounts of time in bed
    ii. Routine use of products containing alcohol, nicotine, or caffeine, especially in the period preceding bedtime
    iii. Engagement in mentally stimulating, physically activating, or emotionally upsetting activities too close to bedtime
    iv. Frequent use of the bed for activities other than sleep (e.g., television watching, reading, studying, snacking, thinking, planning)
    v. Failure to maintain a comfortable sleeping environment
D. The sleep disturbance is not better explained by another sleep disorder, medical or neurological disorder, mental disorder, medication use, or substance use disorder.

Clinical and Pathophysiological Subtypes

Not applicable or known.

Unresolved Issues and Further Directions

There have been few research studies to confirm the role of inadequate sleep hygiene in the development or perpetuation of insomnia. Chronic insomnia sufferers tend to be more aware of sleep-hygiene issues than are good sleepers, but they may practice good sleep hygiene less often. Despite the paucity of research support for the etiologic role of inadequate sleep hygiene, most researchers and clinicians recommend attending to sleep hygiene issues as a matter of course in the treatment of insomnia. Although there is modest support for the efficacy of sleep hygiene instructions alone, it is frequently recommended as an adjunct in any treatment of chronic insomnia.

Because inadequate sleep hygiene is multifactorial, future diagnostic and treatment studies should evaluate

ICSD2: Inadequate Sleep Hygiene 2005

- Demographics
  - Condition is present in 1% to 2% of adolescents and young adults.
  - Among sleep-clinic populations, approximately 5% to 10% of those who present with insomnia complaints are found to have symptoms that are assigned inadequate sleep hygiene as the primary diagnosis.
  - Inadequate sleep hygiene may be considered as primary or secondary diagnosis in more than **30%** of sleep-clinic patients.

ICSD3: Inadequate Sleep Hygiene 2014

- Changes
  - The collapse of all previous chronic insomnia diagnoses into a single *chronic insomnia disorder* diagnosis with clinical and pathophysiological subtypes.

ICSD3: Inadequate Sleep Hygiene 2014

- Clinical and pathophysiological insomnia subtype
  - *Inadequate Sleep Hygiene* Patients with this form of insomnia have ongoing sleep/wake difficulties as a function of practices such as daytime napping, scheduling, caffeine/tobacco/alcohol use, mental activation, stimulus control, environmental issues.

ICSD3: Inadequate Sleep Hygiene 2014

- Changes
  - "Experience suggests that, in practice, it is rare to encounter patients who meet the diagnostic criteria for exclusively on of these subtypes."
  - …diagnostic distinctions… difficult to reliably ascertain and are of questionable validity."
  - ICSD3 "abandons the previously employed complex and highly specific insomnia classification scheme."

Principles and Practice 4th ed 2005

- …poor sleep hygiene is neither necessary nor sufficient for the occurrence of insomnia. Patients with primary insomnia do not necessarily engage in more poor sleep hygiene practices than good sleepers, and monotherapy with sleep hygiene instructions does not reliably produce significant benefit. Perlis et al.

Principles and Practice 6th ed 2017

- …may be helpful for mild insomnia…This information is very useful to help some patients distinguish clinical insomnia from normal (age-related) sleep disturbances. Such knowledge can prevent excessive worry and concern, which can lead to clinical insomnia.

Sleep Medicine 16 (2015) 736–745

Contents lists available at ScienceDirect

Sleep Medicine

journal homepage: www.elsevier.com/locate/sleep

Original Article

Can a school-based sleep education programme improve sleep knowledge, hygiene and behaviours using a randomised controlled trial ☆

Gabrielle Rigney [a,*], Sarah Blunden [b], Carol Maher [a], James Dollman [a], Somayeh Parvazian [c], Lisa Matricciani [a], Timothy Olds [a]

[a] University of South Australia, Alliance for Research in Exercise, Nutrition and Activity (ARENA), Sansom Institute for Health Research, North Terrace, Adelaide, SA 5001, Australia
[b] Central Queensland University, Appleton Institute, PO Box 42, Goodwood, SA 5034, Australia
[c] Center for Work+Life, University of South Australia, Magill, SA 5072, Australia

School-based sleep hygiene program

- The intervention consisted of four classroom lessons delivered at weekly intervals, followed by a group sleep project presented to parents. The program increased time in bed by 10 min ($p = 0.03$) for the Intervention group relative to the Control group. These changes were not sustained at follow-up. There was no impact on sleep knowledge or sleep hygiene.

Sleep Hygiene Index

- SHI The Sleep Hygiene Index is a 13-item self-administered index intended to asses the presence of behaviors thought to comprise sleep hygiene. Higher scores are indicative of more maladaptive sleep hygiene status.

Journal of Behavioral Medicine, Vol. 29, No. 3, June 2006 (© 2006)
DOI: 10.1007/s10865-006-9047-6

Assessment of Sleep Hygiene Using the Sleep Hygiene Index

David F. Mastin,[1,5] Jeff Bryson,[2,3,4] and Robert Corwyn[1]

Accepted for publication: January 23, 2006
Published online: March 24, 2006

The Sleep Hygiene Index was developed to assess the practice of sleep hygiene behaviors. The Sleep Hygiene Index was delivered to 632 subjects and a subset of the subjects participated in a readministration of the instrument. Test–retest reliability analyses suggested that sleep hygiene behaviors are relatively stable over time for a nonclinical population. Results confirmed that sleep hygiene is strongly related to sleep quality and modestly related to perceptions of daytime sleepiness. As predicted, support of the sleep hygiene construct was also

Sleep Hygiene Index

- Results confirmed that sleep hygiene is strongly related to sleep quality and modestly related to perceptions of daytime sleepiness. As predicted, support of the sleep hygiene construct was also provided by strong correlations with the associated features of a diagnosis of inadequate sleep hygiene.

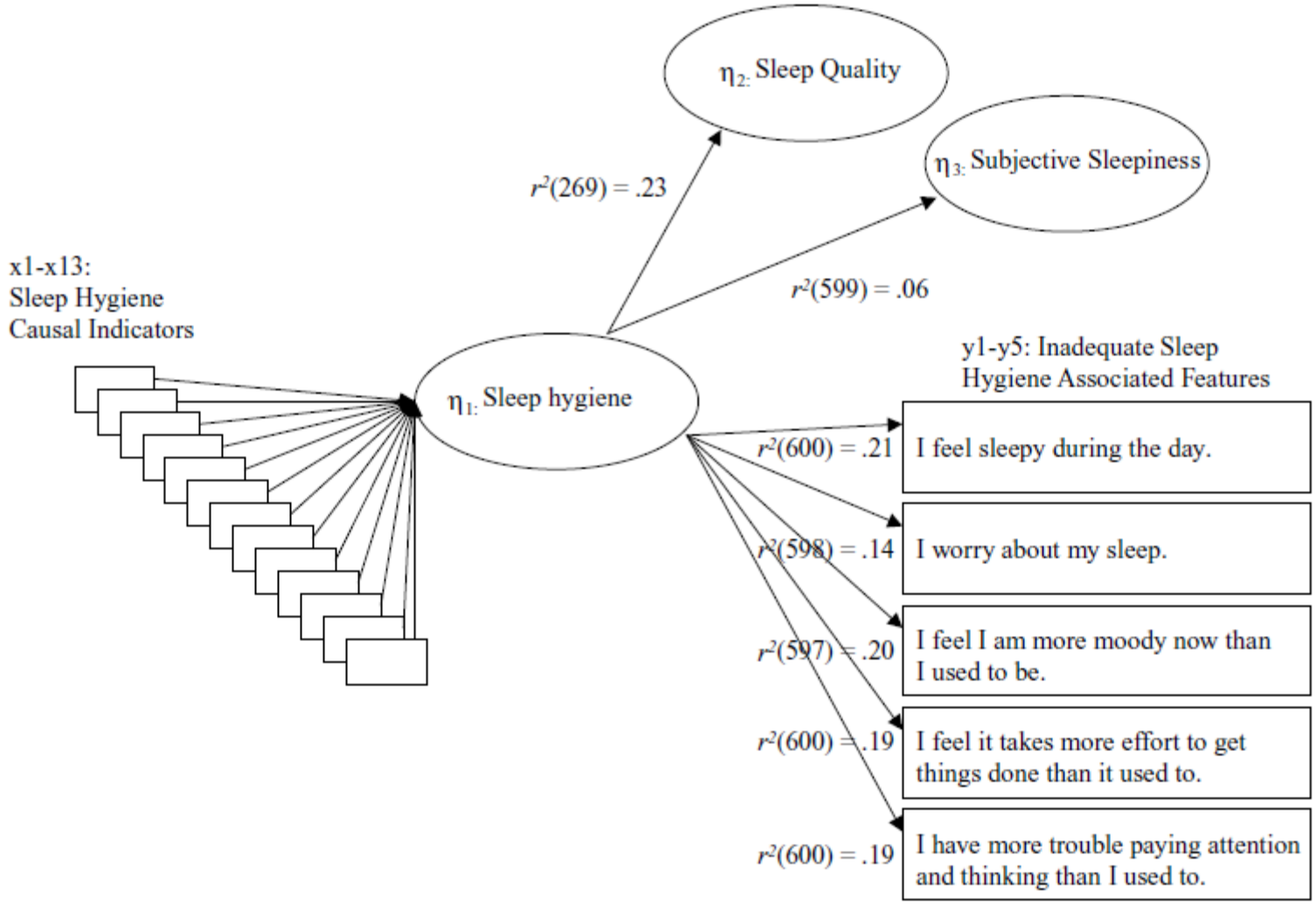
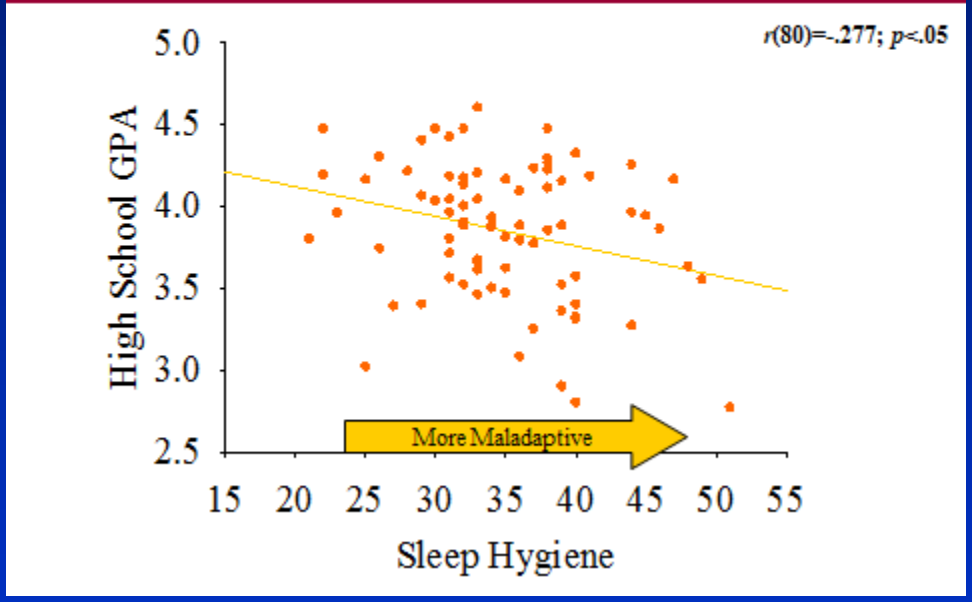


Fig. 1. Diagnostic criteria for inadequate sleep hygiene are x_1 through x_{11}. Variable of interest, sleep hygiene, is identified by η_1. Associated features of inadequate sleep hygiene are identified by y_1 through y_5. Two linked constructs, sleep quality and subjective sleepiness, are identified by η_2 and η_3, respectively. All correlations in this figure were significant at the 0.05 level or less.

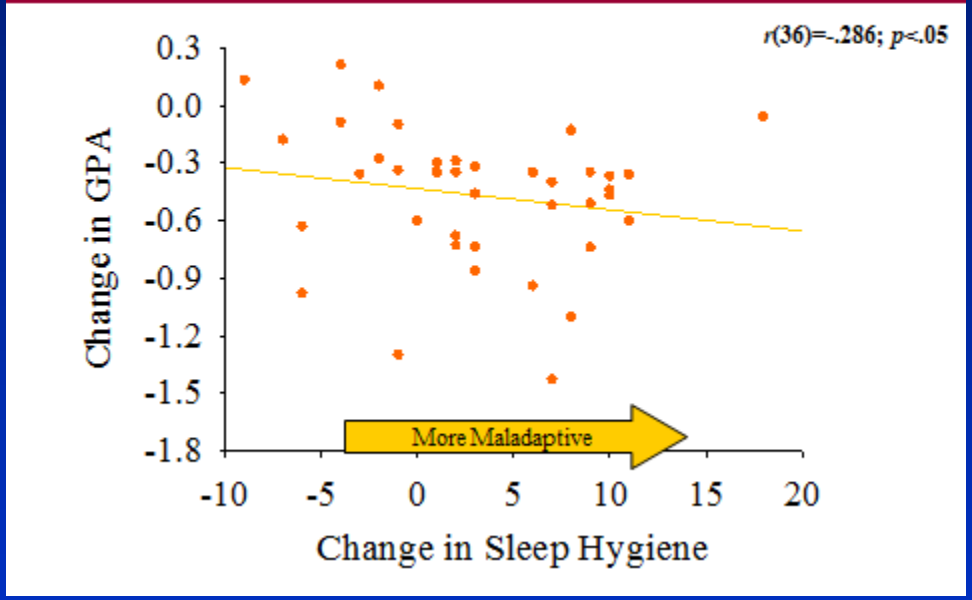
Sleep Hygiene, Chronotype, and Academic Performance during the Transition from High School through Four Years of College

- Maladaptive sleep hygiene was associated with poorer high school academic performance. Sleep hygiene shifted toward maladaptation for all students in the transition from high school to college, but no direct relationship was found between college academic performance and sleep hygiene.

Sleep Hygiene and GPA



Change in Sleep Hygiene and GPA



- Students whose sleep hygiene worsened during college, also showed a greater decline in their GPA during college ($r(36)=.286$; $p<.05$).

Journal of the Neurological Sciences 359 (2015) 445–449

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Journal of the Neurological Sciences

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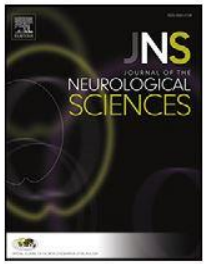

Sleep hygiene and its association with daytime sleepiness, depressive symptoms, and quality of life in patients with mild obstructive sleep apnea

Sang-Ahm Lee *, Joon-Hyun Paek, Su-Hyun Han

Department of Neurology, Asan Medical Center, University of Ulsan College of Medicine, Seoul, Republic of Korea

OSA and sleep hygiene

- Lee 2015 JNS: Previous studies found that poor sleep hygiene practices are significantly associated with poor sleep quality in adolescents, university students, hospital nurses, and medical students. Poor sleep-related habits are considered to be one of the major etiological factors of psychophysiological insomnia, and sleep hygiene recommendations are commonly integrated into behavioral treatments for insomnia. Despite being emphasized less frequently, sleep hygiene behaviors are also recommended in order to improve sleep quality in OSA patients, which consequently give rise to decreasing the functional outcomes of OSA such as daytime sleepiness, depression, and quality of life.

OSA and sleep hygiene

- 260 OSA Patients
- Sleep hygiene is indirectly associated with daytime sleepiness, depressive symptoms, and QoL through sleep quality. Also, sleep hygiene is directly related to daytime sleepiness and QoL independent of sleep quality in mild OSA patients.

OSA and sleep hygiene

- Among the 13 items of SHI, 7 items were poor sleep hygiene behaviors (defined by the participants' responses of “always” or “frequently” to each item) answered by ≥10% of the participants. Younger patients (r=−0.345; p b 0.001) and men demonstrated higher SHI scores (more maladaptive; 25.3 ± 6.3 in men vs. 23.2 ± 5.8 in women; p = 0.009).

Table 2
Percentages of poor sleep hygiene behaviors in the study patients with mild obstructive sleep apnea (n = 260).

	Always or frequently, %
9. I use my bed for things other than sleeping or sex.	32.7
6. I use alcohol, tobacco, or caffeine within 4 h of going to bed or after going to bed.	22.3
2. I go to bed at different times from day to day.	19.6
13. I think, plan, or worry when I am in bed.	18.1
7. I do something that may wake me up before bedtime.	15.4
5. I stay in bed longer than I should two or three times a week.	13.1
3. I get out of bed at different times from day to day.	12.7
12. I do important work before bedtime.	7.7
11. I sleep in an uncomfortable bedroom.	5.0
10. I sleep on an uncomfortable bed.	4.6
1. I take daytime naps lasting 2 or more hours.	3.1
8. I go to bed feeling stressed, angry, upset, or nervous.	2.7
4. I exercise to the point of sweating within 1 h of going to bed.	1.5

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Comprehensive Psychiatry 59 (2015) 135–140

COMPREHENSIVE PSYCHIATRY

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Psychometric properties of the Turkish version of the Sleep Hygiene Index in clinical and non-clinical samples

Pınar Guzel Ozdemir[a,*], Murat Boysan[b], Yavuz Selvi[c], Abdullah Yildirim[a], Ekrem Yilmaz[a]

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[b]*Department of Psychology, Yüzüncü Yıl University School of Arts, Van, Turkey*
[c]*Department of Psychiatry, (SUSAB, Neuroscience Research Unit), Selçuk University School of Medicine, Konya, Turkey*

Turkish SHI

- The SHI revealed a unidimensional factor structure. Significant strong partial associations of the SHI with depression, insomnia and poor sleep quality and a modest partial association with sleepiness were detected. Three-week temporal reliability demonstrated for the community sample and among patients with major depression.

SHI Languages

- The index has previously been, or is in the process of being, translated into Italian, Russian, Persian, Turkish, Hindi, Korean, Formosan Mandarin Chinese, Portuguese, Spanish, and Japanese.

- According to the Pew Internet: 44% of cell phone owners have snoozed with their phone next to their bed to make sure they didn’t miss any crucial calls or texts.

SHI 14th Question?

Is Social Technology Use Related to Sleepiness?

Two separate social technology sleep hygiene items were used to examine the relationship between daytime sleepiness and social technology use during and around sleep time. The first version showed no significant correlation with ESS ($r(249) = .052$, $p > .05$). In contrast, the second version did show a medium positive significant relationship with ESS ($r(178) = .322$, $p < .05$).

Technology and sleep hygiene

- 14A. I wake up early or during the night to check or respond to social technology (for example: Facebook, Twitter, e-mail, text, phone).
- 14B. I check e-mail, texts, or social media during my sleep time (between going to bed and getting up).

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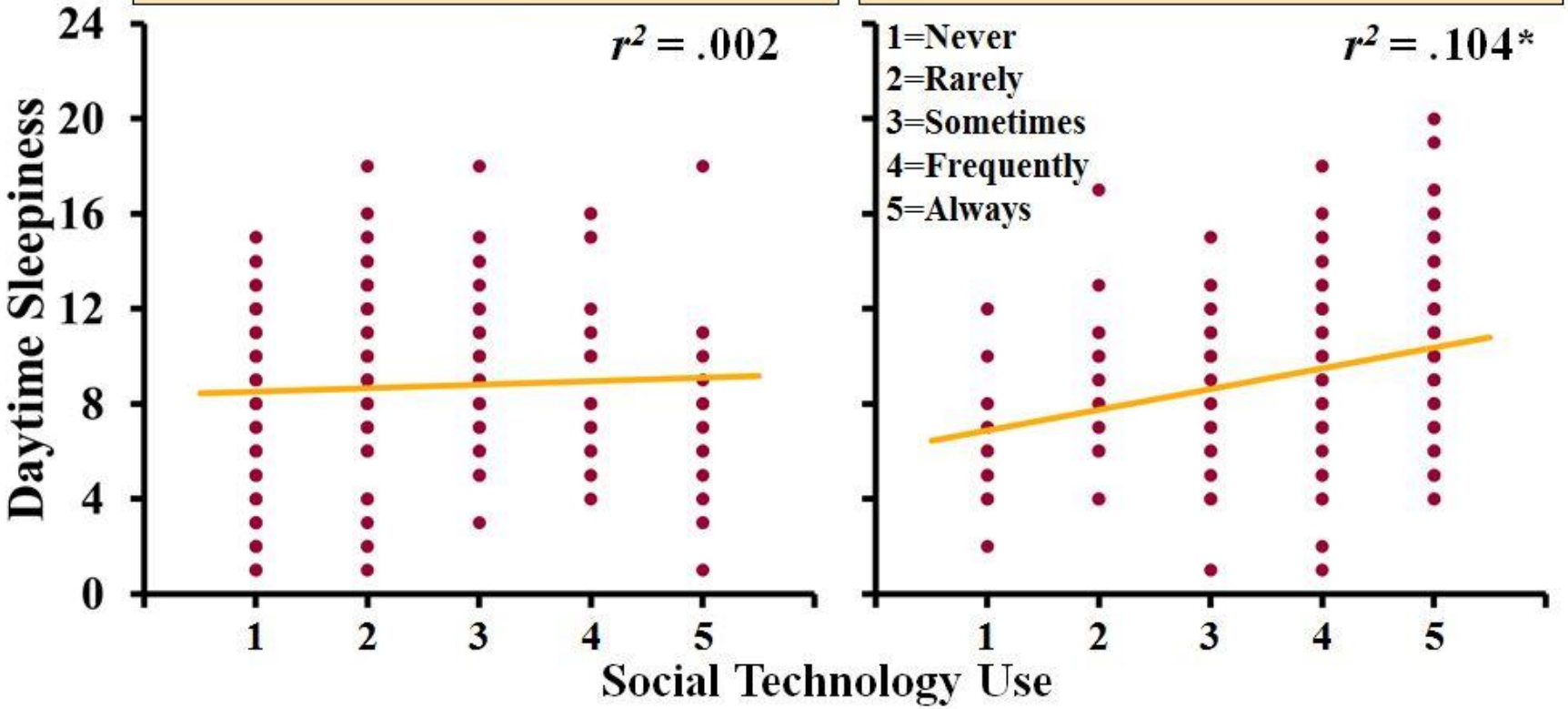

Passive Technology Use

- 15. I keep some type of technology on or near my bed during my sleep time (between going to bed and getting up).

Principles and Practice 2nd ed

- Sleep hygiene is thought to play a role as a mediating variable with regard to the effects of sleep disorders and may be seen as an integral component of treatment. (V Zarcone, 1989,1994)
- From a practical point of view, sleep hygiene advice, given by itself, probably will be of little benefit to the patient. (V Zarcone, 1989,1994)

Principles and Practice 2nd ed

- Regardless of the model employed or the complaint of the patient, sleep disorders physicians almost always counsel patients about sleep hygiene. (V Zarcone, 1989,1994)

Questions?