
Sleep: More Important Than You REMember!
Session 1523
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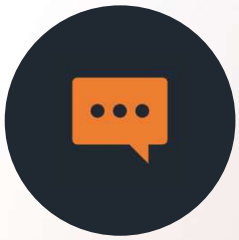

ADRIAN S. BANNING IS A PAID COHOST FOR THE AAPA/HIPPO MEDICAL EDUCATION PRIMARY CARE RAP. NO OTHER DISCLOSURES

STEPHEN T. WOLFF HAS NOTHING TO DISCLOSE

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Objectives

- **Describe the neurology of sleep and sleep patterns**
- **Correlate** sleep quality, health, performance, and clinical decision-making.
- **Examine** deleterious effects of sleep deprivation on performance
- **Assess** sleep hygiene strategies

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Everyone's favorite: A few vignettes…

…just for fun

What is one way they found an undergraduate college student can increase the likelihood that a behavioral change is more successful?

- (1) talk to your significant other about your preferred sleep habits and goals
- (2) read all the primary literature about healthy sleep hygiene
- (3) set a goal to change all your sleep habits starting this week
- (4) if you fail to meet your desired goal, you penalize yourself

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What about that nightly alcohol?!

A 24-year-old male PA-C who works 12-hour shifts finds it hard to fall asleep most nights of the week. He reports that if he has one glass of wine before he goes to bed that it "knocks him right out." He says he's been sleeping better, but still feels fatigued 3-4 times a week. What advice would you give him about his nightly glass of wine?

- (1) he should continue to drink his nightly wine and add a cup of coffee in the morning to feel less drowsy
- (2) he should stop drinking his nightly glass of wine and try relaxation exercises after his 12 hour shifts before bed
- (3) he should change his wine to one shot of a higher proof liquor such as whiskey which has better aromatic properties
- (4) he should stop drinking his nightly wine and instead take 50 mg of diphenhydramine (Benadryl) when he finishes a shift

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How about when traveling from West to East time zones?

A 25-year-old female is traveling from California to Philadelphia for a residency interview. She arrives at 6 pm eastern time in Philadelphia. She is not tired but has to be awake early for the interview tomorrow. What is one intervention she can take to help with her sleep the next few days she spends on the eastern time zone.

- (1) take 3 mg of melatonin around 8 pm
- (2) take 50 mg of diphenhydramine right before bed
- (3) take 0.5 mg of Xanax before bed
- (4) take 100 mg of CBD oil now that she has arrived in Philadelphia

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But my sleep hygiene is really good!

A 45-year-old male PA-C states he has had trouble falling asleep. He wakes up at 6 am every day and attempts to go to bed routinely at 10pm but often cannot fall asleep. He has tried hot baths before bed, typically reads in dim light on the sofa before going to bed. He takes no medications daily and never consumes alcohol, marijuana or other illicit substances. What is the best next step he can take to improve his sleep?

- (1) try doing yoga 1 hour before bed
- (2) take 50 mg of Benadryl nightly 30 mins before bedtime
- (3) go to a supplement store to see what supplements they recommend
- (4) consult a healthcare professional to discuss his insomnia

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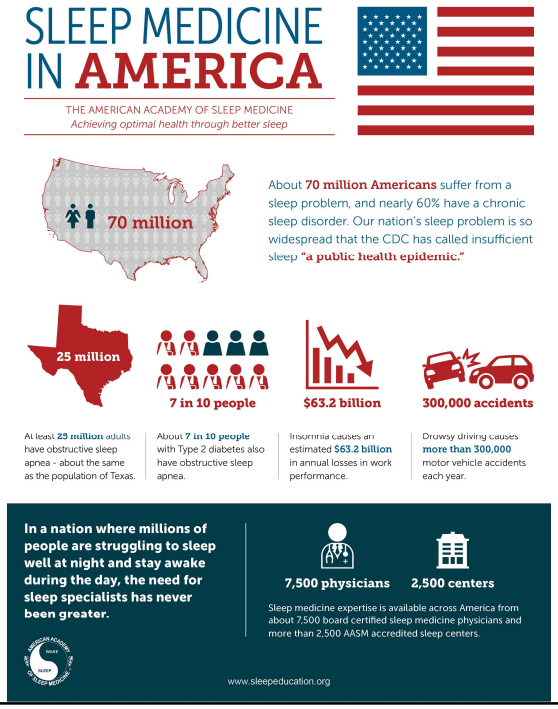
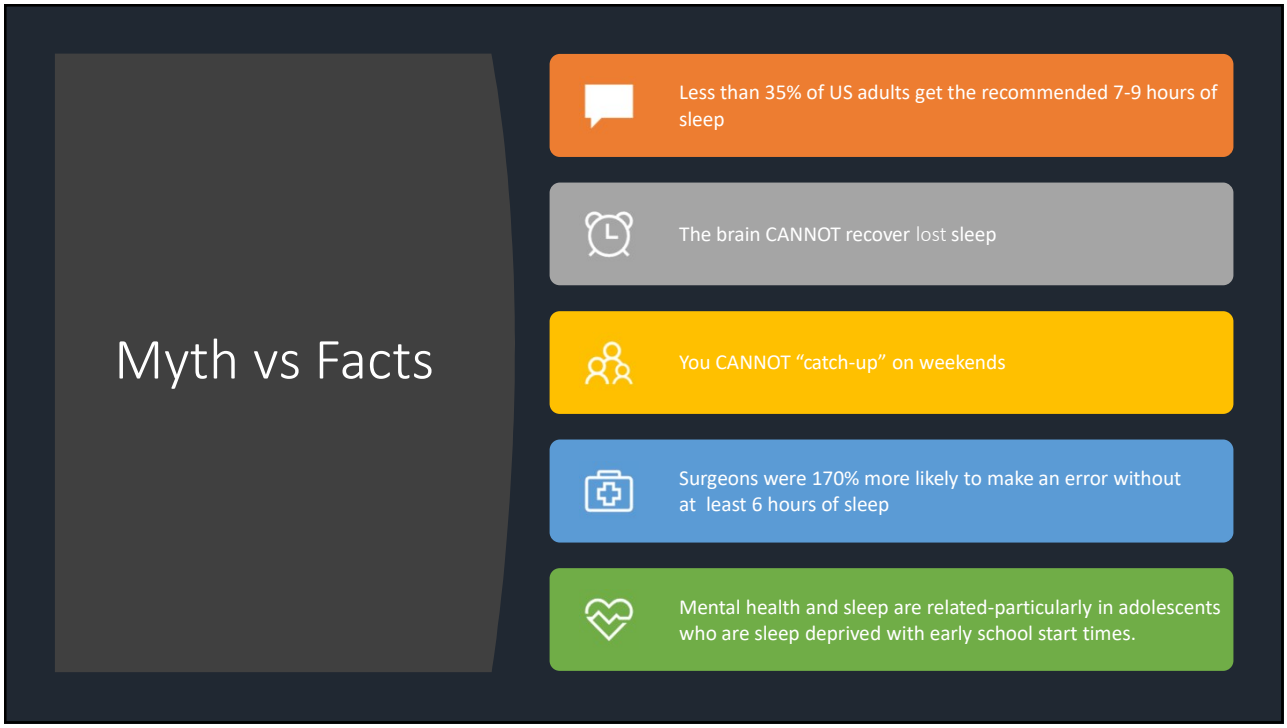
What's the Problem?




Myth vs Facts
Less than 35% of US adults get the recommended 7-9 hours of sleep
The brain CANNOT recover lost sleep
You CANNOT "catch-up" on weekends
Surgeons were 170% more likely to make an error without at least 6 hours of sleep
Mental health and sleep are related-particularly in adolescents who are sleep deprived with early school start times.

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While hard work and commitment to our patients and roles are necessary, research demonstrates that lack of sleep harms individuals, clinical, and academic performance

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Anatomy and Physiology of Memory

- Sensations come in and are processed in the **sensory cortex with amygdala (emotional)** influence, then move to the **prefrontal cortex for working memory** and **hippocampus for short term storage**
- From the **hippocampus**, memories are encoded and sent back to the **cortex for long term storage** in **declarative memory**
- Memories about movement, actions or step-by-step processes, called procedural memories, are stored in the **basal ganglia and cerebellum**

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Anatomy and Physiology of Sleep

- **Sleep: Optic nerve** is just under the **suprachiasmatic nucleus** which tells your **pineal gland** to produce melatonin which tells your brain, "it's dark".
- Sleep is active, starts in **frontal lobes**. The **thalamus** blocks external stimuli form reaching the **cortex.** Stages 1-4 progress as slow waves synchronously move from the front of the brain to back, broken by sleep spindles
- When awake, the **brain stem** starts a cycle of awake with many other structures included **prefrontal cortex** and **hippocampus**

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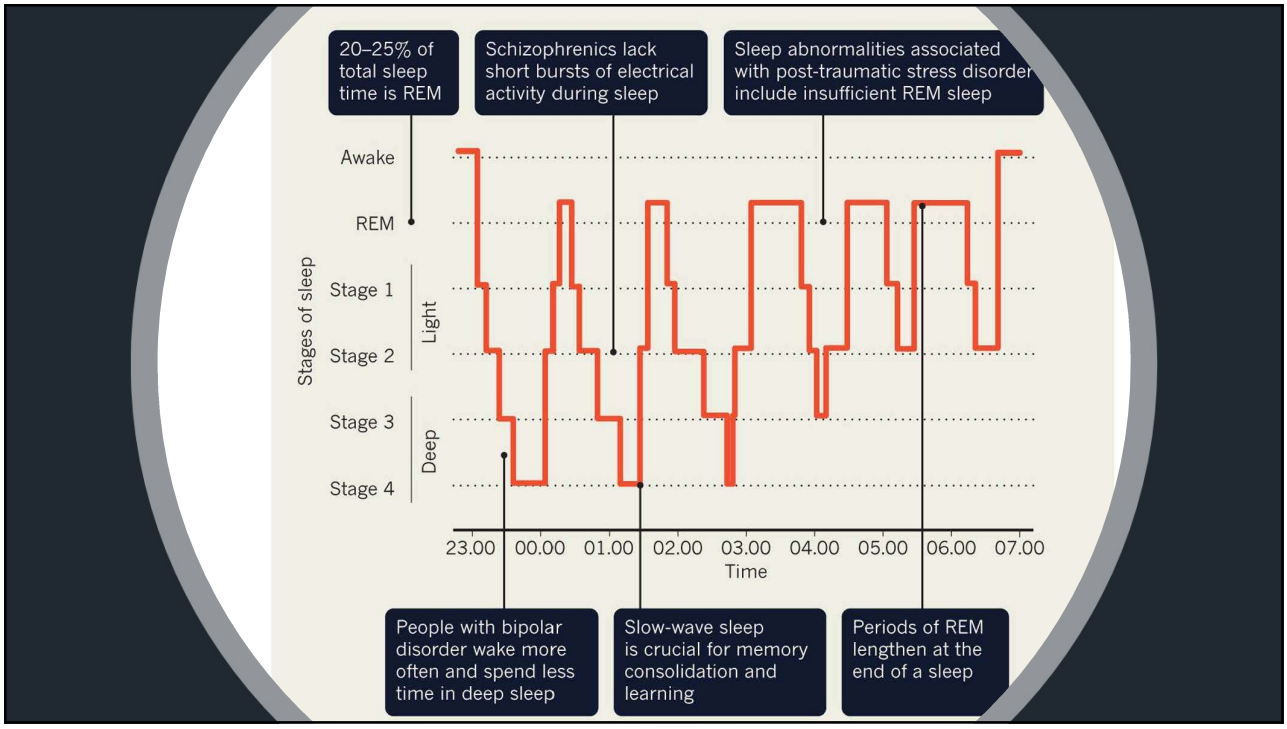
20–25% of total sleep time is REM
Schizophrenics lack short bursts of electrical activity during sleep
Sleep abnormalities associated with post-traumatic stress disorder include insufficient REM sleep
Awake
REM
Stage 1
Stage 2
Stage 3
Stage 4
Light
Deep
Stages of sleep
23.00
00.00
01.00
02.00
03.00
04.00
05.00
06.00
07.00
Time
People with bipolar disorder wake more often and spend less time in deep sleep
Slow-wave sleep is crucial for memory consolidation and learning
Periods of REM lengthen at the end of a sleep

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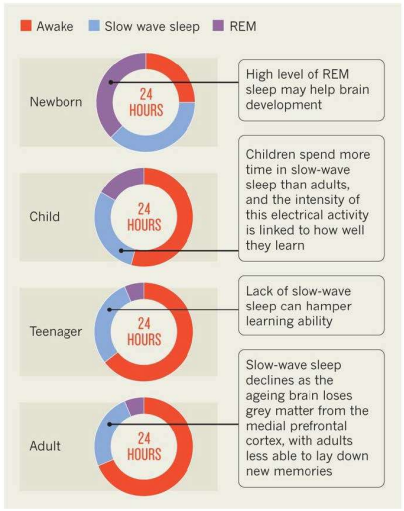
Awake
Slow wave sleep
REM
Newborn
24 HOURS
High level of REM sleep may help brain development
Child
24 HOURS
Children spend more time in slow-wave sleep than adults, and the intensity of this electrical activity is linked to how well they learn
Teenager
24 HOURS
Lack of slow-wave sleep can hamper learning ability
Adult
24 HOURS
Slow-wave sleep declines as the ageing brain loses grey matter from the medial prefrontal cortex, with adults less able to lay down new memories

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Sleep and Memory

- Slow waves (non REM) sleep promotes cerebral recovery and improves cognitive functioning
- Sleep consolidates memories. Research demonstrates that we remember things better when we sleep after learning them
- Want to remember? Go to sleep!

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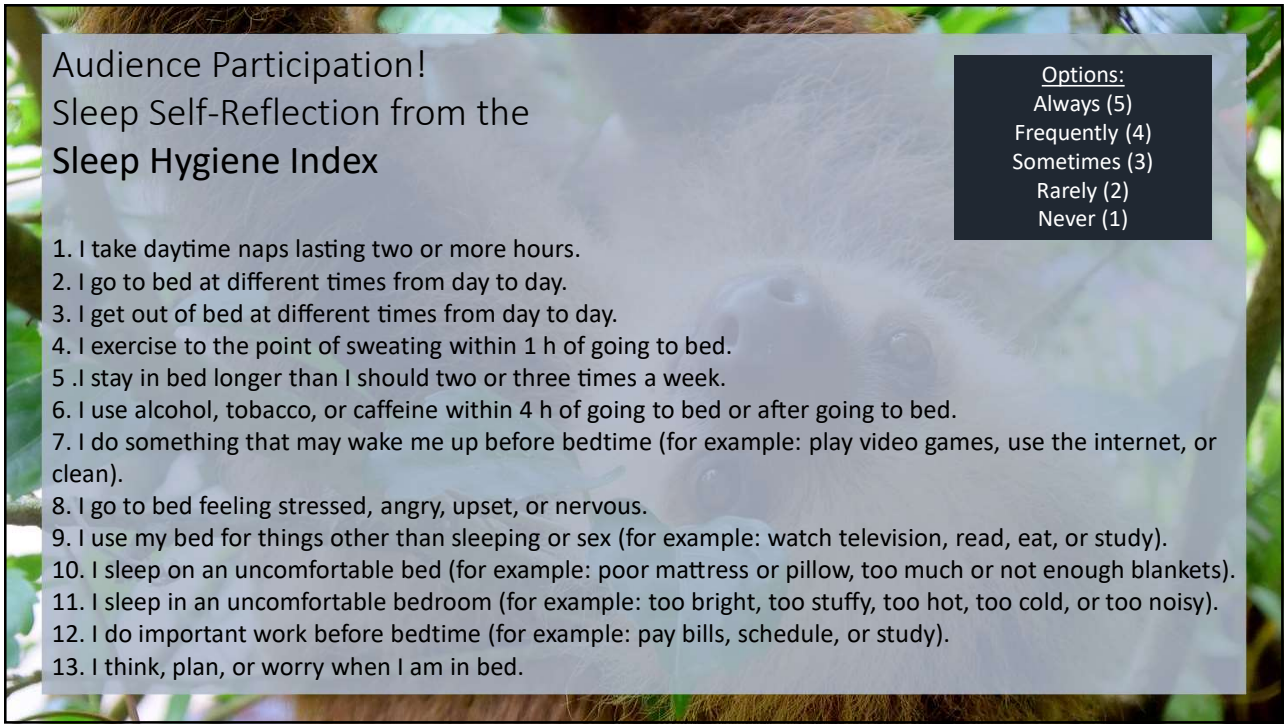
Audience Participation!
Sleep Self-Reflection from the
Sleep Hygiene Index
Options:
Always (5)
Frequently (4)
Sometimes (3)
Rarely (2)
Never (1)
1. I take daytime naps lasting two or more hours.
2. I go to bed at different times from day to day.
3. I get out of bed at different times from day to day.
4. I exercise to the point of sweating within 1 h of going to bed.
5 .I stay in bed longer than I should two or three times a week.
6. I use alcohol, tobacco, or caffeine within 4 h 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.

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Facts
Association between amount of sleep and lifespan
Heart disease, cancer, dementia, obesity, diabetes all worsen with decreased sleep
One study concluded than <6 hours of sleep = 4-5x more likely to have an MI
Sleeping les than 6 hours (instead of 7-8_ doubled the risk of MI/CVA in another study
Sleeping improves BP (btw, take BP meds before sleep for better outcomes)
Sleep stabilizes mood and reactions. See JAAPA , Luu, Rodway and Rice, 2018 "Should we be targeting sleep architecture to more effectively treat schizophrenia?"

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How do we get from sleep to success?

Think of sleep as a car wash for your brain and body, like a computer defragmenting

Immune system is hard at work

Memories are consolidated (made) and cells are repaired

Homework: Watch Shai Marcu Ted-Ed “The Benefits of a Good Night’s Sleep”

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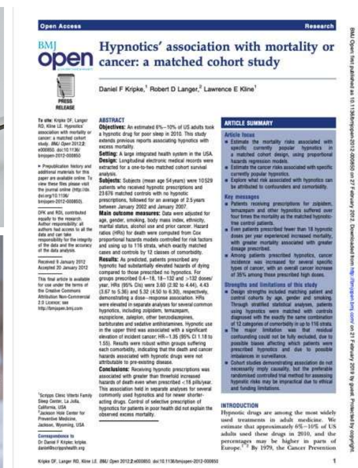
Pills
Zolpidem (Ambien) & Temazepam (Restoril)



Open Access Research

BMJ open

Hypnotics' association with mortality or cancer: a matched cohort study

Daniel F Kripke,[1] Robert D Langer,[2] Lawrence E Kline[1]

PRESS RELEASE

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▸ Prepublication history and additional materials for this paper are available online. To view these files please visit the journal online (http://dx.doi.org/10.1136/bmjopen-2012-000850).

DFK and RDL contributed equally to the research. Author responsibility: all authors had access to all the data and can take responsibility for the integrity of the data and the accuracy of the data analysis.

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Accepted 20 January 2012

ABSTRACT

Objectives: An estimated 6%–10% of US adults took a hypnotic drug for poor sleep in 2010. This study extends previous reports associating hypnotics with excess mortality.

Setting: A large integrated health system in the USA.

Design: Longitudinal electronic medical records were extracted for a one-to-two matched cohort survival analysis.

Subjects: Subjects (mean age 54 years) were 10 529 patients who received hypnotic prescriptions and 23 676 matched controls with no hypnotic prescriptions, followed for an average of 2.5 years between January 2002 and January 2007.

Main outcome measures: Data were adjusted for age, gender, smoking, body mass index, ethnicity, marital status, alcohol use and prior cancer. Hazard ratios (HRs) for death were computed from Cox proportional hazards models controlled for risk factors and using up to 116 strata, which exactly matched cases and controls by 12 classes of comorbidity.

Results: As predicted, patients prescribed any hypnotic had substantially elevated hazards of dying compared to those prescribed no hypnotics. For groups prescribed 0.4–18, 18–132 and >132 doses/year, HRs (95% CIs) were 3.60 (2.92 to 4.44), 4.43 (3.67 to 5.36) and 5.32 (4.50 to 6.30), respectively, demonstrating a dose–response association. HRs were elevated in separate analyses for several common hypnotics, including zolpidem, temazepam, eszopiclone, zaleplon, other benzodiazepines, barbiturates and sedative antihistamines. Hypnotic use in the upper third was associated with a significant elevation of incident cancer; HR=1.35 (95% CI 1.18 to 1.55). Results were robust within groups suffering each comorbidity, indicating that the death and cancer hazards associated with hypnotic drugs were not attributable to pre-existing disease.

Conclusions: Receiving hypnotic prescriptions was associated with greater than threefold increased hazards of death even when prescribed <18 pills/year. This association held in separate analyses for several commonly used hypnotics and for newer shorter-acting drugs. Control of selective prescription of hypnotics for patients in poor health did not explain the observed excess mortality.

ARTICLE SUMMARY

Article focus
- Estimate the mortality risks associated with specific currently popular hypnotics in a matched cohort design, using proportional hazards regression models.
- Estimate the cancer risks associated with specific currently popular hypnotics.
- Explore what risk associated with hypnotics can be attributed to confounders and comorbidity.

Key messages
- Patients receiving prescriptions for zolpidem, temazepam and other hypnotics suffered over four times the mortality as the matched hypnotic-free control patients.
- Even patients prescribed fewer than 18 hypnotic doses per year experienced increased mortality, with greater mortality associated with greater dosage prescribed.
- Among patients prescribed hypnotics, cancer incidence was increased for several specific types of cancer, with an overall cancer increase of 35% among those prescribed high doses.

Strengths and limitations of this study
- Design strengths included matching patient and control cohorts by age, gender and smoking. Through stratified statistical analyses, patients using hypnotics were matched with controls diagnosed with the exactly the same combination of 12 categories of comorbidity in up to 116 strata.
- The major limitation was that residual confounding could not be fully excluded, due to possible biases affecting which patients were prescribed hypnotics and due to possible imbalances in surveillance.
- Cohort studies demonstrating association do not necessarily imply causality, but the preferable randomised controlled trial method for assessing hypnotic risks may be impractical due to ethical and funding limitations.

INTRODUCTION

Hypnotic drugs are among the most widely used treatments in adult medicine. We estimate that approximately 6%–10% of US adults used these drugs in 2010, and the percentages may be higher in parts of Europe.[1 2] By 1979, the Cancer Prevention

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Facts
Even 20 minutes of sleep loss causes trouble
Less emotional regulation when the end of sleep is interrupted- because the end is when you are literally processing feelings.
More traffic accidents and disasters occur in early morning hours
(3 Mile Island in Pennsylvania, Chernobyl)
Inadequate sleep costs American business $411 billion/year and countless lost creative opportunities

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Sleep well: How to get better sleep quality and duration


Cold, dark and quiet room


Protect enough time


No phones! (remember the suprachiasmatic nucleus)


Little caffeine


No meds or ETOH


A nap before 3 if you must


Still can't sleep? Find a sleep (CBT) therapist

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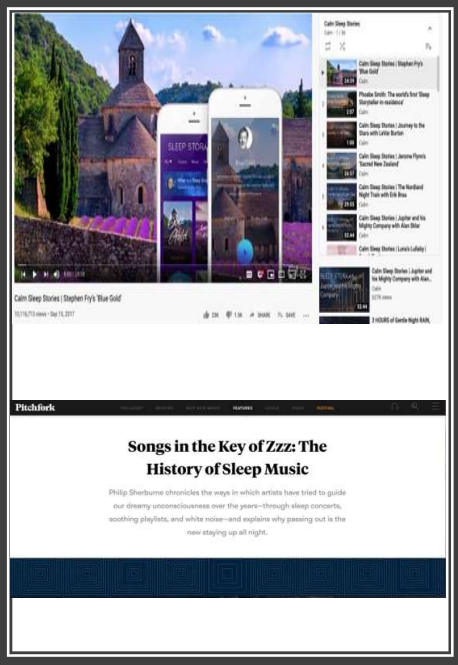

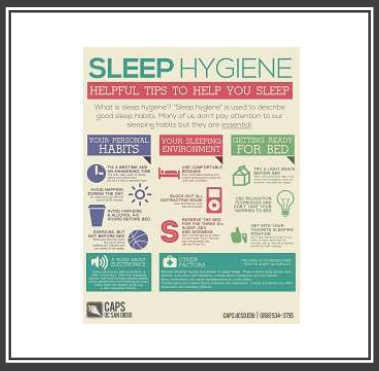

At Home Sleep Resources

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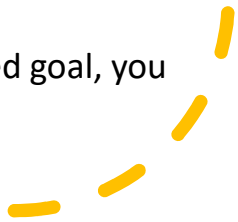
Everyone's favorite: A few vignettes…

…Just for Fun

What is one way they found an undergraduate college student can increase the likelihood that a behavioral change is more successful?

- (1) talk to your significant other about your preferred sleep habits and goals
- (2) read all the primary literature about healthy sleep hygiene
- (3) set a goal to change all your sleep habits starting this week
- (4) if you fail to meet your desired goal, you penalize yourself



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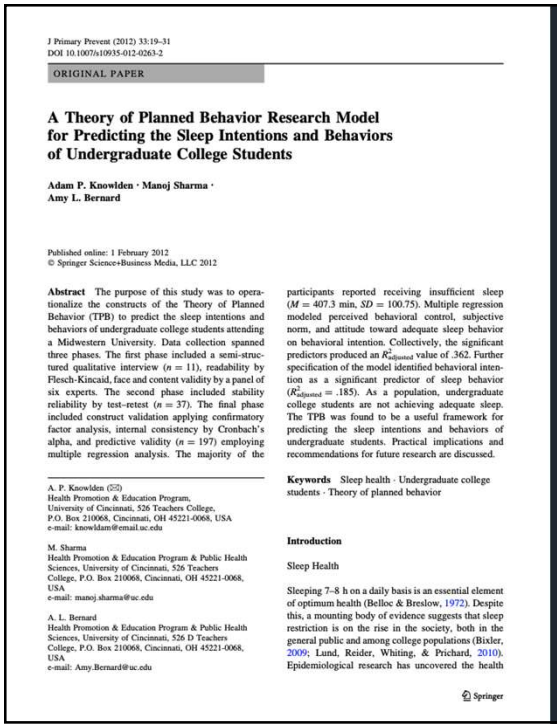

J Primary Prevent (2012) 33:19–31
DOI 10.1007/s10935-012-0263-2

ORIGINAL PAPER

A Theory of Planned Behavior Research Model for Predicting the Sleep Intentions and Behaviors of Undergraduate College Students

Adam P. Knowlden · Manoj Sharma · Amy L. Bernard

Published online: 1 February 2012

Abstract The purpose of this study was to operationalize the constructs of the Theory of Planned Behavior (TPB) to predict the sleep intentions and behaviors of undergraduate college students attending a Midwestern University. Data collection spanned three phases. The first phase included a semi-structured qualitative interview ($n = 11$), readability by Flesch-Kincaid, face and content validity by a panel of six experts. The second phase included stability reliability by test–retest ($n = 37$). The final phase included construct validation applying confirmatory factor analysis, internal consistency by Cronbach's alpha, and predictive validity ($n = 197$) employing multiple regression analysis. The majority of the participants reported receiving insufficient sleep ($M = 407.3$ min, $SD = 100.75$). Multiple regression modeled perceived behavioral control, subjective norm, and attitude toward adequate sleep behavior on behavioral intention. Collectively, the significant predictors produced an $R^2_{adjusted}$ value of .362. Further specification of the model identified behavioral intention as a significant predictor of sleep behavior ($R^2_{adjusted} = .185$). As a population, undergraduate college students are not achieving adequate sleep. The TPB was found to be a useful framework for predicting the sleep intentions and behaviors of undergraduate students. Practical implications and recommendations for future research are discussed.

Keywords Sleep health · Undergraduate college students · Theory of planned behavior

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Introduction

Sleep Health

Sleeping 7–8 h on a daily basis is an essential element of optimum health (Belloc & Breslow, 1972). Despite this, a mounting body of evidence suggests that sleep restriction is on the rise in the society, both in the general public and among college populations (Bixler, 2009; Lund, Reider, Whiting, & Prichard, 2010). Epidemiological research has uncovered the health

Here is the research study examining how college students can be successful at changing behaviors

Answer: (1) talk to your significant other about your preferred sleep habits and goals

What about that nightly alcohol?!

A 24-year-old male PA-C who works 12-hour shifts finds it hard to fall asleep most nights of the week. He reports that if he has one glass of wine before he goes to bed that it "knocks him right out." He says he's been sleeping better, but still feels fatigued 3-4 times a week. What advice would you give him about his nightly glass of wine?

- (1) he should continue to drink his nightly wine and add a cup of coffee in the morning to feel less drowsy
- (2) he should stop drinking his nightly glass of wine and try relaxation exercises after his 12 hour shifts before bed
- (3) he should change his wine to one shot of a higher proof liquor such as whiskey which has better aromatic properties
- (4) he should stop drinking his nightly wine and instead take 50 mg of diphenhydramine (Benadryl) when he finishes a shift

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What about that nightly alcohol?!

- Answer: (2) he should stop drinking his nightly glass of wine and try relaxation exercises after his 12 hour shifts before bed

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How about when traveling from West to East time zones?

A 25-year-old female is traveling from California to Philadelphia for a residency interview. She arrives at 6 pm eastern time in Philadelphia. She is not tired but has to be awake early for the interview tomorrow. What is one intervention she can take to help with her sleep the next few days she spends on the eastern time zone.

- (1) take 3 mg of melatonin around 8 pm
- (2) take 50 mg of diphenhydramine right before bed
- (3) take 0.5 mg of Xanax before bed
- (4) take 100 mg of CBD oil now that she has arrived in Philadelphia

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How about when traveling from West to East time zones?

Answer: (1) take 3 mg of melatonin around 8 pm

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But my sleep hygiene is really good!

A 45-year-old male PA-C states he has had trouble falling asleep. He wakes up at 6 am every day and attempts to go to bed routinely at 10pm but often cannot fall asleep. He has tried hot baths before bed, typically reads in dim light on the sofa before going to bed. He takes no medications daily and never consumes alcohol, marijuana or other illicit substances. What is the best next step he can take to improve his sleep?

- (1) try doing yoga 1 hour before bed
- (2) take 50 mg of Benadryl nightly 30 mins before bedtime
- (3) go to a supplement store to see what supplements they recommend
- (4) consult a healthcare professional to discuss his insomnia

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But my sleep hygiene is really good!

Answer: (4) consult a healthcare professional to discuss his insomnia

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Problems and Solutions

Problems:

Chronic lack of sleep leads to:

- Decreased academic performance
- Decreased emotional well-being
- Increased accidents, mistakes and damages

Solutions:

- Teach and practice sleep hygiene skills
- Engage in educated conversations about the value of sleep as more than a luxury
- Show values to student and worker sleep time

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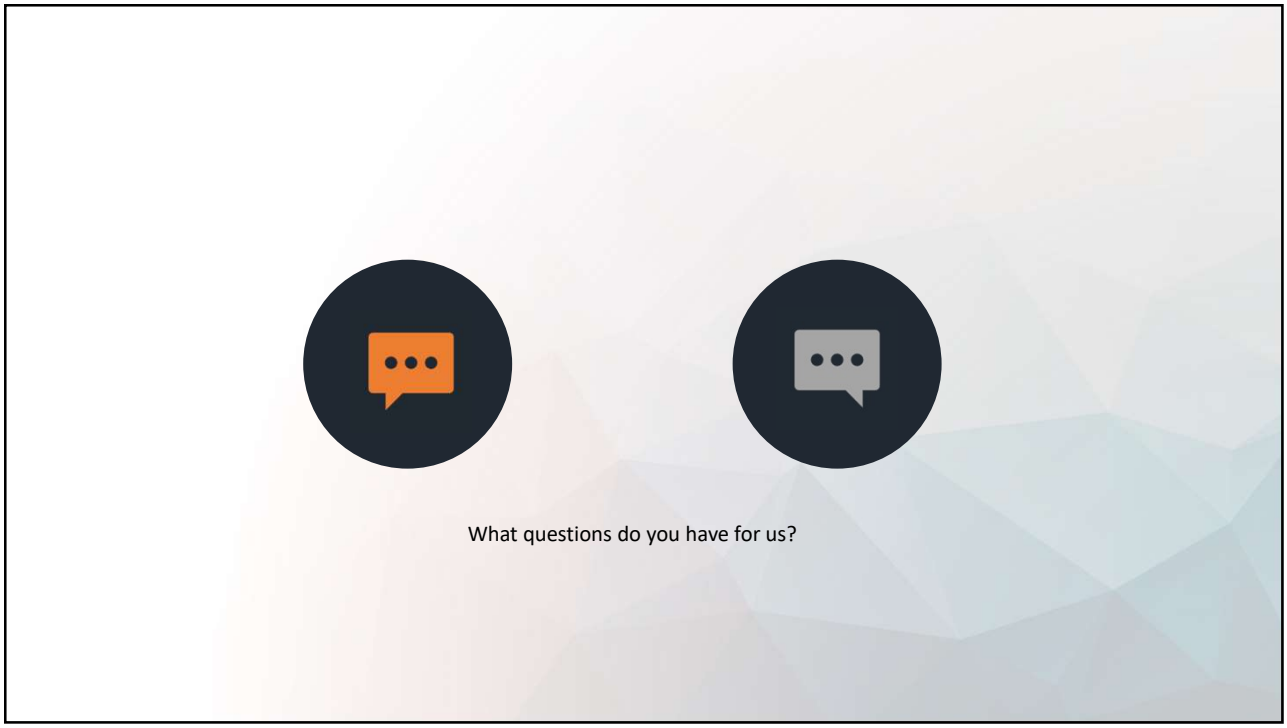

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