

# Streaming, Dreaming & Teening – Sleep Problems & Solutions

- Chris Seton-Paediatric & Adolescent Sleep Physician
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- Woolcock Institute of Medical Research-Sydney University-Multi disciplinary Clinic
- SleepShack-online sleep treatment



## Talk outline

- Global & general info (to convince you !)
- Teen sleep concepts
- Screenagers & their screens
- Learning & sleep
- Sleep deprivation-moods-stress relationship
- Types of sleep problems
- Solution pathways for you
- My solution pathways



## The “3 pillars” of good teen health

- Good sleep
- Regular exercise
- Good nutrition
- These together protect mental & physical health
- Form a triangular relationship, both positive & negative
- Research shows that smart kids sleep longer & better. Sleep problems are 9 x as common in the bottom academic centile than in the top centile

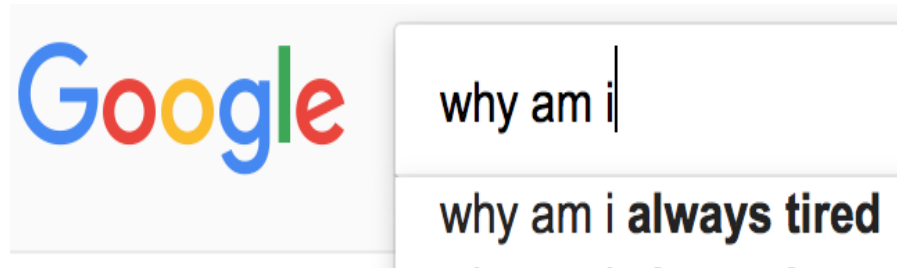


## Other topics of “non discussion”

- Blue light blocking glasses
- Sleep drugs, herbs & spices
- Sleep Trackers
- Apps to reduce screen light
- Other “instant” fixes & gimmickry



The most googled personal question worldwide is...





## Sleeping aids on the subway



OK sleep deprivation is real, but how bad can it get ?

## Bank intern Moritz Erhardt found dead after working '72 hours straight'

August 21, 2013 - 10:18AM

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Victoria Ward

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An intern who died after allegedly working for 72 hours without any proper break at a leading bank in the City of London had admitted feeling "pressurised" to succeed.

Moritz Erhardt, 21, was found dead as he neared the end of a seven-week placement with the Bank of America Merrill Lynch's (BAML) investment bank division.

He collapsed in the shower in his student flat in east London amid claims that he had worked through the night eight times in two weeks in an attempt to impress bosses, returning home at 6am on three consecutive days. His office day began at 9am. It has been claimed that he suffered an epileptic fit.

In an online profile, Mr Erhardt, from Germany, had previously written of a tendency to be "overambitious". He said: "I have grown up in a family that expected me, in whatever respect, to



21 & healthy

London banker

Worked thru the night 8 times over 2 weeks including 3 consecutive nights

Went home & collapsed in the shower & died



# His 'sleep-deprived' mum thought she'd taken him to daycare. He was left to die in the car.



JESSICA CLARK

 355



Noah Zunde was just 22 months old when he was left in the back seat of his family car outside a childcare centre in Kyneton, Victoria for seven hours on February 19, 2015.



Noah's mother inadvertently believed she had dropped her son off at daycare, and only discovered his body when she realised he was not in the centre.







# Doctors too are sleep deprived from long work hours

- Fall asleep car accidents
- Inconsolable crying
- Panic attacks
- Medical errors
- Spate of suicides
- Fear of failure

## Falling asleep at the wheel after a day as a junior doctor

**Kate Aubusson**  
Health editor

Getting home safely after a gruelling night shift is not something Dr Tessa Kennedy takes for granted.

Three of her junior doctor friends have crashed their cars driving home after a night shift, one on her way to pick up her daughter from daycare. She has caught herself falling asleep behind the wheel at the end of her 16-hour shifts and 90-hour weeks.

The paediatric trainee has battled sleep-deprived panic attacks before medical exams, and cried inconsolably as she sat in her car after narrowly escaping a crash for which she says she would have been responsible.

She regularly stays back hours after her shift ends only to be told she can't claim overtime. For three months, her only contact with a supervising consultant was through his secretary. He didn't bother to learn her name.

None of this would sound remotely remarkable to any doctor working in NSW, Dr Kennedy said.

Junior doctors are being overworked to the point of exhaustion in an overstretched health system



**Overworked and overtired:**  
Doctor Tessa Kennedy works a 90-hour week.  
Photo: Louise Kennerley

and a bullying culture that puts their lives and the lives of their patients at risk, mounting evidence shows.

A staggering 71 per cent of junior doctors report being concerned about making clinical errors because they are overworked and overtired, found a damning survey of junior doctors by the NSW Australian Medical Association.

"What if you're the patient at the end of a needle being held by a doctor who has been awake for 20 hours, who has just been yelled at and is expected to fix every problem that arises on a night shift with little support?

"I don't want to be that patient

and I wouldn't want my child to be that patient," said Dr Kennedy, who is also the chair of the AMA NSW doctor-in-training sub-committee.

The findings come after the recent deaths by suicide of four junior doctors in NSW within six months. More than two in three junior doctors surveyed said they had been concerned about their own health and safety due to fatigue as a result of their work hours, according to the survey of 1107 doctors in training, an estimated 20 per cent of the current junior doctor workforce in NSW.

Just 3 per cent reported working a "standard" 38-hour week. Al-

most half said they worked more than 90 hours in a fortnight.

Almost 90 per cent reported not being paid for all their unrostered overtime, and 46 per cent reported not being paid for any of it.

"This is unhealthy not only for us, but for our patients, who are at increased risk of harm when doctors in training are working in these conditions," Dr Kennedy told the Junior Medical Officer Well-being Forum convened by Health Minister Brad Hazzard and mental health minister Tanya Davies in Sydney on Tuesday in response to the spate of suicides.

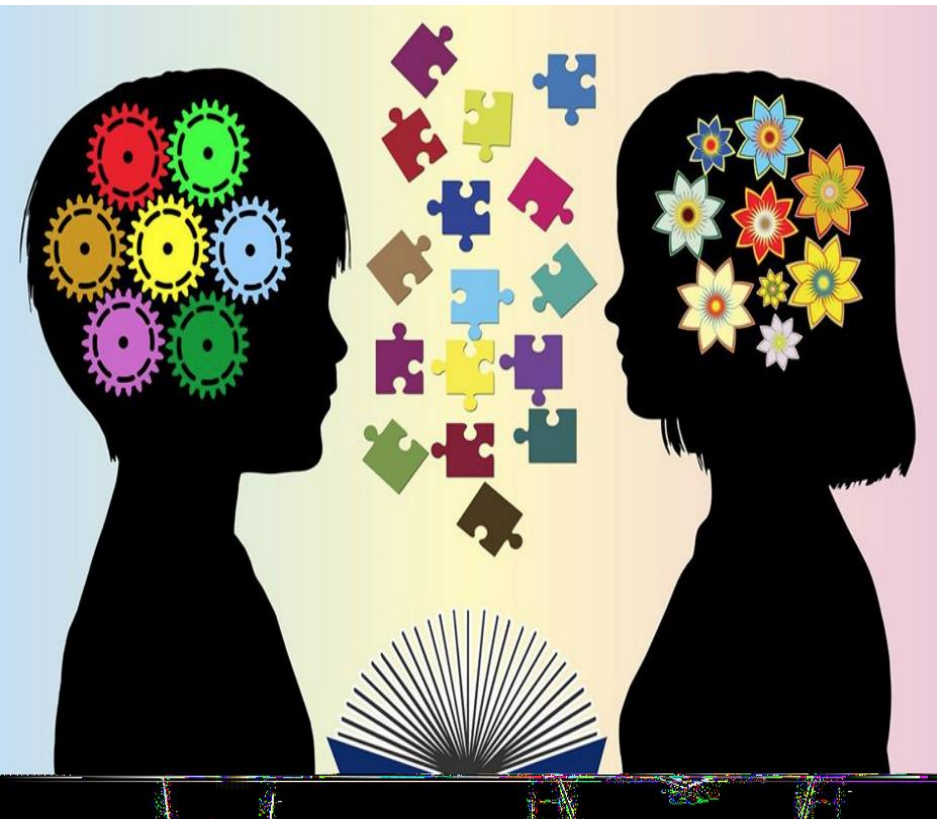
"There is enough evidence from those still living that the system is causing harm to a much greater number of doctors-in-training," Dr Kennedy said.

Mr Hazzard said the health system "is not working as well as it should" to protect doctors.

"Junior doctors cannot do their job and be caring and compassionate for patients when they are scared of speaking up about their own problems," he said.

Everything was on the table in an effort to improve the mental health and wellbeing of junior doctors.

## Multiple factors conspire to sabotage teen sleep-the perfect storm



Non flexible school starting times

Social connectedness & FOMO (a powerful addiction)

Drugs, alcohol

Exams & Daylight Saving

Late body clocks

Part time jobs

Homework & extra curricular activities

Ambition, pressure, stress

Electronic stuff & the 24hr society

Rapidly changing hormones & emotions

Competition of wakefulness ("sleep is for wimps")

Sleep has low priority

Reduced parental control

- 70% are chronically tired on school days
- Negative impact on learning & moods
- Doubled in last 12 years
- 3rd worst globally
- Close link to a nation's rate, & speed of uptake of new screen technology



## Teen sleep facts & opinions to ponder

- Yet this big “elephant in the room” is little talked about nor recognised
- Tired kids can’t learn
- Tired kids develop mental health problems
- Tired kids decompensate in the face of stress
- Teens are mostly not lazy, they are tired
- Sleep deprivation & stress are a toxic mix





## Way beyond tiredness & academic failure

- Altered body image
- Screen addiction
- Poor food choices & obesity
- High cortisol (stress hormone)
- More infections
- School lateness & absenteeism
- Cyber & non cyber bullying
- Depression (15 fold)
- Anxiety
- Impaired ethical & moral judgement
- Suicide- 1 hour lost sleep=58% increase in teen suicide
- Motor vehicle accidents=27% drop with late school start times
- Lower self esteem
- Drug use
- Teen pregnancy
- Poor stress coping
- Family relationship breakdown
- Emotionality
- Loss of sense of humour

## What about later effects?

- Teen sleep deprivation increases suicide risk in mid 20s to 8x average
- One night of sleep deprivation elevates amyloid beta
- Then a night of good sleep restores normal levels

### Brain plaque: researchers find Alzheimer's link to a poor night's sleep

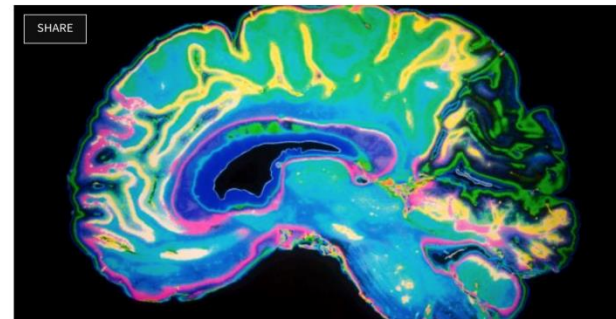
Sarah Knapton

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**London:** Just one night of poor sleep is enough to trigger a spike in a brain chemical linked to Alzheimer's disease, a study has shown.

Although scientists knew there was a connection between dementia and lack of sleep, it was unclear whether the disease was insomnia or vice versa.



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## “Selling Sleep” to teens & tweens is tricky

- Not valued
- Not protected or prioritised
- Awake activities are much more fun
- There is “no time” to sleep for busy-bee teens
- Sleep deprivation is “normalised”
- Sleep is not sexy or cool
- So teens are generally hopeless sleep managers
- “Selling” sleep to parents is easier



39<sup>th</sup> of 41-Maybe it's not about money!

- A 16 year decline in maths, science & reading in 15 yr olds
- \$28 billion of “Gonski 2” & extra \$2.2 billion in NSW budget may not work !
- Late school starting times do work & are cheaper !
- Maybe sleep education should be part of every school's curriculum

## UN agency ranks Australia 39 out of 41 countries for quality education



Pallavi Singhal



Australia has been [ranked 39 out of 41 high- and middle-income countries](#) in achieving quality education, in the latest international report to find that the country is falling behind in basic measures of teaching and learning.

Only Romania and Turkey were ranked below Australia in education in the latest United Nations Children's Fund (UNICEF) report card.

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## “Sleep Matters” @ Brisbane Boys Grammar

- Initial sleep health program for athletes, then integrated to Student Wellbeing Curriculum
- Partnership between school, students & parents
- Recognition of impact of “over scheduling” on sleep
- Balancing homework & sleep needs
- Considering a trial of late school start times to fit with teen body clocks
- Reasonable limiting of screens at night



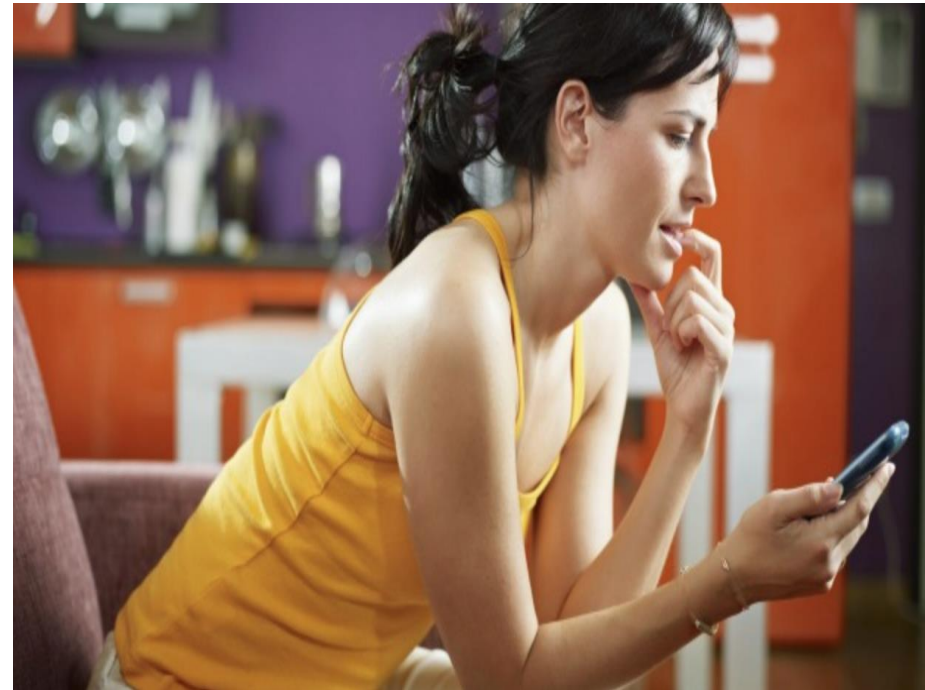
## “All petrol no brakes”-the nocturnal teen brain

- Limbic system, “fires up” at night, causing heightened emotions
- The pre frontal cortex, the “rational brain”, shuts down when tired & is relatively under developed in teens
- Teens make emotional & risky decisions, rather than rational ones, when tired
- Increased cyber bullying, car accidents, anxiety, suicidal thoughts, drug use at night



## Teen Sleep Data US Nat Sleep foundation 30,000 teens across 50 states

- 96% screen use in the hour before bedtime
- Active screen activity(phones, games) worse than passive (TV, DVDs)
- Only 8% turn phone off at night
- 34 texts per night average. No real school night weekend difference (insight lacking)
- 77% report sleep difficulties &/or morning tiredness
- 35% have 2 or more energy drinks per day-surrogate marker of sleep deprivation
- 25% of final school year students use a stimulant drug or so called “smart drug” as a “study aid” in order to stay awake in order to complete homework or study



## Why so much at night?

- 75% of online gaming between 10pm & 6 am
- Fun
- Highly addictive-both physically via Dopamine & psychologically via FOMO
- Well marketed to young people
- Cheap & portable
- Maintains 24 hour social connectivity
- Out of parents' sight & control





## How screens sabotage dreams

1. Screen time delays bed time
2. It's exciting. Dopamine & Adrenalin surges. These are awake-promoting chemicals
3. Portability means less on desk & more on bed. This blurs the boundary between awake-non bed activities & sleep. Brain gets "mixed messages" resulting in conditioned arousal



## Conditioned Insomnia-training to be awake in bed

- Screen use in bed trains the brain that bed is a place of exciting wakeful activity. This is called “conditioned arousal”
- “Conditioned Insomnia” is the inability to get to sleep, because of this wakeful training
- Gaming & electronic messaging cause the highest levels of conditioned arousal. The latter results in “Infomania”



## The 4<sup>th</sup> effect of screens on sleep

- Blue screen light lowers melatonin & signals the brain to “wake up”
- Smaller screens are worst as light intensity is highest, & screen held closer to face
- So a large screen TV is less of an issue than a smart phone
- Electronic screens should sleep away from the bedroom





## “Blinded by the light”



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### CORRESPONDENCE

## Transient Smartphone “Blindness”

N Engl J Med 2016; 374:2502-2504 | June 23, 2016 | DOI: 10.1056/NEJMc1514294

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### To the Editor:

Transient monocular vision loss is a common clinical presentation, and the cause is not always thromboembolic.<sup>1</sup> We present two cases in which careful history taking established a benign cause (for the case histories, see the [Supplementary Appendix](#), available with the full text of this letter at NEJM.org).

A 22-year-old woman presented with a several months' history of recurrent impaired vision in the right eye that occurred at night. The results of ophthalmic and cardiovascular examinations were normal. Vitamin A levels and the results of magnetic resonance angiography, echocardiography, and a thrombophilia screening were also normal.

The second case involved a 40-year-old woman who presented with a 6-month history of recurrent monocular visual impairment on waking, lasting up to 15 minutes. The results of investigations for a vascular cause were again normal. Aspirin therapy had been commenced.

When the patients were seen in our neuro-ophthalmic clinic, detailed history taking revealed that symptoms occurred only after several minutes of viewing a smartphone screen, in the dark, while lying in bed (before going to sleep in the first case and after waking in the second). Both patients were asked to experiment and record their symptoms. They reported that the symptoms were always in the eye contralateral to the side on which the patient was lying.





## Sleep-Screen Synergies & bidirectional relationships

- Kids who choose to use screens late at night become sleep deprived
- Kids who “choose” not to sleep, & those who “can’t” sleep are more likely to undertake late night screen time, as they have more “awake opportunity”
- Sleep deprivation elevates addiction risk (alcohol, drugs, screens etc), which results in more screen use
- Treatment of screen addicted teen is unlikely to be successful if they are sleep deprived, because sleep deprivation lowers motivation, insight, & reduces understanding the concept of consequences



## 2 consecutive nights of good sleep to learn & retain

- Learning requires short & long term memory
- “Cognitive shutdown” occurs when a tired brain is unable to access short term memory. “In one ear & out the other”.
- A well rested brain, which processes new classroom learning into short term memory, then needs consolidated REM sleep on the subsequent night to file this learning into long term memory banks



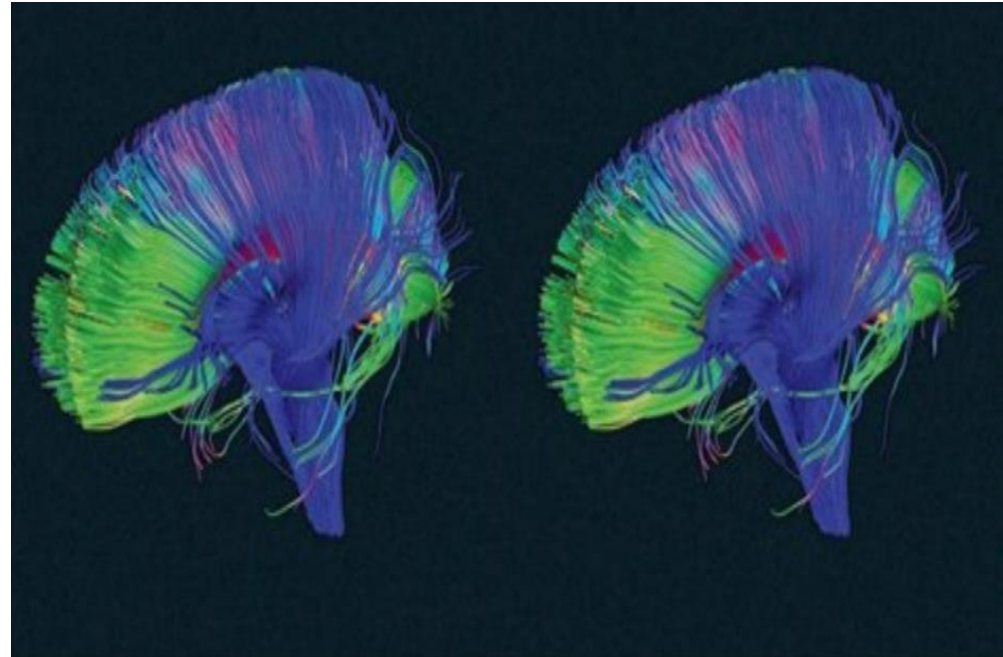
## The spiral of cognitive slowing & futile learning at night

- A tired at night teen brain slows down
- So homework & study completion takes longer
- So bedtime is delayed
- So sleep time is reduced
- So the previous day's & night's learning is not consolidated into long term memory & is thus forgotten
- The next day same again
- This is futile learning



## Brain gardening-interesting & new

Micro glial cells are the brain's gardeners. They undertake "synaptic pruning" only during sleep, getting rid of inefficient neural pathways, & creating space for new efficient pathways to grow. This creates more "storage space" to accommodate more long term memory





## It's all gibberish

- Group 1
  - Taught a gibberish language for 2 hours a day for 10 days. Bedtime as per normal
- Group 2
  - Taught the same gibberish language for 4 hours a day for 10 days. The final hour of gibberish teaching, delayed bed time by one hour
- Then there was a gibberish exam, which was incentivised with prizes
- Which group won ?
- Good sleep is needed for learning to be effective



## The relationship between sleep & psychological symptoms is bidirectional

- Depression and anxiety can cause sleep problems...and....sleep deprivation causes mood disorders or “I’m anxious therefore I can’t sleep”....or “I can’t sleep & this makes me anxious”
- Sleep & Mood disorders frequently co-exist
- Sleep problems mostly get forgotten when a mood problem co-exists
- Treating a mood disorder often fails in a sleep deprived teen





## Stress, moods & sleep research

- Assessed students at a stressful time (college entrance).
- Measured sleep time, genetic risk of Depression, & Mood (CES-D)
- Those with inadequate sleep & genetic depression risk, became clinically depressed at college entry time
- Those with genetic risk of depression & adequate sleep did NOT become depressed
- Sleep deprivation plus stress results in sub optimal moods in those that are genetically pre disposed
- So good sleep is protective of mood disorders in the face of stress



## A toxic mix

- Sleep deprivation + genetic tendency to depression or anxiety + stress = disaster
- Stress + genetics are hard to avoid
- Sleep can be fixed
- Good sleep provides resilience & mood protection in the face of stress





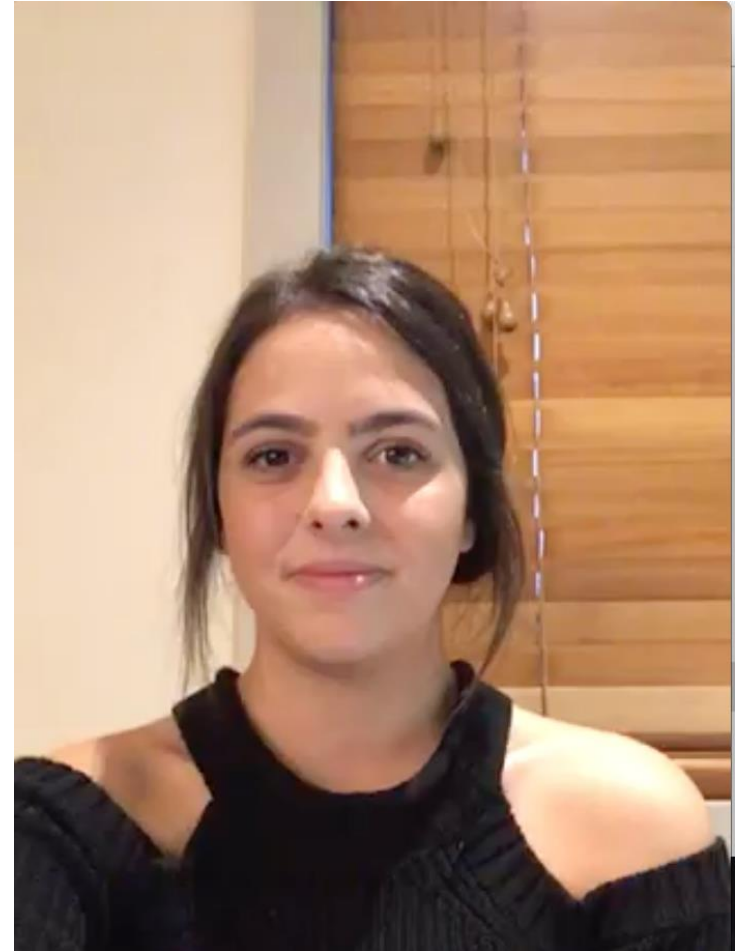


- Shall we have afternoon tea & then I will introduce you to Monique. She is a sleepless year 12 girl who will speak to you for 2 minutes about her sleep



Video 2.MOV

- Watch carefully, then I will ask you some questions!!



- Bed 1-2 am on school nights
- “Binge” watching Netflix
- Scrolling “aimlessly” on social media
- Sleeps all day on weekends & “misses out” on things
- Lack of sleep is taking it’s “toll”
- Wakes not “feeling up to going to school”
- “Unproductive” at school & work is “not good quality”
- Weekends, go to bed 5-6am until 3pm
- “Don’t see my family much”
- Headaches
- Now can’t get to sleep at a normal time
- My devices distract me

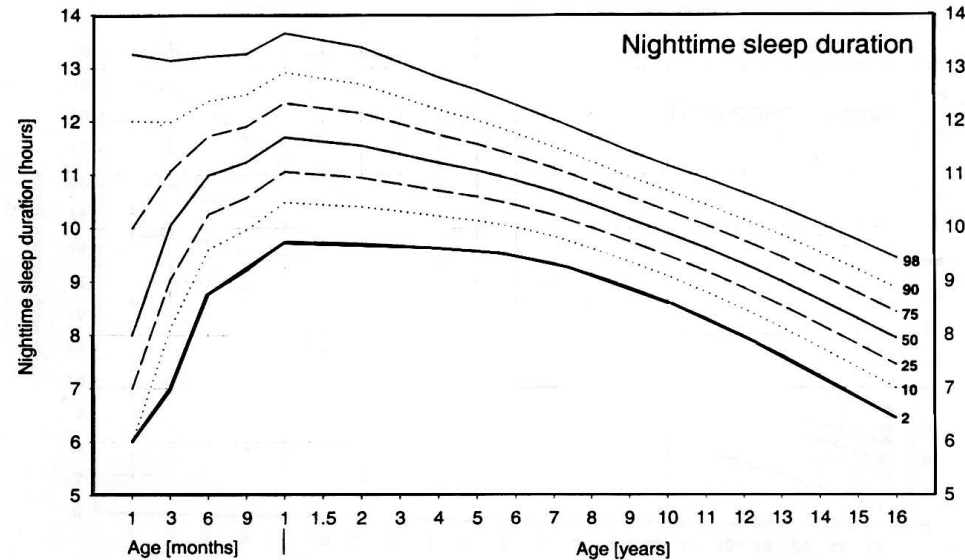
## So what are the sleep problems ? The “won’t sleepers” & the “can’t sleepers”

- Voluntary sleep restriction....can get to sleep but don’t...the group that can be helped by you
- Delayed Sleep Phase Syndrome-late body clock ...”can’t sleep” at normal bed time. Can sleep if they go to bed late. Get great benefit from late school start times
- Conditioned Insomnia-screens train the brain to be awake in bed
- Psychological insomnia...sleep onset is delayed by anxiety, low moods etc



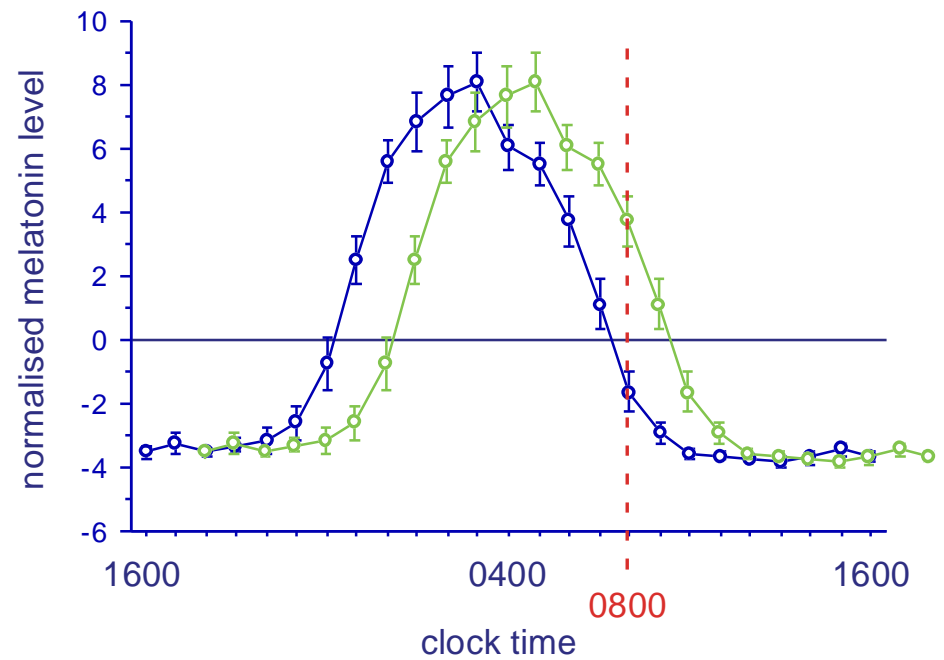
## Scientific research vs real life

- Real life drop off from 9-7.5 hours
- Science says sleep need is constant at 9 hours from 12-18 years of age
- This is a “hard sell” to teens





Lots of owls not many larks



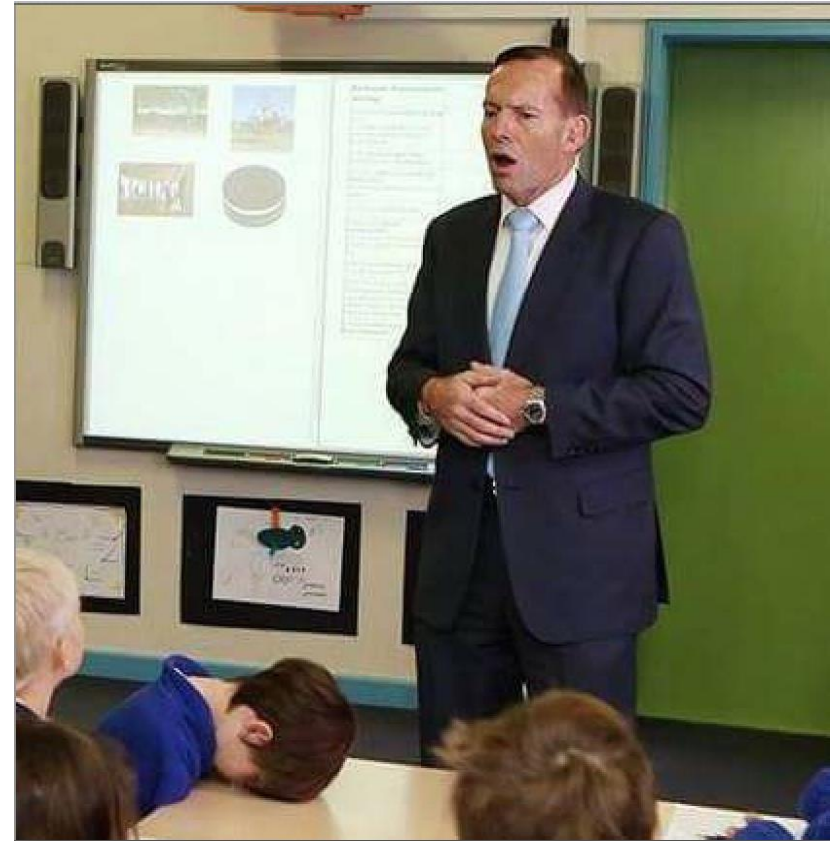
## Late body clocks & social jet lag

- Inverted sleepiness
- Full of beans, wide awake & “wired” late at night when melatonin is low. So they CAN’T sleep at a normal bed time. Because they are so awake, they are very likely to use screens, which further delays their already late body clocks
- Lethargic & cranky first thing in the mornings when melatonin is high. Can’t get out of bed. Slow to dress & breakfast. May be late for school. This lethargic state is called “sleep inertia”
- So the teen body clock becomes misaligned with school scheduling
- So this is how we all feel with bad jet lag, except in late body clock kids it is chronic



## Detecting Sleepiness-1st suspect it

- Tired body language-yawning, poor engagement, distractibility, frequent blinking
- Learning below expectation-poor concentration, low task completion, “in one ear & out the other”
- Moody
- Late for school



Let's get practical-but how do I know there is a problem?

- Very difficult or “impossible” to get out of bed on school mornings. Leads to family disputes and school lateness
- Big weekend sleep ins. This is “catch up” sleep which is proportionate to weeknight insufficient sleep or the so called “sleep debt”
- (No need to ask “how much sleep” as this is likely to be inaccurate-over reporting of sleep time is common in teens)





## I have detected it-what do I do about it-the starting points

- When? The earlier the better. It only gets worse. Do not “wait & see”. From Year 9 on it gets really hard!
- Parents need to know, so tell them. Teens won’t manage their own sleep. They need support & direction
- Have a family meeting (not late at night). Put your cards on the table
- Ask for their suggestions. “What are you willing to change?” “Name one thing”
- Outline upsides of good sleep. Sleep is precious & needs protection. Know that sleep education alone is not enough
- Sleep is a hard sell, try to find their “currency” see next slide
- At this point assess whether there is motivation to change & insight to understand






## Sleep extension research in basketball & baseball

### Sleep extension improves response time, reduces fatigue in professional baseball players

*Short-term sleep loading can improve sports performance*

AMERICAN ACADEMY OF SLEEP MEDICINE



 PRINT  E-MAIL

Preliminary results from a new study suggest that short-term sleep extension improves response time and daytime functioning of professional baseball players.

Results show that after five nights of sleep extension, professional baseball players from an MLB organization demonstrated a 13-percent improvement on a cognitive processing speed test by reacting 122 milliseconds faster. They also responded 66 milliseconds faster on a test of selective attention when confronted with distractors. According to the authors, a fastball takes approximately 400 milliseconds to travel from the pitcher to the hitter, requiring batters to have optimal visual search strategies to distinguish and react to different types of pitches.

"Our research indicates that short-term sleep extension of one additional hour for five days demonstrated benefits on athletes' visual search abilities to quickly respond when faced with distractors," said lead author Cheri D. Mah, MS, research fellow at the University of California San Francisco Human Performance Center.



## Is 1 hour of sleep worth \$800,000?

- Late night tweeting used as a surrogate marker for sleep deprivation
- Better stats, quicker responses- equates to \$800,000 pa on contract
- Other currencies-scientific interest
  - career plans
  - weight control
- Parents currency-\$30,000 school fees wasted on gamer son with academic drop from 75<sup>th</sup>-168<sup>th</sup> of 170 over 12 months

### Late-night tweeting by NBA players linked to worse game performance

*Date:* June 1, 2017

*Source:* Stony Brook University

*Summary:* NBA players had worse personal statistics in games that followed a late-night tweet between 11 p.m. and 7 a.m, preliminary data from a new study suggests.

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#### FULL STORY

Preliminary data from a new study suggests that NBA players had worse personal statistics in games that followed a late-night tweet between 11 p.m. and 7 a.m. Players scored on average about 1 point less in games following late-night tweets, and their shooting accuracy dropped 1.7 percentage points compared with their performance in games that did not follow late-night tweeting. After a late-night tweet, players also took fewer shots and had fewer rebounds, steals and blocks.

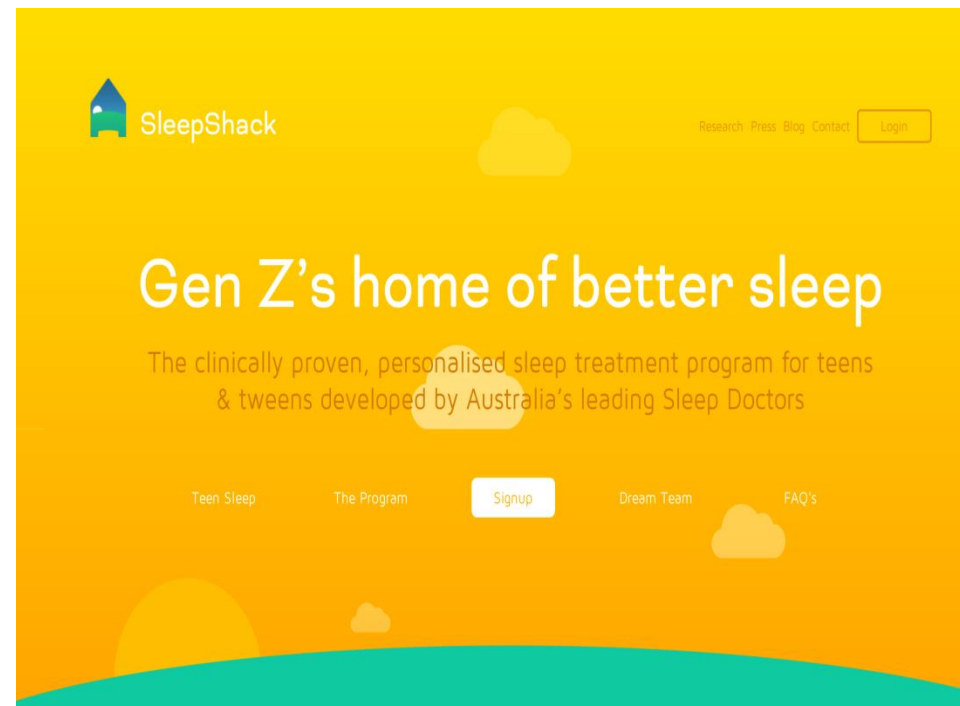
## Parent-driven treatments-part 2

- Think of evening efficiencies & organisational strategies that help avoid bed time delays. Boys particularly are often hopeless evening organisers. Maybe a timetable?
- Use the bed for sleep only (avoid conditioned arousal).
- Bedtime=lights out=reasonable time. Compromise often needed (8 hours rather than 9 hours)
- Electronic clean out 1 hour b4 bed. This will be a very unpopular suggestion. May need a compromise & progress slowly to overcome FOMO & addictions
- Next step, talk about imposed screen limitation. Family Zone. Sometimes discussion is enough to achieve an agreed “digital contract”
- Then, if needed, install Family Zone. Some parents need you to empower them for this step



## Online diagnosis & treatment via SleepShack-10-18 years

- Replicates face to face consultation, diagnosis & treatment in the online environment. An alternative to Woolcock Sleep Clinic. Same assessment & treatment but delivered electronically
- Educational-research, media, FAQs, Facebook & Blogs
- Multidisciplinary treatment
- Circadian-body clock
- Behavioural
- Environmental
- Psychological
- Drug free
- All this is explained in detail on site-have a look





## Why online ?

- Avoids the feeling of being a “therapeutic prisoner” in a doctor’s consulting room
- Overcomes clinic waiting times, so less “in crisis”
- No time out of school & work
- Appealing format for teens (108/110)
- Email alerts to parent & teen, if not complying
- Attracts younger clients & thus more successful treatment





## Extra treatments if needed-change the hour before bed

One hour before bed:

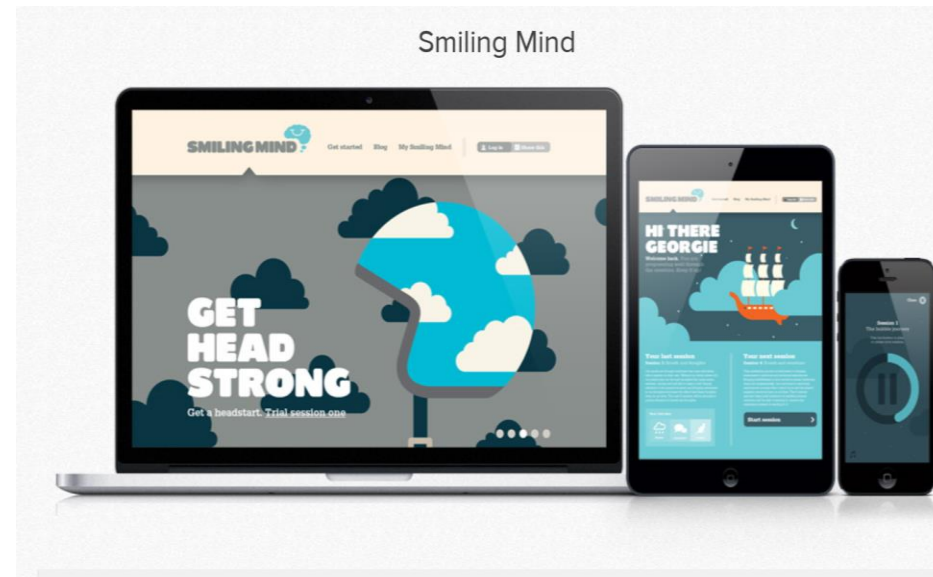
1. Stop work and study
2. Turn down the lights
3. Switch off electronic devices

*But what will I do?!*



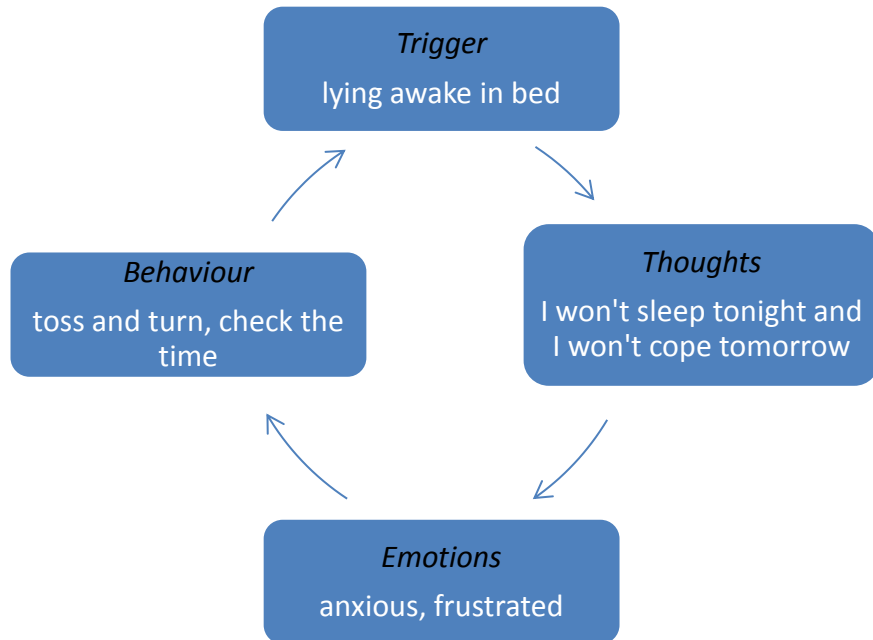
## Pre bed routines set up positive cues for sleep

- Sometimes needed for those who don't resolve with parent-driven strategies
- A 45 minute routine pre bed could include a bath, relaxed reading, music, meditation (smiling mind), a snack & drink
- These routines “signal” the brain that sleep is coming & reduces awake time in bed

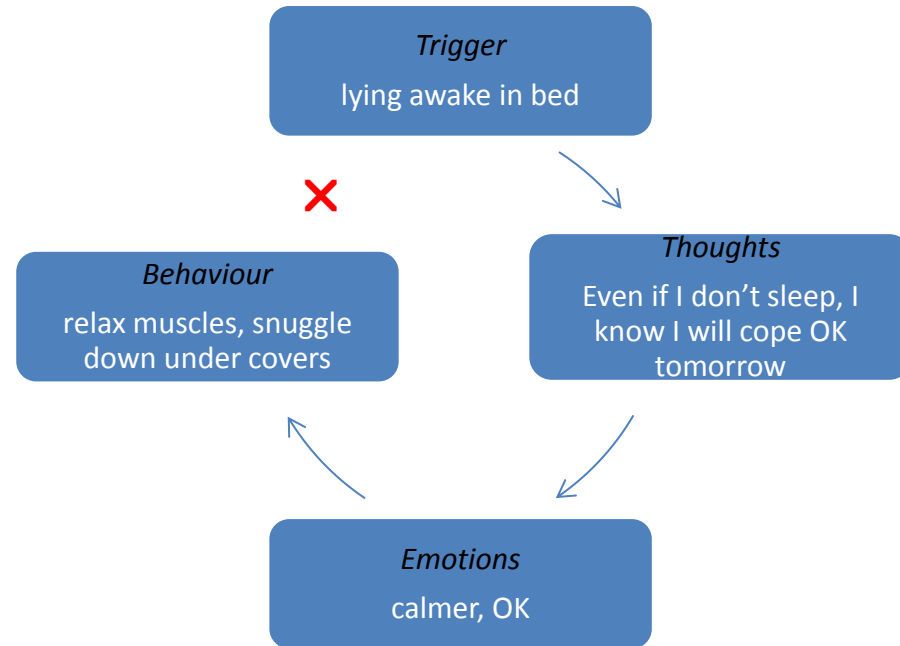


## Pre bed routines create a “sleepy headspace”

### Wide-awake Headspace

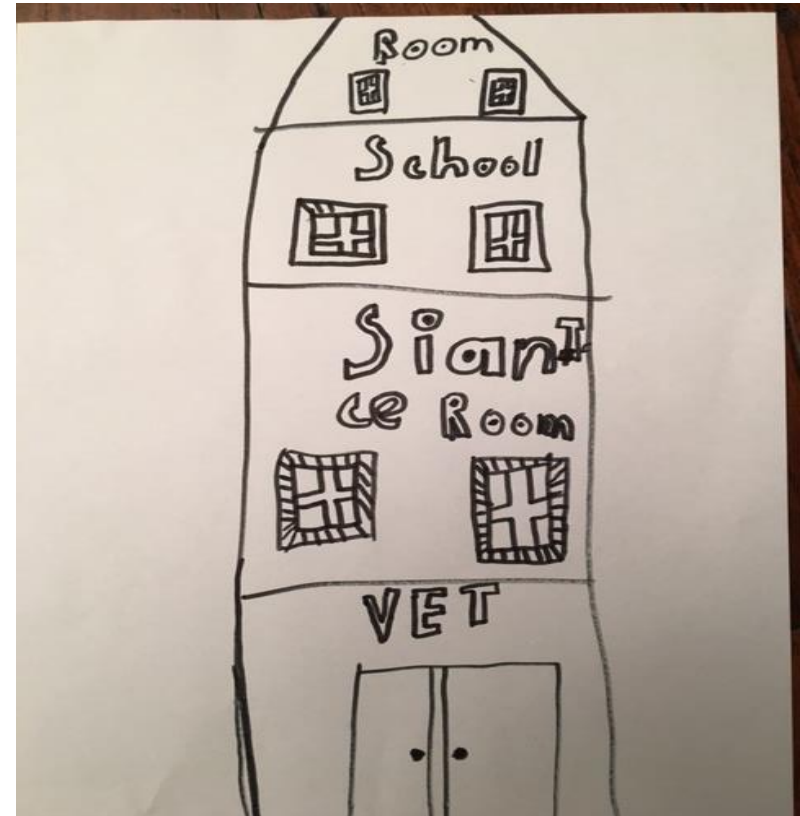


### Sleepy Headspace



## Some take home points

- Suspect sleep deprivation if a teen is moody &/or has poor learning
- View sleep health as part of student well being
- Appreciate that teen sleep is precious & should be protected
- Optimising sleep protects mental & physical health, & results in resilience, particularly in the face of stress
- Try to empower parents to actively address their teen's sleep deprivation



## Resources

- Online Sleep Treatment (10-18 years)  
[sleepshack.com.au](http://sleepshack.com.au)
- Adolescent Sleep Clinic  
[woolcock.org.au](http://woolcock.org.au)
- In School Sleep Health Seminars & Workshops  
[thesleepconnection.com.au](http://thesleepconnection.com.au)
- Screen management tool  
[familyzone.com.au](http://familyzone.com.au)
- Contacting me-via SleepShack





Questions & thanks for listening

