

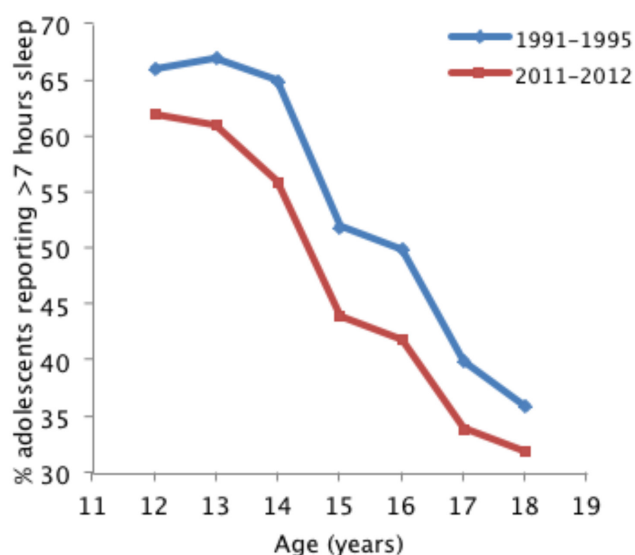
e-teaching

Management strategies for the classroom

Sleep and performance



Adolescent sleep: 1991 to 2012



Adapted from *The Great Sleep Recession: Changes in Sleep Duration Among US Adolescents, 1991-2012*

While most people would agree that sleep is essential to health and well-being it would seem that many are paying scant attention to the fact. Population studies show that the average sleep time for adults has decreased from 8.5 hours per night in 1960 to the current 6.5 hours during the working week, a decrease of about 20 percent.

Such longitudinal data is not available for children or adolescents although trend data from the US published earlier this year show between a 10–20 per cent decline in sleep time between 1991 to 2011 in children aged 12–18 years (see graph above right).

No doubt the escalating demands on our time and the ubiquitous rise of the internet and social media have increased the imperatives to be wakeful for both young and old. However research shows clearly that pushing late into the night is a health and productivity killer and it is becoming increasingly clear that the cost of insufficient sleep is much higher than most people recognise.

The results of insufficient sleep can be serious for all of us, but when we factor in a child's developing brain and body the consequences can be truly disastrous. As leaders and teachers it is

important to be aware of these effects not only because it impacts your ability (and that of your students) to perform optimally but also because of the broad negative impact sleep deprivation has on physical and mental well-being both for you and the children you teach.

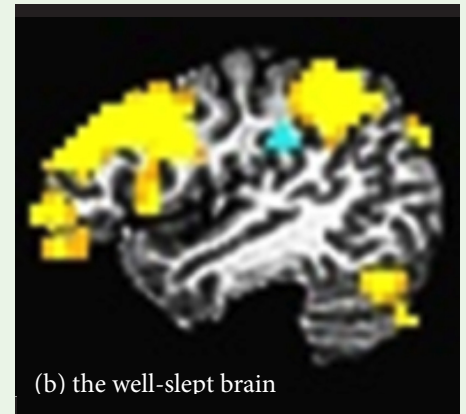
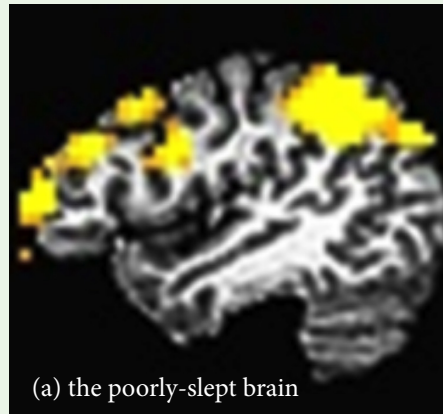
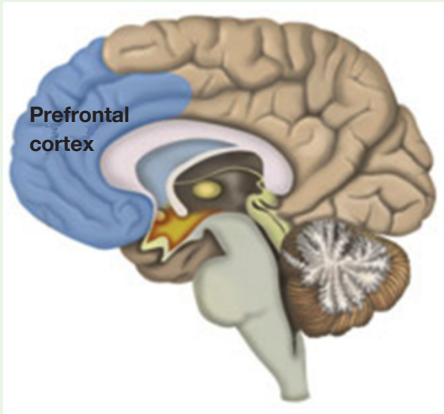
We need sleep for optimal performance

Unfortunately any productivity gains thought to be achieved from skipping sleep are quickly undone by the negative effects sleep deprivation has on the ability to access higher-level brain functions. When sleep deprived, not only are tasks performed more slowly but with a higher error rate. Indeed the negative effects are so great that people who are legally intoxicated outperform those lacking sleep.

When you sleep the brain removes toxic wastes that are the by-product of daily brain activity. The brain can only do this while you sleep so when you don't get enough sleep these waste products stay in your brain cells, killing creativity and, for days, slowing your ability to process information and problem solve.

In recent years it has become possible to view this decrement in brain function via functional magnetic resonance imaging

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Higher cognitive functions are better accessed with good sleep

(fMRI) of the brain undertaken while people engage in specific tasks. The prefrontal cortex (highlighted in blue in the diagram above on the left) is responsible for many higher-level cognitive functions and is particularly vulnerable to a lack of sleep.

This vulnerability is clearly illustrated by the fMRI images above. In a study evaluating the difference caused by depriving participants of just one hour of sleep, participants were asked to perform a cognitive task while at the same time having an fMRI. While participants did the task researchers observed significantly less prefrontal cortex activation (denoted by yellow) in the sleep-deprived participants (image (a) above) compared to the better-slept participants (image (b) above). Not surprisingly this lack of activation correlated with a decreasing ability to perform the cognitive task at hand.

We need sleep for good mental health

Depression is the most common psychological disorder in the western world and it is growing in all age groups, but especially so in the young, especially teens. It has long been recognised that depression can cause sleeping problems but it is now known that the relationship is bi-directional. In other words, poor sleep can also cause the onset of depression. A study which followed more than 7000 people for 12 months or more, showed that those who reported sleep difficulties at baseline were six times more likely to develop depression than those who reported good sleep.

Sleep very much affects how you view yourself and the world around you. Studies have shown that the level of self-esteem and optimism is highest in adults who regularly get between 7–9 hours of sleep each night and lowest in those who get less than 6 hours. It has also been found that when

you don't get enough sleep you preferentially remember negative events and have minimal recall of positive events, creating a falsely negative view of yourself and of the events in your life. Not surprisingly therefore lack of sleep is not only linked to the development of depression but also to lack of motivation and a generalised negative mood state.

We need sleep for good physical health

Many studies have repeatedly shown that people who get enough sleep live longer and healthier lives. In the short-term, lack of sleep increases vulnerability to cold and 'flu infections because it is during sleep that the immune system fires up and rids the body of virally infected cells.

In the long-term though, sleep deprivation is associated with much more serious health issues such as cancer, cardiovascular disease and metabolic disorders including Type 2 Diabetes. Interestingly, one of the most troublesome health issues that society faces today, the obesity epidemic (approximately 63% of Australian adults and 25% of Australian children are either overweight or obese) is strongly linked to lack of sleep. When you don't get the sleep you need not only does your body increase the amount of the appetite-stimulating hormone, ghrelin, and decrease the amount of the satiety-inducing hormone, leptin, making you much hungrier but it also decreases your metabolic rate by as much as 15%, meaning that just to stay at the same weight you need to eat 15% less. This combination of consequences quickly results in significant weight gain.

How much sleep do we need?

Sleep needs change with age. The chart below, published in 2015, indicates the amount of sleep required for each age group. It clearly shows that adults need

between 7–9 hours sleep per night and importantly that young school children need between 9–11 hours and adolescent students, 8–10 hours. While about 3 per cent of the population have either a short- or long-sleep gene, meaning they may need less or more sleep than indicated, the vast majority of us fit well within these limits.

Sleep and school performance

Sleep factors highly into a child's ability to achieve. Worldwide research has revealed clear and consistent associations between sleep, sleepiness and lower academic achievement among younger and older adolescents. Good grades are significantly associated with better sleep (sufficient sleep, regular going-to-bed and getting-up times) and there is a strong correlation between poor sleep (insufficient sleep, irregular sleep schedule and rise-time variability) and failure.

Lack of sleep in teenagers is also highly associated with poor mental health and behavioural outcomes. In a study of more than 4000 adolescents (11–17 year-olds) 25 percent of participants experienced sleeping difficulties. Compared to those students who reported good sleep, these students were twice as likely to have problems at home, at school and with their peers; 2–3 times more likely to be depressed; twice as likely to abuse alcohol or drugs; and 2–3 times more likely to have health problems.

The message is very clear. If students are to perform at an optimum level, physically and mentally, they need to be adequately slept.

Doing something about it

When life interferes with the ability to get the amount of sleep required, it's absolutely essential to start making sleep a priority. Firstly it is important to give yourself enough time to sleep. This means that if

you need to get up at 6.30 am and you require 8 hours of sleep you should be in bed and asleep by 10.30 pm and not just at the point of going to bed – a mistake many people make. Secondly you need to pay sufficient attention to setting yourself up for good sleep. Good sleep practices are essential for good sleep but many people unwittingly sabotage their sleep.

To optimise your sleep you need to prepare both your mind and your body. To prepare the body you need to:

- Get up at the same time every day
- Exercise for at least 20 minutes per day (A walk at lunchtime is good)
- Not have caffeine after midday
- Not drink alcohol (or restrict it to one standard glass)
- Not sleep during the day (although a nap of 20 minutes is OK and sometimes very worthwhile)
- Eat only a small meal at night and especially no big meal within three hours of bedtime
- Not exercise within three hours of bedtime (This will alert the body).

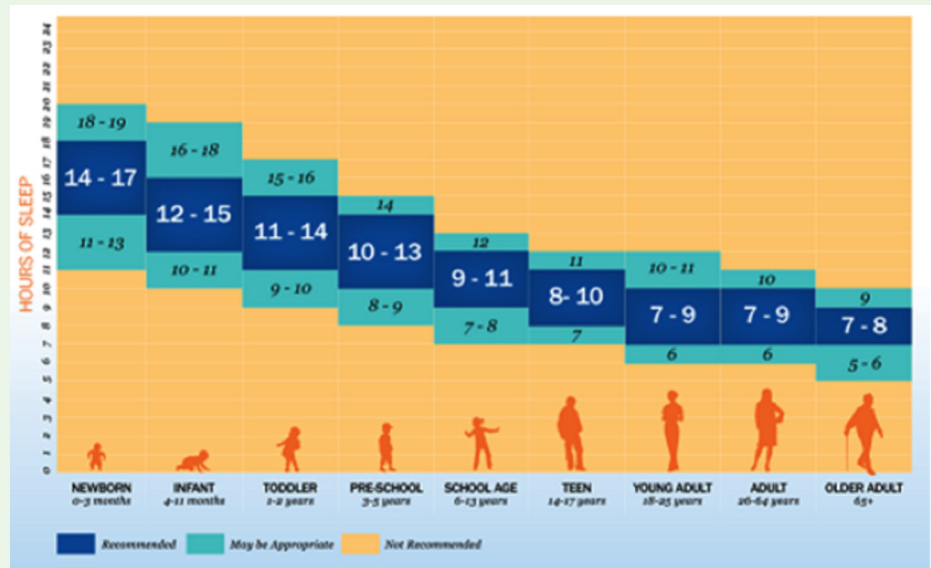
To prepare the mind you need to:

- Deal with the issues of the day: in the early evening spend no more than 20 minutes writing events of the day that are of concern along with potential solutions. Close the book and put it away.
- Set an alarm to go off one hour before your proposed bedtime. At that time:
 - turn off all technology (and make sure not to look at the bright light of the computer, phone or tablet after that time)
 - dim the lighting in the room
 - take a warm-hot shower
 - do a relaxation exercise.
- Ensure that the bedroom environment is conducive to sleep and that it is quiet, cool and dark. If this is difficult to achieve consider an eye mask, ear plugs and/or fan.
- Absolutely and definitely no technology in the bedroom.

Tips for teachers

Sleep should be one of the first considerations for teachers when dealing with under-performing or behaviourally difficult students. There are a number of strategies that can be implemented which may improve the student's performance or attitude. These include:

- Being aware of your sleepy students. As a class activity you could get students to complete a sleep diary for one



Our changing sleep needs (National Sleep Foundation 2015)

- or two nights. This will highlight those students experiencing sleep difficulties.
- Educating students about the importance of sleep and the role it plays in optimal performance.
- Emphasising the importance of good sleep practices to your students.
- Assisting students to develop a sleep plan. Depending on their age this may involve liaising with parents and educating them on the importance of sleep. Emphasise the importance of role-modelling when it comes to sleep choices.
- Ensuring homework load is not too great.
- Avoiding having lessons or any extra-curricular activity prior to the commencement of classes.

For both you and your students one of the best things that can be done to improve performance and to optimise potential is to ensure that everyone gets the sleep they need.

Further reading

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Quotes on sleep

A ruffled mind makes a restless pillow

Charlotte Bronte

Think in the morning. Act in the noon. Eat in the evening. Sleep in the night.

William Blake