

## Unit 5 Review!

Use the text to answer the following FRQ's one of these will be on the next Learning Exercise following the Thanksgiving break!

**1. Franco studied all evening for a chemistry test scheduled the following morning. That night he dreamt that he accurately copied a female classmate's correct answers to the test questions as they unexpectedly flashed before his eyes. Compare and contrast explanations of Franco's dream that might be provided by Freudian, memory consolidation, and activation-synthesis theories. In what sense is the dream a reflection of Franco's level of cognitive development?**

**2. Because he has difficulty falling asleep at night, Dr. Hogan doesn't go to bed until very late. Before he retires, he tries to wear himself out by running around the block several times. Then he treats himself to a beer and perhaps a pizza while preparing for the next day's early morning classes. What specific advice would you give Dr. Hogan to help him fall asleep?**

**3. A good friend of yours hopes that hypnosis will improve his memory and help him study longer and more effectively. He worries, however, that he might not be easily hypnotized. Your mother hopes that hypnosis will help relieve her arthritis pain but fears that under hypnosis she might do something embarrassing. Discuss the extent to which the hopes and fears of your friend and your mother are realistic. Where appropriate, use research evidence to support your conclusions.**

**4. A classmate believes that alcohol, marijuana, and cocaine all have similar effects on behavior and that therefore all three drugs ought to be legalized. Carefully evaluate the strengths and weaknesses of your classmate's position.**

**Read the following article on teen sleep. Discuss how close this research is in terms of your life. Compare and contrast the research with your own life. What can you do to improve your sleeping habits?**

## **The sleep-deprivation epidemic affecting our teenagers is not all about screen time**

**Madonna King** April 1 2017

**Seven in every ten 14-year-old girls get insufficient sleep, most of them recording fewer than eight hours, when nine hours is the minimum required. Technology isn't the only culprit.**

**Let me introduce you to four 14-year-old girls:** Mandy, Margaret, Joanne and Liz. They could be your daughters or nieces or neighbours, given how common their stories are. All four bring home strong report cards; three play sport and the other spends hours each week, late into the night, at ballet class. All four of them are drunk tired.

*"We go from school to sport to homework to bed to sport, back to school. And then you have to fit part-time work and friends in there. It's too hard."* –Mandy

*"A good night is five hours for me. A bad one can be three hours."* – Margaret

*"It's so hard to get out of bed of a morning. And if I have two consecutive nights' sleep of only six or seven hours, on that third day I can't cope. And then Mum will just say something and I'll go off."* – Joanne

*"I can have devices in my room, so I get distracted and it gets later and later. Sometimes I wish my parents would enforce that rule of no devices in the bedroom, but I'm not going to suggest it. That would be stupid."* – Liz

Today, school is only part of a hectic teen's day, and for many 14-year-old girls, the day can reach far into the night. Rowing can start before the moon nods off to sleep, meaning an alarm clock cuts through any teen dreams as early as 4.15am. Rowing morphs into school, which becomes hockey or swimming training or netball practice. Home beckons, but means a quick shower and dinner. And the clock chimes 8.30pm. Often, this is when many girls first open their books to begin the assigned homework.

Mandy, Margaret, Joanne and Liz are not exceptions to the rule. Busy-bee lives are unfolding each day in high schools across Australia, and the impact is devastating. Teachers report yawns from 9am and brain experts say learning while tired is pretty much useless. Parents admit they're not sure what time their teens nod off, and many girls nominate a lack of sleep as the key reason behind conflict with their parents.

Heavy school workloads, on top of extracurricular activities, are a key reason behind an epidemic in sleep deficit. Our 14-year-olds are worried sick, even if they are not telling you. It might be anxiety over an upcoming test or friendship angst that follows your daughter home from school.

The lure of the blue-lit screen resting on the bedside table adds to the problem, with the short-wavelength light emitted suppressing the sleep hormone and delaying sleep onset. In lay terms, the teen's brain is being told it's time to wake up. And then, when they wake to a piercing alarm the next morning, what is their first act? That question is put to a group of Brisbane 14-year-olds. The answer is so in tune it seems practised: "Check my phone."

Another year 9 student, Sarah, goes to bed between 10.30pm and 11.30pm. She admits she is on Instagram, Tumblr, Snapchat, Facebook, Twitter, Skype and ooVoo. Sheepishly, she also owns up to the fact that she's only allowed social media between 4pm and 9.30pm – so doesn't begin her homework until 9.30pm. Her case points to another issue: few 14-year-olds have curfews, and those who do largely ignore them, tucked in their room with the door closed, while their parents, tired themselves, nod off to sleep up the corridor.

When this picture is described to Dr Chris Seton at Sydney's Woolcock Institute of Medical Research, he nods his understanding. None of this is a surprise. Also a paediatric and adolescent sleep physician at western Sydney's Westmead Children's Hospital, he hears it every day. About 80 per cent of his patients are drawn from private schools, many of them weighed down by non-stop extracurricular activity cycles and hours of homework. Seven in every 10 14-year-old girls get insufficient sleep, most of them recording fewer than eight hours, when nine hours is the minimum required. About 15 per cent, Seton says, sleep for only five hours each night. He is deeply frustrated that the sleep-deficit epidemic is still not accepted as a public health issue.

The average 14-year-old with 30 minutes of missed sleep records a measurable IQ difference of up to 10 points, he says. Ten points! Isn't that enough information for this to be treated as a serious public health issue? Mild sleep apnoea equates to losing two grades in terms of learning: an A becomes a C; a B becomes a D. Why wouldn't that hard evidence win parents over? And it doesn't stop there. Seton says a string of other links – between insufficient sleep and drug and alcohol use, depression and anxiety – also exists, and the problem continues to grow.

The drop in academic results recorded by tired students can be explained by how sleep loss affects short and long-term memory; the old adage "in one ear and out the other" is truer than we might have believed. Short-term memory loss can happen with one night's missed sleep. For good long-term memory, a teen needs sufficient sleep to consolidate their learning.

"Say a child gets a good night's sleep and they're in the classroom and they're learning well on that particular day and accomplishing short-term memory," Seton says. "That learning only goes to long-term memory if they have consolidated sleep the night after. So rapideye-movement [REM] sleep consolidates learning. If they get a good night and they learn well during the day and then they sleep badly [the next] night, the learning has not gone into long-term memory."

But it's not just a matter of introducing a curfew and sending your 14-year-old off to bed, whether her homework is complete or not. Earlier bedtimes are impractical for teens, whose body clocks make it searingly hard to fall asleep early, as I will explain shortly.

What would work best, according to experts across the globe, is to encourage society to fit in with teenagers. That would mean allowing them to stay up late, recognising it is almost impossible for them to fall asleep early and that 15 per cent – or one in six teens – have difficulty sleeping, no matter what. That cohort, with or without technology and pressure, still struggle to nod off at any time, even during school holidays.

Sleep is increasingly seen as the third pillar of good health in many countries, alongside diet and exercise, and research demonstrating that adolescent sleep deprivation has links not only to drug and alcohol use, but also to traffic accidents, could be the alarm needed here. In fact, it was a grant by the US-based Centers for Disease Control and Prevention that threw up stunning results that have prompted many schools, worldwide, to have the debate over whether they should delay their opening hours.

The piece of research was a three-year study involving 9000 male and female students, aged between 14 and 18. The students attended one of eight public high schools in three US states: Minnesota, Colorado and Wyoming. Dr Kyla Wahlstrom, the lead author on the 2014 report, says the sleep-wake cycle of teens had identified changes in specific biological processes that occurred with the onset of puberty, which meant teenagers not only needed more sleep, but also felt sleepy at a later time. "They all fall asleep pretty much around a quarter to 11 or 11pm, and their brains don't really wake up until eight in the morning," she says. "The human [teen] body is seeking about nine or nine-and-a-quarter hours' sleep every night."

Wahlstrom and her research team looked at whether or not a delay of more than an hour in the start time for high-school students had an impact on students, specifically on their health or their academic performance. Survey data was drawn from the 9000 students, who were individually questioned about their daily activities, substance use and sleep habits. The team also used students' academic reports – grades, attendance, punctuality and how they fared on state and national tests – as part of the investigation. And what did they find?

"Later start times had a statistically significant positive impact on grades," Wahlstrom says. "It's very powerful data." In Jackson Hole, Wyoming, for example, a statistically significant improvement was recorded in all subjects – English, maths, social studies and science – and in all grades. Ninety-two per cent of parents believed their children were easier to live with when school started later in the morning.

While research has looked at the link between academic performance and sleep for many years, perhaps the most interesting part of this research related to its focus on car accidents.

A comparison was drawn between teens driving to school for an early start – 7.30am – compared with a school start closer to 9am. "When the high schools started later ... we had a 70 per cent reduction in car crashes," Wahlstrom says. "It's phenomenal." I think I have heard her wrong. Seventeen per cent? No, she says. Seventy per cent. The data is gold for public policy experts, particularly when looked at in the context of science: eye-blink rates, the speed with which teen drivers can brake, how much attention they pay to their peripheral vision, and their inexperience.

Wahlstrom's findings are mentioned to me repeatedly by others during my research. "When they have a late body clock, getting them up at 7am is like you and me getting up at 3am," Seton says.

Neural and systems complexity specialist Dr Fiona Kerr, from the University of Adelaide, points to the two times in our lives that our brains undergo major reshaping. One is as a baby, the other is as a teenager around puberty. Sleep deprivation could alter brain development, she says, particularly the frontal lobe, which is critical for logic and reasoning skills.

**The list of problems associated with drowsy teenagers** runs to pages. Impaired learning. Mood swings. Anxiety. Depression. More prone to developing a negative body image. Low self-esteem. A loss of their sense of humor. Sleep-hungry teens are also more likely to eat fast food two or more times a week, have difficult relationships with their parents, increase school absenteeism and be put on detention. "Not getting enough sleep causes the number of T-cells in a teenager's body to fall by 30 to 40 per cent, thereby reducing the ability of their immune system to fight everyday infections," Seton adds.

It's not surprising that Kids Helpline often receives calls from high school students late into the night. Many of them are studying, and anxious, or still on their phones. But, despite the enormous amount of money poured into the education system and the focus on how best to test our students, nothing has changed to assist their sleep patterns.

Some schools have instituted "sleep hygiene lessons" as part of life-skills programs, where students are taught a routine to get ready for bed. That's right: in year 9! Seton is teaching the same routine in his clinics. Forty-five minutes before bed, all technology is turned off, then the teen has a bath. A chilled music playlist is turned on, a snack and a drink devoured, before the teen slips into bed. "It trains the brain to get ready for sleep," Seton says. "It means when the light goes off, the brain is not racing." But few follow it.

Teenage girls in particular, say experts, suffer FOMO (fear of missing out) if they turn their device off overnight. (It might be that crucial message from a friend, an invitation to the school dance, a piece of gossip they can't live without.) They'd rather suffer tiredness than arrive at school, into their peer group, being the only one who wasn't up with the nocturnal electronic goings-on. That is borne out in the data showing the percentage of teens texting – not just after midnight but after 3am on weeknights.

Seton says about 45 per cent of teens aged 14 to 16 regularly sent texts after 3am, and 75 per cent after midnight. Some were sending more than 100 texts a night. The average sat at 34. Unfortunately, it's not only sending the texts that's part of the equation; the anticipation of waiting for a reply to a text means the brain wakes up – a term called "infomania".

In the search for solutions for teenagers, experts raise their vanity as a possible smart means of prompting them to take personal ownership of their sleep. That means equating sleep with looking better and having clear skin and shiny hair, as well as feeling better, doing better at school and living longer. Research shows all that to be true, too. This approach gives a 14-year-old girl, under pressure to stay connected, the impetus and the confidence to claim back time, to tell her friends that she is not going to answer texts in the middle of the night

because she is sleeping. To do that would turn down the controls on the social-pressure dial that dictates that each and every text needs to be read and acknowledged.

Arianna Huffington, founder and former editor-in-chief of *The Huffington Post* and author of *The Sleep Revolution*, has also brought a bit of welcome celebrity to the call for more sleep. Just pop "why am I" into Google, she says, and before you can type the next word, its auto function will complete it for you: "why am I so tired?" pops up first, closely followed by "*why am I always tired?*".

Speaking at the 2016 National Coalition of Girls' Schools conference in New York, Huffington received a rock star's welcome for her call for us to redefine what success means. The audience – educators in girls' schools the world over – saw, on a daily basis, the devastating impact that a sleepless night waged on a student. "We need to educate our young girls that they don't have to burn out to succeed," Huffington told the packed room. School start times needed to be changed, too, she said.

That latter comment – about school start times – is almost universally supported – by students, teachers, doctors, psychologists, brain experts and academics. Wahlstrom, who is also a former school administrator and school principal, knows the hurdles such a suggestion raises: it interferes with child-minding; it disrupts peak hour; the logistics don't work; the list goes on. "But the community has to come together," she says.

The perfect time for high school gates to swing open is a matter for debate, but if an ideal night's sleep for teens runs from 10.45pm until 8am, school should not begin before 9am, Wahlstrom says. That would allow a 14-year-old to rise, get ready and travel to school. School programming could then run later, because it is the starting time, not the length of the day, that is at issue. Seton believes a 10am or 10.30am start time would be the best-case scenario.

Certainly some Australian schools have been tinkering with start times, but there is no mass move to allow high school students to begin their daily education a bit later. Some schools have raised it as an option, but support for it among families is low. And in some cases, there has been strong opposition to trialling later start times.

Like most of her peers, Jane Danvers, principal of the Wilderness School in South Australia, agrees with the science behind calls to change the school day. But she says obstacles exist to make it difficult and schools frequently look at other ways to cater for teens. For example, timetables are often structured to differentiate what is taught in morning classes and what is taught in afternoon classes.

The current model is compatible with bus and train timetables, allows homework to be done before dinner, and doesn't create a logistical problem for big cities. In other words, it's neat. It's clean. It works, for almost everyone. The one demographic missing out here: the teens.