



HM Prison &
Probation Service



Learning
Together

Keeping connected: introducing ThinkLets

Learning Together builds educational communities that bring together people who live, study and work in universities and criminal justice organisations. Together, we want to use the power of education to improve lives, institutions and communities.

Covid-19 is a major challenge to our health and wellbeing. It means that we cannot physically come together as a community to learn with and from each other. But we can still keep learning and supporting each other to stay hopeful, positive and engaged.

Members of the Learning Together Network have created ThinkLets to help us all keep connected. Each ThinkLet contains resources that will help us to think about new ideas and develop new skills together, even from afar.

Each week, for the next eight weeks, two ThinkLets will be shared across our national community. We hope you enjoy them and find them helpful.

**Keep well. Keep hopeful. Keep connected.
And keep Learning Together.**

Please note:

The following resource was created with love and care by a member of the Learning Together Network. We sincerely hope that the creator's work will be respected by distributors, readers and users, and will not be subject to plagiarism or other forms of academic misconduct. Thank you for your cooperation.

ThinkLet #1

An Introduction to the Psychology of Sleep

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Most species of animal sleep in some form or another. In humans it is generally recommended that we try to get eight hours of sleep a night. There is evidence suggesting that humans sleep, on average, one hour less a night than we did 100 years ago and there is growing concern about the chronic lack of sleep that much of our society is experiencing.

We know that sleep can be particularly difficult in prison contexts. Therefore, we thought that a short introduction to sleep might be of interest. I hope that this article will enable you to understand some of the biological factors that help control our sleep-wake cycle and how sleep affects our mood and our physical health. At the end of the article, you will find a sleep diary to help you monitor your own sleep pattern; in two weeks' time, ThinkLet #5 will build on this with ideas on how to improve sleep and wellbeing.

How does our body control our sleep?

There is an internal, **biological clock** that controls when we feel sleepy and when we feel alert. A key part of our body clock is located in the brain, in an area called the **suprachiasmatic nuclei (SCN)**. This area of the brain has an **innate** daily rhythm which means that we show a sleep-wake cycle even when there are no external cues telling us when to go to sleep (e.g. clocks, darkness...).

This inbuilt sleep rhythm was demonstrated by Michael Siffre, who lived in a cave for 6 months, away from natural light and clocks. He turned the lights off when he felt sleepy and on when he was awake. His biological clock was "**free running**": he settled into a cycle of about 25 hours, so what felt like a day to him was slightly longer than a normal day. As a result, he felt that fewer days had passed over the six months.

There are important chemicals in our body that are involved in the sleep-wake cycle. One is called **melatonin**. Levels of this hormone increase in the evening, as light levels fall. Melatonin causes us to feel sleepy. In contrast, bright morning light suppresses melatonin, so we feel awake and alert. Therefore, if possible, try to look out of the window for 20 to 30 minutes at midday and try to sleep in total darkness. This will help regulate your melatonin levels and improve your sleep.

There is another biological process that controls how tired we feel, which is known as **sleep pressure**. Have you ever tried to keep yourself awake much later than you should, perhaps when working a night shift? If so, then you will probably have noticed an overwhelming urge to sleep. This sleep pressure is caused by the build-up of a chemical in your body called **adenosine**. This chemical acts on your brain to "turn down" the areas that make you feel awake and alert and to "turn up" feeling of sleepiness. Sleep pressure peaks about 12 to 16 hours after you woke up. One way to "trick" the brain into feeling alert is to drink caffeine as this blocks the action of adenosine on the brain. However, the adenosine continues to build up, so when the caffeine wears off, the brain is flooded with adenosine and we experience a "caffeine crash". Unfortunately, it takes up to seven hours for just half of the caffeine in a drink to wear off.

So, if you drink a caffeinated drink (like coffee or cola) at 5pm, half of it is still in your brain, affecting your sleep, at midnight. Therefore, if you wish to improve your sleep, try to avoid such drinks after 5pm. This is particularly true if (like me) you are a bit older, as it takes longer to break caffeine down the older we get.

Five stages of sleep

Sleep has five different stages during which the activity in our brain changes. In a typical eight hours of sleep our brains go through most of the stages several times!

REM sleep is characterised by fast brain waves, rapid eye movements and **dreaming**. Adults spend about 25% of their sleep time in REM. To stop us acting out our dreams, our brains cause paralysis of all muscles in the body (except those for eye movements). Sleep walking typically does NOT occur in REM sleep. In non-REM sleep there are no rapid eye movements. There are four different types of non-REM sleep. For example, Stage 4 is the deepest stage and has large, slow brain waves. Stage 4 sleep is particularly important for helping us to lay down strong memories from the day before. In contrast, the lighter Stage 2 sleep, which has a lot of what are called “sleep spindles”, seems to help ensure that our brain is ready to learn new information the next day.

The link between sleep and mental and physical health

Most of us will have experienced feeling “moody and irritable” when we have not had enough sleep or when our sleep has been disturbed – what is going on in our brains?



Research in brief – sleep and mood

Yoo and colleagues (2007) conducted an experiment to investigate the impact of sleep deprivation on the centers of the brain that trigger our emotional responses.

Fourteen volunteers were prevented from sleeping for 35 hours, whilst twelve volunteers were allowed to sleep normally. Both groups then had a brain scan whilst watching emotional images. Some of the images were neutral (e.g. trees), other images were negative (e.g. pictures of a rattlesnake or a car accident). It was found that, when seeing the negative images, the sleep-deprived group had significantly GREATER activation of an area of the brain that is closely linked to fear and anger, called the amygdala. In fact the activity in this area was 60% higher than in the group that had slept before seeing the images.

The findings of this study have been repeated by a team in Japan. In this case, greater activity in the fear/anger centre of the brain was seen after allowing people to sleep for only five hours a night, for five nights. Therefore, our mood might be significantly affected after even just a few nights of really poor sleep.

Yoo, S. S., Gujar, N., Hu, P., Jolesz, F. A., & Walker, M. P. (2007). The human emotional brain without sleep—a prefrontal amygdala disconnect. *Current Biology*, 17(20), R877-R878.

Sleep, learning and memory: Professor Mathew Walker explains that there is now evidence that having sleep enhances our ability to learn new information. This is because, when we are awake, the brain is taking in and temporarily storing new information (such as people’s names, faces or the facts in this article). The area of the brain that is vital in this temporary storage is called the **hippocampus**. However, this area of the brain can only store a limited amount, so in order to learn new information the brain needs to move memories from the hippocampus to other areas of the brain for longer-term storage. This is where sleep comes in, as there is now evidence that this “memory transfer” takes place when we are asleep and that sleep “refreshes” our ability to learn the next day.

Walker, M. (2017). *Why We Sleep: Unlocking the Power of Sleep and Dreams*. Penguin.

Sleep and physical health: Sleep has been related to many aspects of physical health. Here is just one example. Eva Schernhammer and her colleagues (2001) used data on the health of over 78,000 US nurses over a ten year period. She found that there was a significant (moderate) link between the number of years working rotating shifts and risk of breast cancer, even when other risk factors (e.g. alcohol consumption) were taken into account. It is argued that the increased risk of cancer in those working shifts, over many years, is related to the impact of shift work on sleep and the “body clock”. However, it is worth remembering that whilst the increase in risk was statistically significant, it was still a small increased risk.



One possible explanation for why shift work is associated with increased risk of cancer relates to the hormone melatonin. You will recall that melatonin is important for making us sleep when its levels increase at nightfall. Melatonin is also thought to be important in the repair of body cells and the prevention of cancer cells. It is possible that shift work disrupts the release of melatonin and so, over many years, this may increase the risk of cancer.

Research in brief - sleep in prison

Lindsay Dewa and her colleagues (2017) interviewed 119 female prisoners and 118 male prisoners (aged 18 to 72) from category B (local) and C (training) prisons. The interviews used a range of questionnaires to assess whether participants were reporting signs of clinically diagnosable insomnia, poor sleep quality and symptoms of anxiety, depression and suicide risk. They also asked about a range of other factors that have been linked to poor sleep, including unhelpful (dysfunctional) beliefs about sleep and features of the prison environment (e.g. noise, light) and sleep habits (e.g. going to bed at a regular time).

They found insomnia was very common and was reported by 62% of the prisoners in their study compared to 46% in the general population. Insomnia was significantly more likely in females than males. Poor sleep quality was reported by 88% of prisoners in the study. Further analysis showed that several factors that were significantly linked to insomnia including depression, having had sleep problems prior to coming into prison, poor sleep habits and a disruptive prison environment at night.

Dewa, L. H., Hassan, L., Shaw, J. J., & Senior, J. (2017). Trouble sleeping inside: a cross-sectional study of the prevalence and associated risk factors of insomnia in adult prison populations in England. *Sleep Medicine*, 32129-136.

*I hope that this ThinkLet has explained what controls sleep and has shown that sleep is important for our mental and physical health and for learning. Dewa's study also shows that sleep problems are more common in prison contexts. Although, many factors that affect sleep in prison are hard to change, one of the first steps is to find out about your own, personal sleep patterns and habits. Then you can see what factors you can and cannot alter. Therefore, I include a **Sleep Diary** to help you record and reflect on your own sleep patterns.*

Look out for Ellie Willard and Alexandria Bradley's ThinkLet #5 on how to improve sleep habits (sometimes called "sleep hygiene") and enhance wellbeing.

In the meantime, how about talking about what you have learned from this article with someone else? Ask them about their sleep patterns. In your experience, and in their experience, what (if anything) have you found improves sleep?

Sleep Diary:

Please fill in this diary each MORNING

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Day of the week (e.g. Tuesday)							
How many caffeinated drinks did you have <i>after</i> 5pm?							
In the hour before bed, what was your bedtime routine? Examples: <ul style="list-style-type: none"> • reading • listening to music • watching TV / gaming • vigorous exercise • gentle exercise (e.g. yoga) 							
What time did you get to bed last night?							
What time did you wake up this morning?							
How long did it take you to fall asleep? (in minutes)							
How many times did you wake up in the night?							
What disturbed your sleep? Examples: <ul style="list-style-type: none"> • noise • needing the toilet • worry / anxiety • pain / physical discomfort 							
How would you rate the quality of your sleep? 1-----5 very poor very good							