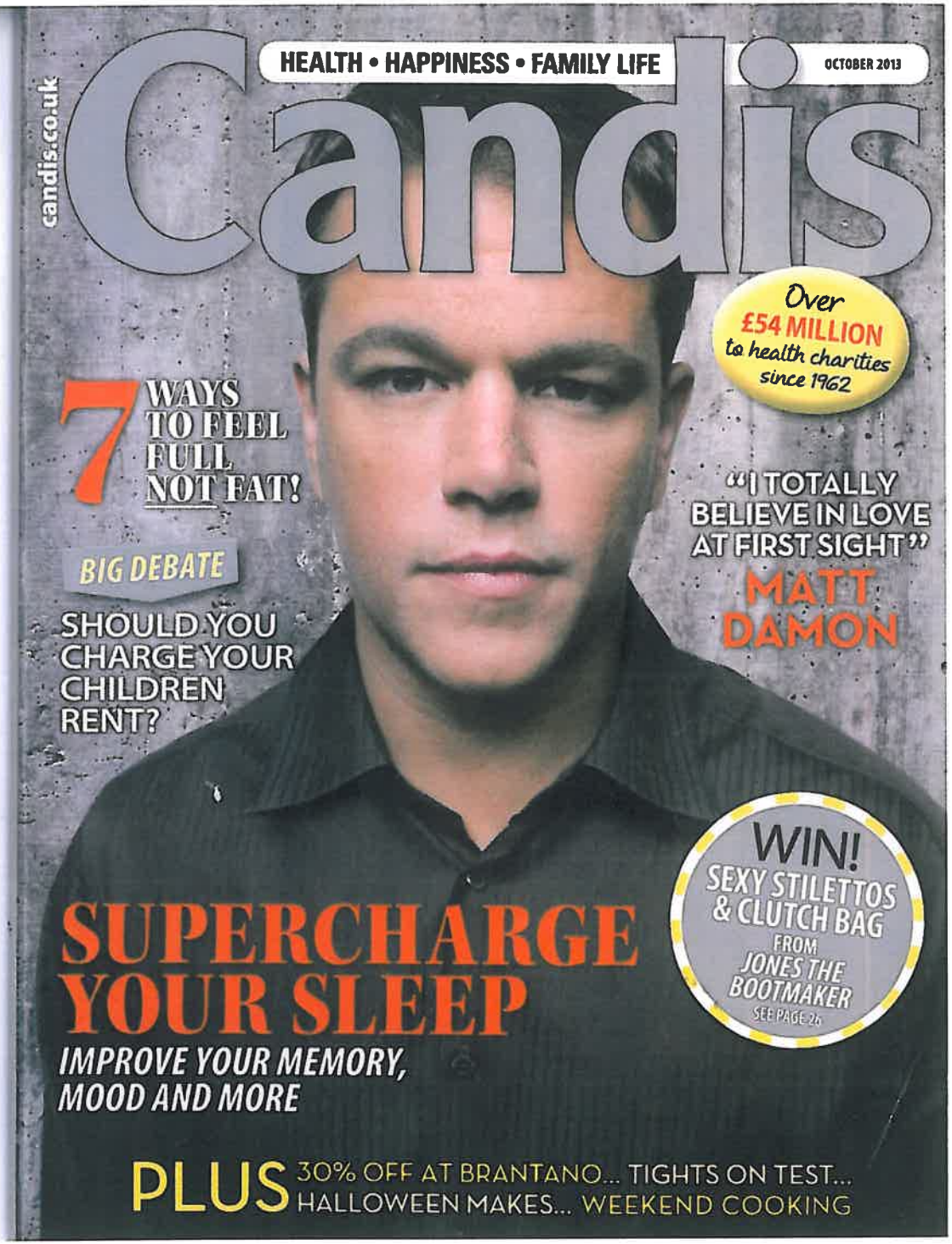
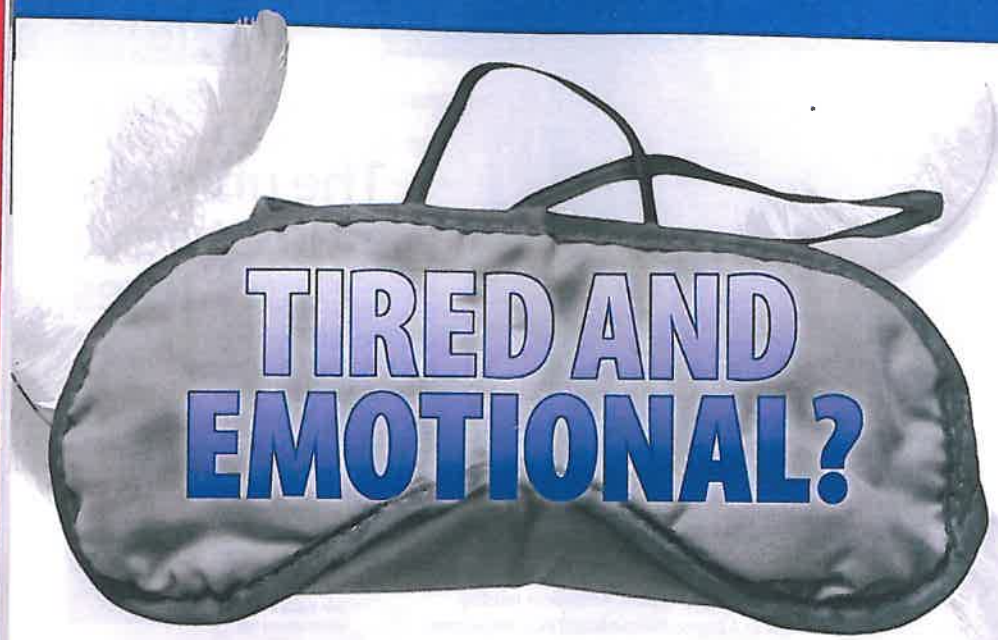

candis.co.uk
Candis
HEALTH • HAPPINESS • FAMILY LIFE
OCTOBER 2013
Over £54 MILLION to health charities since 1962
7 WAYS TO FEEL FULL NOT FAT!
BIG DEBATE
SHOULD YOU CHARGE YOUR CHILDREN RENT?
"I TOTALLY BELIEVE IN LOVE AT FIRST SIGHT"
MATT DAMON
WIN! SEXY STILETTOS & CLUTCH BAG FROM JONES THE BOOTMAKER
SEE PAGE 24
SUPERCHARGE YOUR SLEEP
IMPROVE YOUR MEMORY, MOOD AND MORE
PLUS 30% OFF AT BRANTANO... TIGHTS ON TEST... HALLOWEEN MAKES... WEEKEND COOKING



TIRED AND EMOTIONAL?

Want to be happier, smarter and more creative? You can achieve all three tonight, in the comfort of your own bed. LEAH HARDY looks at why a little shut-eye is the key to health, happiness and prolonged life...

Sleep is the Cinderella of our health regimes. Even if we exercise regularly and eat well, sleep often gets squeezed out of our busy schedules. And while we glow with self-righteousness if we get to our Zumba class, lose 2lb or pick an apple instead of a cake, we may actually feel guilty about tucking ourselves into bed at 9pm, or allowing ourselves a lie-in at the weekend.

But scientists are increasingly discovering the vital role sleep plays in our health, regulating our weight, our hormonal balance and our immune system. In May this year, the Centers for Disease Control and Prevention (CDC), part of the US Department of Health, announced, starkly, that 'insufficient sleep is a public health epidemic'. Its report linked lack of sleep with high blood pressure, depression, obesity, diabetes and even cancer. And, significantly, car crashes and industrial disasters caused by people being too tired to concentrate.

We shouldn't be surprised by this – the need to sleep is programmed deep in our evolutionary code. Every living creature sleeps, even amoebas. We know sleep must be essential because animals are never more vulnerable to predators as when they are sleeping, yet they still do it. Giraffes, for example, take a whole 15 minutes to get up after a snooze – which can be rather bad luck if a lion happens along as they are staggering groggily to their feet.

Traditionally, we've seen sleep as something that primarily benefits tired bodies. But according to one of the world's leading experts on sleep, that might miss sleep's even more important function. Penny Lewis is a neuroscientist and director of the Sleep and Memory Laboratory at the University of Manchester. She is also the author of a fascinating new book called *The Secret World of Sleep* (Palgrave Macmillan). In it, she argues that sleep is absolutely vital for the proper functioning of our uniquely complex brains.

Adequate sleep, she says, increases our ability to learn, allows us to create and retain memories, boosts our creativity and helps us process difficult emotions. It alters our mood and, perhaps surprisingly, it can even affect our morality. In a study published in the journal *Sleep*, people who were deprived of sleep for 53 hours were significantly slower to make moral judgements, which suggests they struggled more to work out the right thing to do.

But before we find out exactly how sleep affects the mind, and why our system melts down when we don't get enough, we need to understand what the brain is doing while we are safely tucked up. Nerve cells in the brain are called neurons, and these are the very building blocks of our mind. These cells communicate with each other using electrical signals and pass on messages via chemical messengers called neurotransmitters. By scanning our brains using sophisticated imaging technology, or simply applying electrodes to the surface of our heads, scientists can record the waves of electrical activity that show our brain cells are firing.

And what they have found is that while our bodies relax and slow down as we sleep, our brains are still crackling and fizzing away all night. As we sleep, our brains show distinct stages of sleep. During some of these, our brainwaves are deep and slow, sometimes fast and furious. But why? And what effect does all this nocturnal activity have on our waking lives?

Sleep and memory

If you've ever missed a night's sleep, you probably noticed that it's harder to remember things. But why? The hippocampus – the region in the brain that's essential for forming, organising and storing memory – is much less active when you learn something when you're tired.

But if lack of sleep messes with memory, the benefits of good sleep on making and saving new memories are astonishing. Learning to ride a bike or play the piano? These skills improve dramatically after a night's sleep. Dr Lewis describes a test in which people were given a sequence of numbered buttons to press (like tapping out a long PIN number). They practised until they couldn't do it any faster, then were tested again 12 hours later. If the 12 hours were all spent awake, their performance didn't improve. However, if it included a night's sleep, they could tap out the sequence up to 20 per cent faster. So what happens in sleep that boosts memories? While you're in deep sleep, the brain moves memories from the short-term storage of the hippocampus to the long-term storage of the prefrontal cortex at the front of the brain, behind the forehead. But that's not all. Dr Lewis explains, "There is strong evidence that sleep provides a sort of spring cleaning for the brain." It works like this – during the day our brains take in a lot of information, so brain cells are constantly firing and creating new connections between different parts of the brain. These link the sights, smells, tastes etc, of everything we come across.

> "PEOPLE WHO WERE DEPRIVED OF SLEEP FOR 53 HOURS WERE SIGNIFICANTLY SLOWER TO MAKE MORAL JUDGEMENTS"

Unfortunately, many of these new connections are irrelevant stuff we don't really need (imagine a cluttered wardrobe full of clothes you never wear). And this 'clutter' of networks makes it harder for us to access the stuff we do need.

Scientists now know that as we sleep, our brains are busy sorting through this mess and getting rid of the connections we don't need. Just as sorting out a wardrobe makes it easier and faster to find a useful outfit, this decluttering of the brain helps to strengthen the most vital connections and boost our important memories.

The brain can be amazingly specific in the areas it tidies up during sleep. For example, if we repeat a physical task for hours during the day (say, playing a specific tune on the piano) this will create tons of new connections in the part of the brain that controls ➤

that activity. Scans show that during sleep that night, this same area will experience more 'housekeeping' activity. Conversely, if your arm is immobilised in a sling, so your body doesn't get much information from it, the part of the brain that controls that arm will show less 'slow-wave' activity at night.

Sleep is vital for memory in other ways too. It appears the hippocampus replays the day's activities as we sleep. Indeed, sleepwalkers literally get up and repeat what they have done during the day. While deep sleep improves memory of facts and skills, REM – or rapid eye movement sleep – increases your ability to make connections between facts. This is especially important for creativity. Dr Lewis notes, "Sleep-deprived people come up with fewer original ideas."

REM also controls the storage of emotional memories but makes us much more likely to remember negative, sad or frightening ones. Scientists aren't sure how, but it seems to be something connected to the way the brain's emotion centres and memory centres synchronise their electrical impulses during REM sleep. If we read something upsetting just before we go to sleep, we are more likely to recall the details and for it to affect us emotionally than if we read it in the morning.

We can, to a certain extent, control sleep's effect on our memory. For example, we are more likely to remember things overnight if we know we are going to be tested on them the following day. So consider setting yourself a test of information that you will need, or help children studying for exams or learning lines for a play, by telling them you'll test them in the morning.

It can also help to study or practise something, then immediately take a short afternoon nap – even a six-minute snooze can improve memory. If we sleep later in the day when we are tired, we plunge quickly into restful slow-wave sleep, which is when our brain is being 'spring cleaned' and important memories preserved. But if we'd like to remember something particularly emotional, take your nap in the morning when your non-tired brain will take you almost immediately into lively REM sleep.

> "MOST OF OUR DREAMS HAVE SETTINGS THAT REFLECT OUR WAKING LIVES, BUT AROUND 70% WILL ALSO INCLUDE A THREATENING SITUATION"

Though we aren't aware of it, our senses are still active as we sleep, and they are a potent way to trigger memories. If you study while smelling a rose scent, then have that fragrance wafted at you during deep sleep, you are more likely to remember what you've learnt – although just sprinkling it on your pillow won't work, as our senses shut out new perfumes after a short time of smelling them.

Sound can also help improve memory and learning. If certain sounds are played during a task and then repeated during deep sleep, it can help fix memories. Listening to music during deep sleep can also help musicians learn new tunes, even if they have no conscious memory of hearing anything.

Why do we dream?

You might be surprised to know you dream all night long, in every phase of sleep. Most of our dreams have settings that reflect our waking lives, and include a mishmash of memories from the previous day. But around 70 per cent will also include a threatening situation. If we are under real-life threat – such as living in a war zone – that proportion gets even higher. This may be because dreams developed to help us plan how to protect ourselves if we are in danger. Dreams can also help us regulate our mood. In her book, Dr Lewis reveals how divorced women who dream about their ex-husbands a lot tend to adapt better to their divorce.

Dreams can even affect our bodies. Dr Lewis says, "People who were deprived of water before they slept but then drank in their dreams were reported to feel less thirsty when they woke up. Our dreams are so creative and innovative, they are likely to be useful for creativity, insight and problem solving."

However, dreams themselves don't seem to improve our memories or help us learn, largely because we don't remember most of them. This is because when we sleep, the part of the brain that stores memories becomes 'disconnected' from the part that generates sensation. It's as if the TV has become unplugged from the DVD, so the show is playing but it's not being recorded.

How does lack of sleep affect us?

Surprisingly perhaps, logic and IQ test scores are barely affected, even after two nights of missed sleep. But that's not to say lack of sleep is harmless. Here are some different ways that tiredness can impact on our brain function.

Attention and focus

If you need to really concentrate, get an early night. Dr Lewis says, "After 20 hours awake, your driving performance is as impaired as if you had exceeded the legal alcohol limit." In new mothers, this muddle-headedness is dubbed 'baby brain'. But the evidence is that it's lack of sleep, not hormones, that makes them do odd things, like walk out of the house leaving the front door open and the key in the lock...

Tired people, she adds, are also "worse at guessing what smells are, and less likely to notice sour tastes. There are subtle problems with hearing – people have trouble telling which of two tones came first." Lack of sleep also affects vision, with more attention given to things on their right hand side. Why? It turns out that the parts of our brain responsible for processing our senses and maintaining attention are less active when we have skimped on sleep.

Emotions

Lack of sleep makes it harder for us to control our impulses, act positively, feel good about ourselves and even empathise with other people. In children it can create or worsen ADHD symptoms. An unsurprising new study from the University of California in Berkeley has shown that couples "experience more frequent and severe conflicts after sleepless nights". Without enough sleep, people felt less loving and misjudged each other's expressions, intentions and emotion. This comes as no surprise to Dr Lewis, who writes, "Sleep-deprived people are more easily frustrated, intolerant, self-absorbed, unforgiving and uncaring than they would be if they were properly rested." These effects are not minor. If people are tested for mood disorders on a sleep-deprived day, these changes may, according to Dr Lewis, tip "perfectly normal people over the edge so... they could be classified as depressed – or even as psychopaths."

> "AFTER 20 HOURS AWAKE, YOUR DRIVING PERFORMANCE IS AS IMPAIRED AS IF YOU HAD EXCEEDED THE LEGAL ALCOHOL LIMIT"

How does depression affect sleep?

Depressed people typically have low levels of a neurotransmitter called serotonin, which reduces levels of the 'wake-up' neurotransmitter acetylcholine. Too much acetylcholine can cause insomnia or trap the brain in long periods of REM sleep, which as we know preserves upsetting memories, and stops us falling into the slow-wave sleep that makes us feel rested and restored. The result?

Depressed people sleep badly, wake up exhausted and feel even unhappier. Their daytime tiredness also affects memory, making them forget good, happy or useful information and events while remembering unhappy, frightening or miserable ones. It's a vicious circle.

However there is hope. Antidepressants known as SSRIs, or selective serotonin reuptake inhibitors, boost serotonin levels and seem to improve sleep too. You can also increase serotonin by taking exercise, practising yoga and meditation, and by eating food that contains the building blocks for serotonin, such as chicken, seafood, fish, eggs and soy products.

Why do we sleep less as we get older?

As newborns we need to sleep up to 18 hours a day. By adulthood, around seven to eight hours is perfect. But after the age of 60 ➤

it's normal to sleep only five to six hours. Meanwhile, our lovely slow-wave sleep starts to decline. By the age of 74 many people have no slow-wave sleep at all, which may be why our memories tend to fail as we age. As to why, well, nobody really knows, but it may be linked to the gradual shrinkage of the brain.

Also, strong, natural blue light sets healthy sleep wake cycles by entering the eye via the pupil, triggering the sleep-regulating hormone melatonin. As we age, our pupils shrink and the lens of our eye becomes yellower, so it's as if we are wearing permanent sunglasses. This means less light penetrates the eye, so we don't make as much melatonin. Women can also suffer from lack of sleep during the menopause. Oestrogen keeps serotonin levels high, which reduces levels of acetylcholine. But when oestrogen levels fall, women often wake up more often in the night and get less deep sleep.

Can sleeping on a problem really help us to solve it?

Dr Lewis writes, "Sleeping on a problem may turn out to be one of the most proactive ways you could possibly try to solve it." Experiments in problem solving have shown people are more likely to notice shortcuts to the right answers after they've slept and that a 90-minute nap helped people solve word puzzles. It seems the more efficient connections forged in sleep helped people see problems more clearly – or by taking away a lot of the wood, enabled them to see the trees.

As for marital rows, we've seen these are often triggered by tiredness, which makes us unreasonable. By sleeping on the problem, you may well find by morning it simply doesn't exist. ✻

Supercharge your sleep

There are many ways to help us sleep better, no matter what our genetic programming. Apart from the obvious – don't drink espressos after 3pm, don't drink lots of alcohol or stay up until 3am playing video games on brightly lit screens – try some of the following...

Take a bath before bed. This is not just to relax you, but cooling the body helps to trigger sleep, and the best way to ensure cooling is to get warmed up first! A hot footbath can be used as a substitute for a full bath.

Heating the skin on your stomach or chest may help you fall asleep more quickly. A hot water bottle should do the trick.

Just do it. Most of us don't get enough sleep. But if we go to bed earlier, it's likely that we will fall asleep, and so get the sleep we need, deserve, and let's face it, enjoy.

When you wake up, set your sleep cycle by getting a few minutes of bright natural light on your face as soon as you can and for at least 30 minutes. Even a cloudy day is many, many times brighter than an artificially lit room.

Eat for sleep. Try chamomile tea, almonds, tuna, banana, milk or low-fat cheese (high-fat meals keep us awake), wholewheat bread, nuts or seeds.

Thinkstockphotos.com, Image Source

For even more fascinating sleep facts, log on to candis.co.uk/sleep.