**Why lack of sleep makes us emotionally distracted by everything**



By **Jessica Hamzelou, New Scientist, 25/09/2015**

Even brain scans show I’m touchy *(Image: Gary Houlder/Getty)*

Dark puffy eyes, a feeling of deep exhaustion, and a foul mood to match – we’ve all experienced the side effects of a [lack of sleep](https://www.newscientist.com/article/mg21829130-100-why-teenagers-really-do-need-an-extra-hour-in-bed). It’s no wonder that sleep-deprivation has been used as a method of torture.

Our brains seem to lose the ability to distinguish between the innocuous and emotional in such circumstances, turning us into overreacting, exhausted wrecks.

We all know that a good night’s sleep is vital for a day of clear thinking, but exactly [why sleep is so important](https://www.newscientist.com/round-up/instant-expert-sleep/)remains a mystery. [Talma Hendler](http://socsci.tau.ac.il/psy-eng/index.php/staff/faculty/38-talma-handler) of Tel Aviv University in Israel is particularly interested in how lack of sleep leaves us with a short emotional fuse. “We know that sleep affects our emotional behaviour, but we don’t know how,” she says.

To investigate further, Hendler and her colleagues kept 18 adults awake all night. “It took a great effort,” she says. “During the night, we repeatedly measured their sleepiness, and unsurprisingly they got more and more tired.”

The volunteers were put through two rounds of tests while their brains were scanned, both the day after a good night’s sleep and after being awake for 24 hours. In one test, volunteers were asked to give the direction in which yellow dots moved on a screen. In each case, the dots were laid over a potentially distracting picture that was either positively emotional (of a kitten or a couple in love, for example), negatively emotional (such as a mutilated body or a snake) or neutral (such as a cow or spoon).

When the volunteers were well-rested, they were quickest and best at telling the direction of movement when the background image was neutral. But after a night without sleep, their performance was equally bad whether neutral or emotional images were used.

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That might simply be because a sleepless night universally impairs judgement, but it’s also possible that the result hints at something more subtle – that lack of sleep makes neutral images suddenly provoke an emotional response, says Hendler.

## Scanning the detail

To probe the link in more detail, her team conducted a similar experiment in an fMRI scanner, which is used to measure activity in different areas of the brain.

Inside the scanner, volunteers were again shown potentially distracting neutral and emotional images while they tried to complete a task – and again, sleep-deprived people found all images distracting, whereas the non-sleep-deprived were only distracted by emotional images.

Moreover, a region of the brain called the amygdala, which is known to play a part in emotion, fired up in response only to emotional images when the volunteers had had a good night’s sleep. But when they were sleep-deprived, it reacted to neutral images in the same way as emotional ones.

The team also found unusual activity in a frontal part of the brain called the [anterior cingulate cortex (ACC)](https://www.newscientist.com/article/dn4377-first-flush-of-love-not-emotional), which is thought to regulate the amygdala and our emotions. In well-rested people, the two brain regions fired together. But they seemed out of sync when the volunteers were sleep-deprived, with the ACC tending not to fire when the amygdala did. As a result, this part of the brain doesn’t seem as able to control our emotional responses when we don’t get enough sleep, says Hendler.

Together, the experiments suggest that when we’re sleep-deprived we tend to see normal, everyday situations as particularly worthy of our attention, says Hendler. “You lose neutrality,” she says. “The ability of the brain to tell what’s important is compromised – it’s as if everything is important.”

There is one obvious way to protect yourself from the effects of sleep loss: try to get enough shut-eye. Hendler thinks people might also be able to strengthen the connection between the ACC and amygdala using [neurofeedback](https://www.newscientist.com/article/mg19225755-000-tame-your-brain-to-keep-your-cool)– a technique that uses brain-monitoring technology to allow people to record and watch their own brain activity and attempt to control it.

But [Mary Carskadon](https://vivo.brown.edu/display/mcarskad) at Brown University in Providence, Rhode Island, isn’t sold on the idea. “Despite wishes some have to the contrary, we all need sleep,” she says. “I don’t want to stimulate the activity between my amygdala and frontal cortex – I want to get plenty of sleep.”

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