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The Power of Coloured Noise

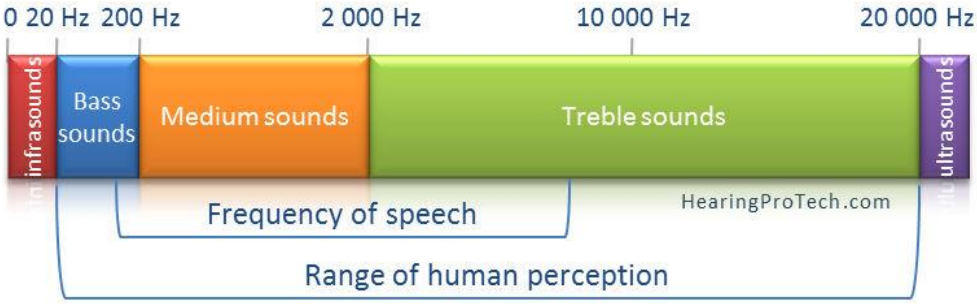
What is the science behind sound frequencies and how can we use them in our day to day lives?

What do you do when you can't sleep? Personally, I listen to Radiohead or a podcast of rain sounds. I found that Radiohead's album 'Kid A MNESIA' and a few other tracks from different albums helped me to relax so efficiently that I started to listen to them to help me drift off to sleep. I then began to wonder how listening to music and white noise can assist with falling asleep.

Listening to music or coloured noise is a solution many turn to when they find themselves tossing and turning. By blocking out noise distractions and disconnecting from day-to-day stressors like social media, we can start to develop healthy sleeping routines.

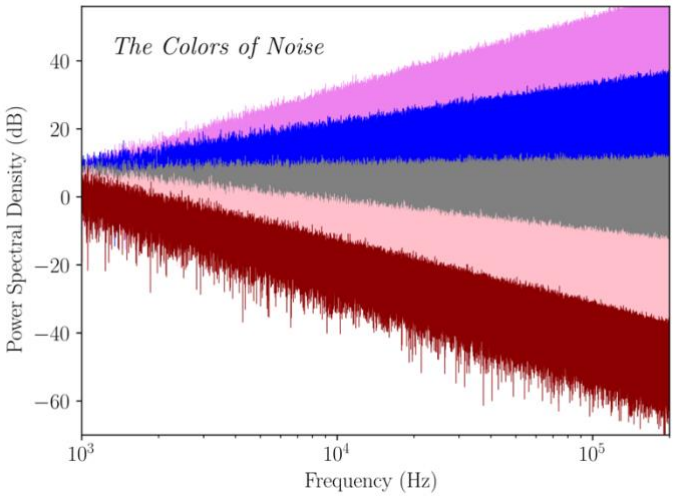
What is coloured noise?

Known alternatively as sonic hues, coloured noise is a scientific term whereby a colour relates to a different frequency of noise. The most popular 'coloured' noise is white, but pink and brown are other hot contenders when it comes to what is best for a restful night. Noises are named after the colour which is mirrored on the electromagnetic spectrum. In other words, the frequency of a sound tells you the sonic hue.



White noise contains all audible sound frequencies on the spectrum (20 – 20,000 Hertz (Hz)). Examples of white noise include: heavy rain, waterfalls, whirring of fans, television or radio static, hoovers or hair dryers.

Pink noise also contains all the audible frequencies on the spectrum but sounds much richer. It emphasises the lower frequencies and reduces the power of higher frequencies.
Pink noise includes: waves, heartbeats, steady heavy rain, wind rustling leaves.



Brown noise is not named after a colour but in fact Robert Brown, a botanist who discovered "Brownian Motion" which describes the random movement of particles

in water. Brown noise can also be referred to as red noise which is the colour of its frequency on the spectrum. Brown noise creates a deeper sound than pink noise, heavy on the bass in lower frequencies.
Examples of brown noise include: rumbling thunder, airplane jet hums, gentle rainfall

The reason why these sounds are able to help us sleep is because they create a consistent 'mask' to other sounds. White and pink produce more static and hissing sounds whereas brown is smoother and calmer.

Putting it into practice
"I am pink noise's biggest fan," claims Amisha Pattni, a 20-year-old student from London who suffers from sleep related issues and found that pink noise was the only thing that could help her.

"I started off using white noise but now I use pink noise, occasionally brown but mostly pink. My sleep problems started as soon as I got to university in my first year. I had a feeling it was coming as it runs in the family.

"I tried everything the NHS recommends: a healthy balanced diet, drinking more water, meditation, chamomile tea, lavender sleep spray, cutting out caffeine, yoga. I did so much.

"One of my flatmates offered me melatonin tablets which worked but I was groggy and tired the next day.

"I had Cognitive Behavioural Therapy through my university which didn't work. It taught me about sensory routines which trained my senses to feel like you're ready to sleep, like taking hot showers before bed. But it wasn't good long term.

"Now I don't use any of that, just hot showers and pink noise. Its brilliant; say out of 100 times there's only two or three times where I haven't fallen asleep in minutes."

How does it work?
"We treat music as a medicine" said Laura Avonius, founder, CEO and CTO of Audicin, a start-up established in 2022 who create immersive music packages made of different frequencies, binaural beats and audio specialisation.

"We put two frequencies that are close to each other, one to the left ear and one to right ear.

"It activates the intended brainwaves. We can decide what state we want to create in the human mind and body, and we take the frequencies that create that."

Binaural beats interpret sounds created by your brain. If you listen to two tones which are both of different frequency in each ear, your brain will process the difference between the two to create a third additional tone, the binaural beat, which is what you hear.

For example, if you listen to one frequency of 200 Hz and the other of 220 Hz, the binaural beat you hear is 20 Hz. The frequency difference between the two tones must be more than 40 Hz in order to work. By altering and mixing frequencies, you can create differing states in

the brain, a process that is called brain entrainment; combined with audio specialisation the audio experience feels natural. Brain entrainment works by naturally pairing and synchronising brainwaves through external stimuli such as music, strobe/flickering lights or altering sound frequencies to create a desired mental state. The stimuli provoke a reaction from the brain which aligns with the correlating brainwaves.

Laura said she uses Audicin and binaural beats all the time, "I use it every chance I get when I'm not on a call or talking to people. When I do work with emails, presentations and applications. I use it in the gym and when I go for walks. It has many possibilities."

Audicin is in the process of making specially curated sleep packages. "When we go into insomnia treatments, we will need even lower frequencies. Our frequencies at the moment are optimised for relaxation which is of course important for sleep. We have users who use it just for that."

But this is nothing new…

Brain entrainment has been around for centuries, dating back to the Bronze Age and was also used by the Ancient Greeks.

People in the Bronze Age used 'ceremonial chambers' to activate a modified mental state. The chambers were caves acoustically tuned to certain brainwave frequencies. The Ancient Greeks built spinning wheels which flickered sunlight through them in a particular way to alter brainwaves.

Brain entrainment places the brain in a comfortable state but it is not advised for those who suffer from seizures, or are pregnant. Those under the age of 26 are advised to take precaution as the brain is still developing.

Sleep playlist

Here are some music recommendations for a good night's rest, including some personal favourites:

In Rainbows, Radiohead
Kid A, Radiohead
Kid A MNESIA, Radiohead
Sleep, Max Richter
Somnium, Robert Rich
Steve Roach – an ambient sleep music composer

Although listening to music and sound frequencies may involve being on your phone for a moment, you can start playing what you want to listen to, either aloud or using headphones, and place your phone away from your bed to prevent from potentially being distracted. An alternative is to use a CD player if the temptation of using your phone is difficult to refrain from. The choice of what works best for you is down to trial and error. If you find music too distracting you could attempt brown noise and so on; it is a completely personal experience.