

Music intervention and mindfulness reduces the effect of mental fatigue

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Mental fatigue is a psychobiological state caused by prolonged periods

of demanding cognitive activity which results in slower reaction times and attention deficits. It affects the ability to focus and impacts the capacity to make optimal decisions during a given task. Mental fatigue is often responsible for accidents in traffic or the workplace and can lead to poor study efficiency. We know that mindfulness has been shown to have a positive effect on stress-coping and cognitive performance. There is also accumulating evidence suggesting that listening to binaural beats may increase sustained attention. Binaural beats are an auditory illusion which have been framed as a class of cognitive and neural entrainment (Kirk et al., 2019). Even though there are different tones of different frequencies (165Hz in the left and 179 Hz in the right) presented in each ear the participant will hear one tone, which is the amalgamated difference between the two tones (beta range of 14 Hz).

In a new study, Johanne L. Axelsen (SDU), Ulrich Kirk (SDU) and Walter Staiano (University of Valencia) test the efficacy of binaural beats compared to mindfulness as a cognitive recovery strategy to counteract the negative effect of [mental fatigue](#) on sustained attention. The study also tests whether the mindfulness interventions will show an effect for the on-the-spot novice group or for the experienced mindfulness group, who have practiced mindfulness for 4 weeks in an online-based mindfulness program through the app Headspace.

There were five phases of the study. In the initial phase the participants' mood were assessed (BRUMS) and they completed a sustained attention [task](#) to measure their mind wandering (SART). The second phase consisted of the mental fatigue treatment for 90 minutes (AX-CPT). Immediately afterwards, the participants' mood was assessed again, and the two on-the-spot interventions followed: either listening to a guided mindfulness meditation track for 12 min. or an audio track (with binaural beats) for 12 min. The control group was asked to relax for 12 min. After this the effects of the interventions were tested using the sustained attention task.

The results showed that there was indeed an effect of on-the-spot binaural beats on sustained attention while in a state of experimentally induced mental fatigue. Interestingly, the experienced mindfulness group performed significantly better than the rest of the groups on the sustained attention task already before the mental fatigue was induced. Furthermore, the group's performance was better than that of the novice mindfulness group and the [control group](#) after the mental fatigue was induced.

The results, and results from previous work by Kirk et al. (2019), indicate that binaural beats may help suppress mind-wandering and sharpening of attentional focus, which in turn reduces the negative effect of mental fatigue. The individual might feel more relaxed and less affected by mental fatigue after listening to the music.

The same goes for the experienced mindfulness group, their mindfulness training already showed on the first task where they performed better than the rest of the groups. This could indicate that practicing mindfulness helps you focus on the task at hand and is effective in offering strategies to handling stressful situations and economizing of mental energy.

Therefore, the study demonstrates that just 12 minutes of binaural beats and 4 weeks of mindfulness training were effective recovery strategies to counteract the negative effects of mental [fatigue](#) on sustained attention.

The researchers are currently investigating whether listening to binaural beats for a longer period or practicing [mindfulness](#) will improve stressed individuals' heart rate variability (HRV) and if this has an effect on performance in specific cognitive tasks.

More information: Johanne Lundager Axelsen et al, On-the-Spot

Binaural Beats and Mindfulness Reduces the Effect of Mental Fatigue, *Journal of Cognitive Enhancement* (2020). [DOI: 10.1007/s41465-019-00162-3](https://doi.org/10.1007/s41465-019-00162-3)

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