

Science for Environment Policy

Long-term exposure to railway noise linked to reduced cognitive performance

Residents living near a busy railway line in Strasbourg were found by researchers to have reduced cognitive function compared to residents in quieter areas, which may be the result of long-term exposure to night-time noise. Psychological tests suggested that they had not adapted to the noise over the years, and they did not become less affected with time.

Rising noise levels across Europe are an increasing environmental concern as more people are exposed to chronic traffic [noise](#). Exposure to traffic noise, especially at night, can cause stress and annoyance and has been linked with several health problems including heart disease and diabetes.

In this study, researchers examined the effects of long-term exposure of railway noise. In particular, they investigated whether individuals exposed to railway noise in the long term can become used to the noise and are therefore less affected by noisy nights.

Forty volunteers from the city of Strasbourg, France, took part in the study. The volunteers were made up of two subgroups; those in the first group lived near a railway track and experienced an average noise level of 39 decibels as a result of 25-30 freight trains passing in the night. These individuals had been living with such conditions for an average of approximately 11 years. The second group was made up of individuals that lived in quiet areas, only experiencing noise levels of 31 decibels, who had also lived in the same area for around 11 years.

To assess whether individuals that had experienced long-term exposure were better able to cope with noisy nights, all participants spent three nights in a specially designed laboratory. The first night allowed volunteers to familiarise themselves with the room. The second and the third night were either silent (as a control condition) or disturbed by the noise of 30 freight trains passing, emitted through loud speakers in the room (as the noise condition).

During the day, participants were tested on alertness and attention, and also underwent an 'electroencephalograph' test, which measures the electrical activity on the scalp and can give a measure of sleepiness.

The results indicated that, following the disturbed night in the laboratory, individuals who lived in noisy environments at home had slower reaction times, increased lapses in attention, and greater sleepiness throughout the day, compared to those who lived in quiet environments. This was probably due to the enhanced 'diurnal cerebral slow wave' activity which characterises sleep pressure.

This suggests that individuals experiencing long-term exposure do not adapt, but in fact suffer a chronic sleep debt. This adds to the evidence of other studies that have reported impaired cognitive performance in children living near airports. However, the researchers do caution that the number of people who took part in this study was rather low and there is no absolute guarantee that the two groups did not differ in some important influential factor on cognition other than noise exposure.



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