

Green earplugs

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Through the window, you hear the traffic noise from down the street, a train rumbles in the distance—that is the everyday life for many of us. Almost 75% of the European population lives in urban areas and only a quarter in rural areas. Noise pollution from cars, trains and planes poses a health problem that should not be underestimated. According to the World Health Organization (WHO), increased noise pollution leads to

numerous negative effects on health, from stress and sleep disturbances to cardiovascular diseases and diabetes.

But how can these negative effects of noise pollution in densely populated, urban regions be reduced, and are there ways of influencing the subjective perception of noise? Empa researchers led by Beat Schäffer of the Acoustics/Noise Reduction lab, together with experts from the Swiss Federal Office for the Environment (FOEN), the Swiss Tropical and Public Health Institute and the University of Basel, have discovered that this works. A view out of the window into the countryside can significantly reduce the perceived noise pollution. Whether it's a nearby park, a pond or the mountain range on the horizon: a view into nature, and the noise will disturb us less.

Green lets us relax

For their study, the research team used the so-called NDVI (Normalized Difference Vegetation Index), which is calculated on the basis of remote sensing data and documents the entire green space of a specific region—from individual groups of trees at roadsides to large parks. The research group also used data from Swisstopo. All parks and gardens are listed there, as well as other green areas such as agricultural zones and forests. The team then compared the data from Swisstopo and the NDVI with the results of the SIRENE study to find out how noise perception changes among inhabitants of [urban areas](#). In 2019, this study with around 5600 participants provided information on [noise pollution](#) from road, rail and air [traffic noise](#). By comparing the data on green spaces in Switzerland with the results of the survey, Schäffer and his team were able to determine how recreational areas affect the perception of noise. Conclusion of the study: Parks and green spaces help to reduce the perception of noise caused by road and train noise. The closer the recreation area to one's own home, the lower the subjectively perceived annoyance from noise emissions.

Ineffective against aircraft noise

It is not surprising that green spaces influence our perception of noise. But much more interesting is the result regarding aircraft noise. It's the opposite to cars and trains: The more green spaces we have, the more disturbed we feel by aircraft noise, according to a comparison of the data. According to Schäffer, there are various reasons for this. "While we can escape from road or train noise by walking a little distance, we cannot do the same with aircraft noise." We are almost helplessly at the mercy of airborne noise, because we cannot escape the noise by a few meters distance. This "being at the mercy of the noise" may lead us to perceive the noise as more disturbing. A second point is the so-called incongruity: "In a park, we expect it to be quiet. If this silence is then disturbed by something that we cannot influence, we perceive this noise as far more disturbing," says Schäffer. For example, we hardly notice an airplane in the sky when we walk around a bustling city.

List of criteria

In a next step, the researchers want to look even further into the psychological and especially physiological aspects of [noise](#) and include other factors. A recently launched Sinergia study by the Swiss National Science Foundation (SNSF) called RESTORE is being developed in collaboration with the Swiss Federal Institute for Forest, Snow and Landscape Research (WSL) and is scheduled to last four years. The team wants to analyze in more detail what effect [green spaces](#) have on physiological stress and what criteria local recreation areas must meet in order for residents to recover from stress. The aim is to apply these findings to urban planning in the future—especially in densely populated urban areas.

More information: Beat Schäffer et al. Residential green is associated

with reduced annoyance to road traffic and railway noise but increased annoyance to aircraft noise exposure, *Environment International* (2020).
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