

Exposure to everyday noise influences heart rate variability

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(Medical Xpress)—Exposure to noise, for example from road traffic, may adversely affect the cardiovascular system. Until now, underlying mechanisms linking noise to elevated cardiovascular risk have rarely been explored in epidemiological studies. Scientists of Helmholtz Zentrum München have now shown that exposure to noise during everyday life influences heart rate variability, i.e. the ability of the heart to adjust the rate at which it beats to acute events. The results were published in the journal *Environmental Health Perspectives*.

The association between [noise exposure](#), particularly high noise levels, and cardiovascular disease is known from previous studies. Ute Kraus and colleagues of the Environmental Risks research group led by Dr. Alexandra Schneider at the Institute of Epidemiology II (EPI II) at Helmholtz Zentrum München have now studied the effects of exposure to our everyday background noise. Their findings: Exposure to this noise also poses health risks.

The scientists analyzed data from participants in the population-based KORA study. 110 participants were equipped with portable ECG devices that recorded their [heart rate](#) in repeated measurements over a period of approximately six hours, and individual noise levels were also recorded. The noise exposure were classified into two ranges (above and below a threshold of 65 dB), and the corresponding heart rates and/or the [heart rate variability](#) (HRV) were analyzed. The HRV describes the adaptability of the cardiovascular system to acute events and is regulated by the [autonomic nervous system](#), which consists of nerve groups of the

so-called sympathetic and parasympathetic system. An activation of the sympathetic system and a decrease in parasympathetic activity result in reduced HRV. A low HRV represents a risk factor for cardiovascular disease.

The results of the study show that HRV was reduced in association with increases of 5 dB in noise exposure at both the higher and lower noise level ranges. "The study showed that not only higher noise levels have a stressful effect and are harmful to health, but that lower noise levels can cause adverse health effects, too," said Professor Annette Peters, director of the EPI II. "We are currently studying the sources of noise from the everyday environment. It would also be interesting to repeat the study on younger participants and conduct sensitivity analyses as well as measurements of other health parameters, such as blood pressure." Since the average age of this study population was 61 years, these results might not be generalizable to other study populations.

Environmental and lifestyle factors contribute significantly to the development of widespread diseases in Germany, such as cardiovascular disease and diabetes mellitus. The aim of Helmholtz Zentrum München is to develop new approaches for the diagnosis, treatment and prevention of common chronic diseases.

More information: Kraus, U. et al. (2013), Individual Day-Time Noise Exposure during Routine Activities and Heart Rate Variability in Adults: A Repeated Measures Study, *Environmental Health Perspectives*, Volume 121, Number 5, 607 - 612. ehp.niehs.nih.gov/1205606/

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