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Title:

Evaluation of stress in response to traffic noise using virtual reality

Authors:

André Kruh-Elendt

Christian Laufs

Andreas Herweg

Jonas Heck, Janina Fels, IHTA (Institute of Hearing Technology Acoustics/RWTH Aachen)

Moritz Lippold, Christoph Klanten, RHA (Reicher Hasse Assoziierte)

Abstract:

Traffic noise is one of the biggest environmental factors associated with a wide range of health risks. It is therefore of great importance to assess the impact of environmental noise and take countermeasures at an early stage, for example, during urban planning. This requires reliable predictors for traffic and environmental noise scenarios that are perceived as very unpleasant and stressful for the body.

To ensure a holistic evaluation of the acoustic environment in accordance with the soundscape approach, the study in this paper provides additional context by performing a perceptual evaluation of various traffic scenarios in a virtual reality (VR) environment. Here, physiological measurements, specifically the measurement of heart rate variability (HRV), is used to detect physiological responses to traffic noise.

For the future analysis of various traffic scenarios within the BaLSaM project, the study in this paper determines whether measurements of HRV in VR can indicate an increase in stress response to an increase in traffic noise loudness. This relationship has already been reliably observed in laboratory studies where only acoustic stimuli were presented. The results provide information on the influence of the VR environment on physiological responses and how the experimental design for physiological measurements in VR needs to be adapted.

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