



# Event-related awakenings caused by nocturnal transportation noise

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**Authors:** Marks, A.; Griefahn, B.; Basner, M.

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**Abstract**

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References

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Citations

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Supplementary Data

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Suggestions

The present study focussed on awakenings caused by nocturnal noises emitted from aircraft, road and rail vehicles with maximum levels ranging from 40 to 76 dBA. A laboratory study with 24 participants (12 male, 12 female, 19–28 years) was performed with polysomnographic recordings during 13 nights (including a preceding habituation night). Multivariable random subject effect logistic regression models containing acoustical, situational and individual parameters were used to determine the probability of event-related awakenings for each traffic mode. Awakening probability increased significantly with maximum sound pressure level (SPL), slope of rise (dB/s), noise duration and the noise-free interval between noise events. Gender, noise sensitivity and age did not influence awakening probability significantly (the latter only in a combined model). Awakening probability increased with elapsed time after sleep onset, and was significantly lower during slow wave sleep compared to S2 sleep, but not during REM sleep. After adjusting for differences in study design (acoustical macrostructure), awakening probability decreased in the order rail, road and air traffic noise, but only rail and air traffic noise differed significantly ( $p=0.002$ ). After further adjusting for slope of rise and noise duration (acoustical microstructure), differences between traffic modes decreased, but rail and air traffic noise still differed significantly ( $p=0.044$ ). Acoustical properties other than slope of rise and noise duration may account for the residual difference. The results of this study suggest that the reduction of maximum SPLs, rise slopes, and traffic volume during the second part of the night might reduce the number of noise-induced awakenings.

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