

Summary

Sustained exposure to elevated noise levels is a well-established cause of noise-induced hearing loss (NIHL); historically associated with occupational environments but now increasingly prevalent in recreational settings. In 2015, the World Health Organization (WHO) estimated that 1.1 billion young people worldwide are at risk of hearing damage due to unsafe listening practices (WHO, 2015). The ongoing rise of urbanization has exacerbated noise pollution, particularly from transportation sources such as traffic, railways, and aircraft, now recognized as the second most significant environmental health hazard in Western Europe. While the acute effects of noise exposure on young adults' auditory health remain debated, there are growing concerns about its long-term impact on children's auditory and cognitive development.

This dissertation addresses these critical issues through **two primary objectives**:

1 The **first objective** focuses on the impact of acute high-level noise exposure in young adults, particularly during long-duration music festivals. This research seeks to fill existing gaps in the literature by evaluating different methods for reporting lifetime noise exposure history, identifying early and reliable indicators of NIHL, and incorporating objective sound level measurements. Key findings highlight the challenges in accurately assessing NIHL risk and emphasize the importance of structured questionnaires and critical exposure habits to enhance data validity. Furthermore, this study demonstrated that consistent use of hearing protection is associated with better baseline hearing outcomes, emphasizing the role of attitudes and beliefs in shaping behaviors towards noise exposure and hearing protection.

Individual noise doses measured at music festivals revealed that attendees spent 40% of their time exposed to sound levels exceeding the WHO guideline of 100 dB, 15 min. This led to persistent reductions in the Envelope Following Response consistent with signs of sustained synaptic damage disrupting the neurotransmission between inner hair cells and auditory nerve fibers.

2 The **second objective** explores the effects of chronic environmental noise exposure on children's developing auditory system, providing valuable insights into the potential long-term effects of sustained exposure during early developmental stages. Contrary to initial expectations, children exposed to higher levels of environmental noise showed enhanced abilities in sound-in-noise detection. Furthermore, better (shared) attention and inhibition skills were observed in children residing in areas reporting traffic noise annoyance, which corresponded to higher exposure levels. These findings suggest that varying patterns of noise exposure may bolster the ability to suppress background noise and strengthen attention control, indicating potential advantages in developing inhibitory control skills.

Conclusion

These findings underscore the importance of sustained awareness and timely interventions to prevent hearing damage, highlighting that while some variability in exposure may offer developmental benefits, it is essential to maintain exposure within safe limits and consistently advocate for protective measures to safeguard auditory health across all age groups.

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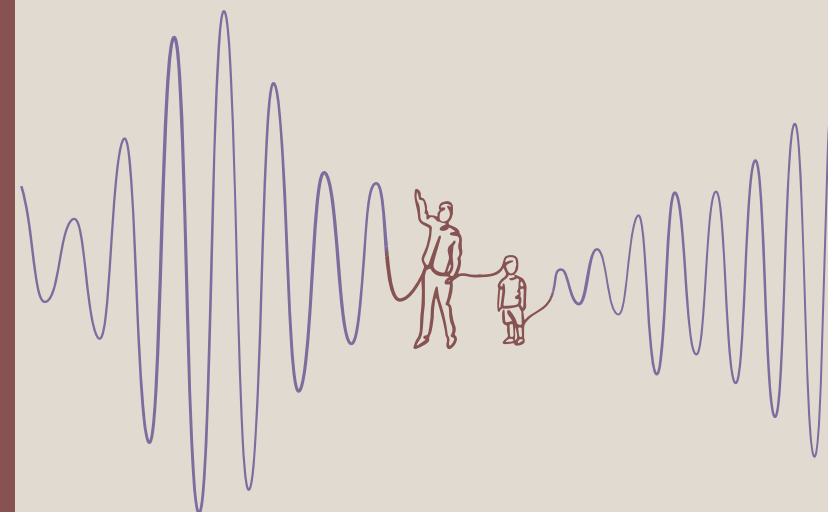
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Exploring the Effects of Noise Exposure



Insights from Young Adults and Children

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