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PSYCHOPHYSICS & MUSIC PERCEPTION

Temporal resolution and pitch discrimination in music education: novel data in children

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Abstract

Background: Rehabilitation of hearing and listening difficulties through neuroplasticity of the auditory nervous system is a promising technique. Evidence of enhanced auditory processing in adult musicians is often not based on clinical auditory processing tests and is lacking in children with musical education.

Purpose: The aim of this study is to investigate the temporal resolution and frequency discrimination elements of auditory processing both in adults and children with musical education and to compare them with those without any musical education.

Methods: Participants consisted of ten children without musical training and ten children with musical training with mean age 11.3 years and range 8-15 years as well as ten adults without musical education and ten adults with musical education with mean age 38.1 years and range 30-45 years. All participants were tested with two temporal resolution tests (GIN:Gaps-In-Noise and RGDT:Random Gap Detection Test), a temporal ordering frequency test (FPT:Frequency Pattern Test), and a frequency discrimination test (DLF: Different Limen for Frequency).**Results:** All test results revealed better performance in both children and adults with musical training for both ears. **Conclusion:** A positive effect of formal music education for specific auditory processing elements in both children and adults is documented. Larger samples, longitudinal studies, as well as groups with impaired hearing and/or auditory processing are needed to further substantiate the effect shown.

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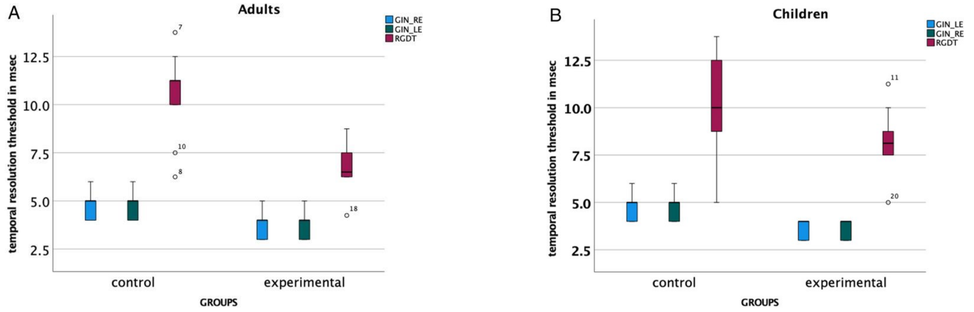
Results

All test results revealed better performance in both children and adults with musical training for both ears. The analysis revealed a statistically significant better performance in the experimental group for the variables of GIN_RE, GIN_LE, FPT_RE, FTP_LE and DLF in comparison to the control group in both children and adults. A statistically significant lower threshold was documented for the RGDT of the experimental as compared to the control group in adults but not in children.



A. Data (mean and standard deviations) of both temporal resolution tests for both groups of adults are plotted for comparison. B. Data (mean and standard deviations) of both temporal resolution tests for both groups of children are plotted for comparison.

Objectives

- to compare a group of children with music education with a control non-training group as well as a group of adults with music education with a control group.
- Comparison of auditory processing will be investigated by the use of clinically available auditory processing tests (GIN, RGDT, and FPT) and one regarding frequency discrimination ability (DLF = Different Limen of Frequency).
- DLF is added to have a more detailed report on frequency discrimination that is known to be highly influenced by exposure to music education.

Conclusion

Results of this study suggest that **music education** provides **a significant benefit in auditory processing** across the life span.
The benefits documented are in **temporal resolution** and **pitch discrimination**.

Larger samples of children with music education as well as groups with impaired hearing and/or auditory processing are needed to verify that music education may be used as a rehabilitation tool for hearing difficulties to improve auditory processing.

Methods and Materials

- Participants: 10 children without musical training, 10 children with musical training with mean age 11.3 years 10 adults without musical education, 10 adults with musical education with mean age 38.1 years.
- All participants were tested with two temporal resolution tests (Gaps-In-Noise and Random Gap Detection Test), a temporal ordering frequency test (Frequency Pattern Test) and a frequency discrimination test (Different Limen for Frequency).

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