



A Domain Specific Hearing-in-Noise Performance is Associated with Absolute Pitch Proficiency

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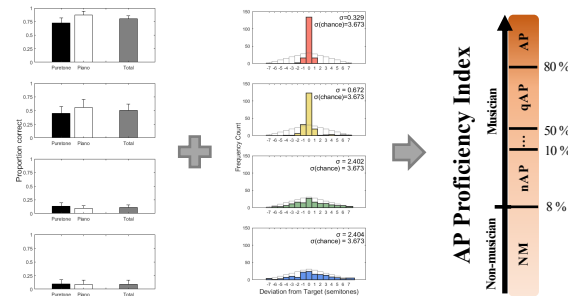
Introduction

Hearing-in-Noise (HIN) is an important issue in our daily life, and difficulties in HIN are commonly observed with aging. Increasing evidence suggests musical training to be related to HIN performance, but these studies seldom distinguish the different degrees of musician's musical aptitude. Here, we investigate a characteristic factor, absolute pitch (AP) ability, to test whether it will affect HIN performance. It is hypothesized that AP proficiency will modulate performance on both Music-in-Noise (MINT) and Speech-in-Noise tasks (SINT).

Methods

Participants

- 42 musicians & 12 non-musicians divided into 4 groups based on AP proficiency level
- Musicians: **AP**, **quasi-AP (qAP)**, **non-AP (nAP)**, and **Non-musicians (NM)**



AP Screening test Pitch Adjustment test

Tasks

- Identify targets embedded in noise with the Signal-to-Noise ratio (SNR) level = 0, -3, -6, -9 dB

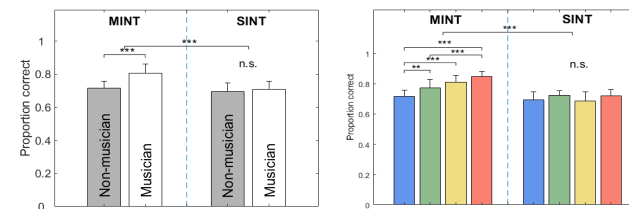
1. MINT

Melodies embedded in multi-music noise, with visual, spatial, and prediction cue subtasks tested for subsequent comparisons.

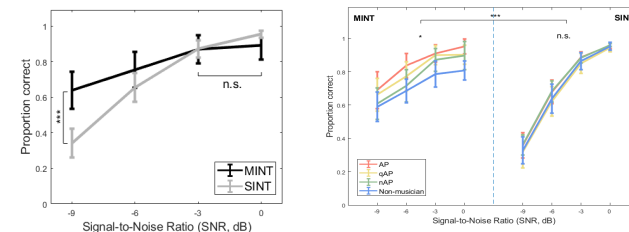
2. SINT

10-word sentences embedded in speech-shaped or babble noise with visual, spatial cue subtasks.

Results

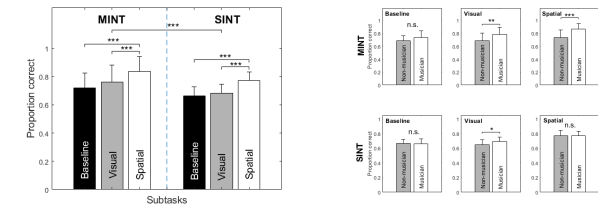


Musicians outperformed non-musicians in identifying music (MINT), but not speech (SINT) targets in noise. Higher AP proficiency was associated with better performance.

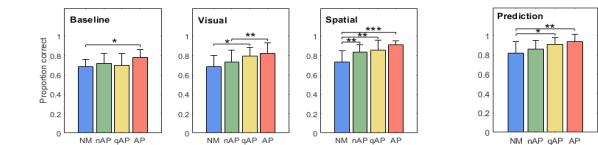


HIN performance declined with increasing SNR level.

MINT performance decreased as a function of SNR levels with higher AP proficiency group less susceptible to the deteriorating effects of noise, but this AP effect was not observed in SINT.



Spatial cue improved HIN performance, while visual cue did not. Musicians could take better advantage of the cues in MINT, while no effects were observed in SINT.



In terms of AP proficiency level, AP applied the cues on MINT most successfully. Furthermore, AP proficiency was also associated with better ability of prediction.

Conclusion

These results show that AP proficiency facilitates performance in MINT but not SINT, suggesting a domain-specific effect on HIN performance. Also, AP listeners exhibit better HIN ability in tough listening situations. Conclusively, AP ability is a crucial factor related to HIN perception.