How does hearing loss contribute to cognitive decline?

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Introduction

Hearing loss in midlife is the strongest risk factor for dementia[1]. A measure linking hearing to cognition could potentially be used to predict dementia.

Auditory Working Memory (AWM) may be a candidate as it is critical for real-life hearing and involves brain structures affected early in dementia.

Aims

1. Explore the relationship between AWM and hearing in 'real-life' i.e. speech-in-noise discrimination (SiND).
2. Identify potential modifiable factors which may affect this relationship.

We hypothesise that our novel tests of AWM are better than conventional tests of working memory in predicting SiND.

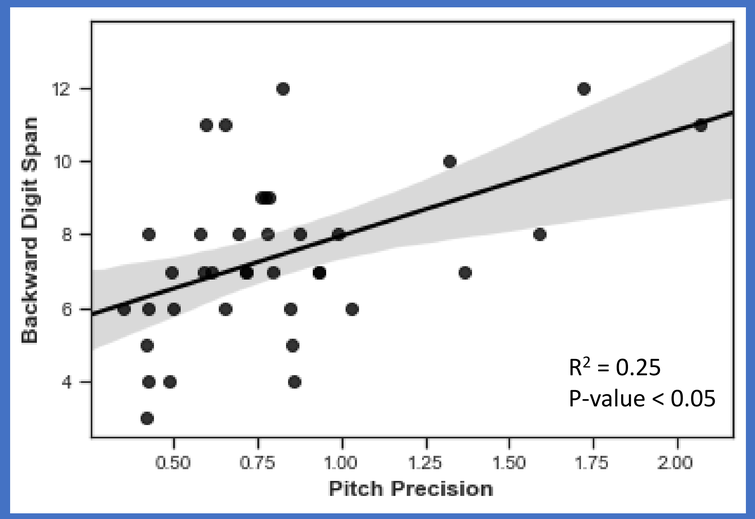
Methods

36 participants performed the following tasks:

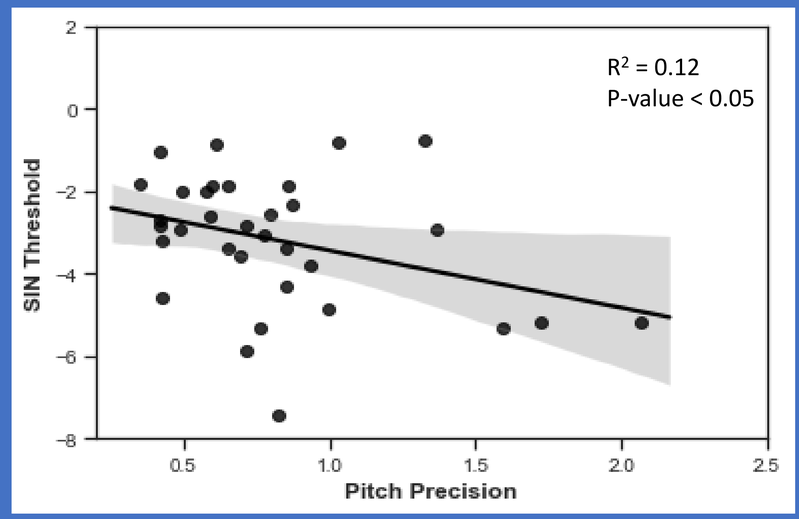
(1) **Pure-tone audiogram** – Conventional test of hearing
(2) **SiND task** – Test mimicking real-life 'hearing'
(3) **Novel AWM tasks** – Sensitive tests using computerised metrics
(4) **Cognitive tasks** – Gold standard clinical measures for working memory, executive function and pre-morbid intelligence.

Results

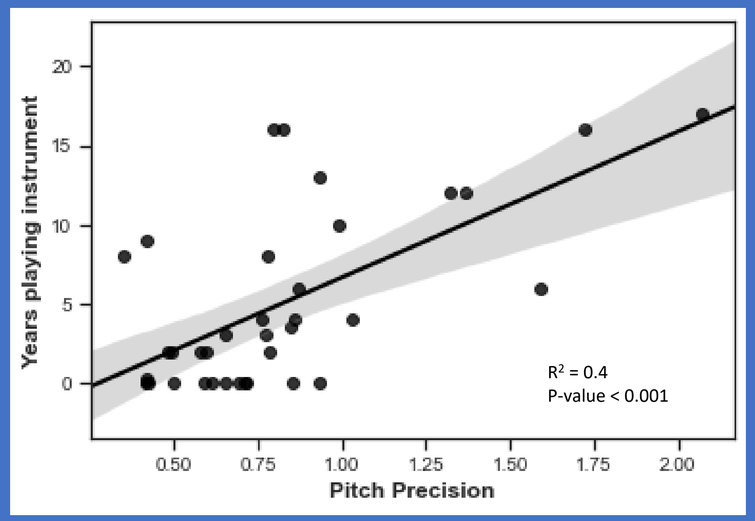
1. Significant relationship between pitch working memory and digit span



2. Significant relationship between pitch working memory and SiND



3. The relationship between musical years and pitch memory



Conclusions

- Computerised measures of AWM correlate with conventional working memory measures.
- Working memory for pitch correlates significantly with SiND when conventional measures do not.
- Playing a musical instrument is a potential modifiable factor to influence working memory for pitch.

Acknowledgements

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1. Livingston G, Sommerlad A, Orgeta V et al. Dementia prevention, intervention, and care. Lancet. 2017;390:2673-734