

Association of self-reported hearing loss and tinnitus with brain structure and cognitive function: a population-based sub-cohort analysis from the Study of Health in Pomerania (SHIP)

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BACKGROUND

Hearing loss is a major and potentially modifiable risk factor for dementia and is frequently accompanied by tinnitus, another prevalent auditory dysfunction.^{1,2} Both conditions have been linked to cognitive decline and brain health^{1,3,4}; however, evidence from large population-based studies remains limited. This study investigated associations of self-reported hearing loss and tinnitus with cognitive performance and brain structure in a large population-based cohort from northeastern Germany.

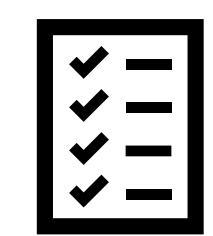
METHODS



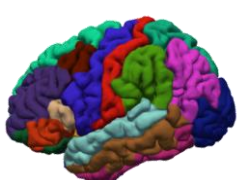
4,420 participants (age 20-84 years, [52±15], 51% females, 12±3 years of education) from the SHIP-TREND cohort³



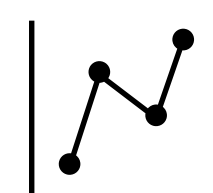
Self-assessment for hearing (N=4,400) and tinnitus (N=3,937)



Assessment of verbal memory (N=3,978) and executive function (N=3,653)



T1-weighted MRI: data on global and regional volumes, cortical thickness, and white matter hypointensity (WMH) volume (N=2,144)



Linear regression and mediation models adjusted for age, sex, and further risk factors for dementia¹

RESULTS

- Hearing loss was reported by 1,455 participants (679 clinically relevant), and tinnitus by 874
- Hearing loss was associated with worse memory performance and unfavorable brain measures, particularly along the central auditory pathway and in regions implicated in cognitive function and AD (Fig.1)

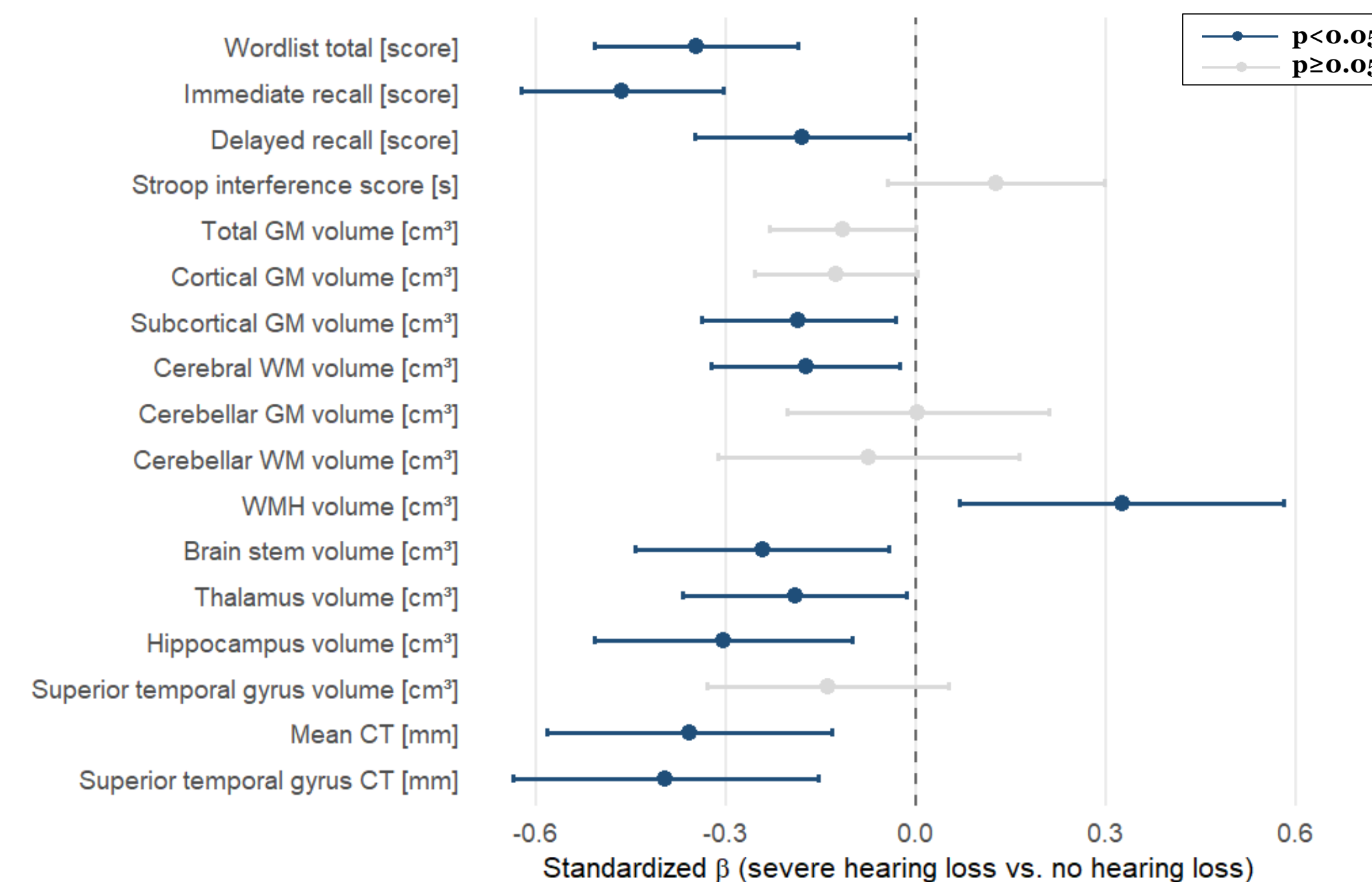


Fig.1: Associations of severe hearing loss with cognitive performance and brain measures.

- WMH volume partially mediated (8.8%) the association of hearing loss with immediate recall performance (Fig.2)
- Hearing loss was associated with tinnitus (p<0.001), but no relevant combined effects on cognitive performance or brain measures were observed, and tinnitus alone was not associated with cognition or adverse brain measures

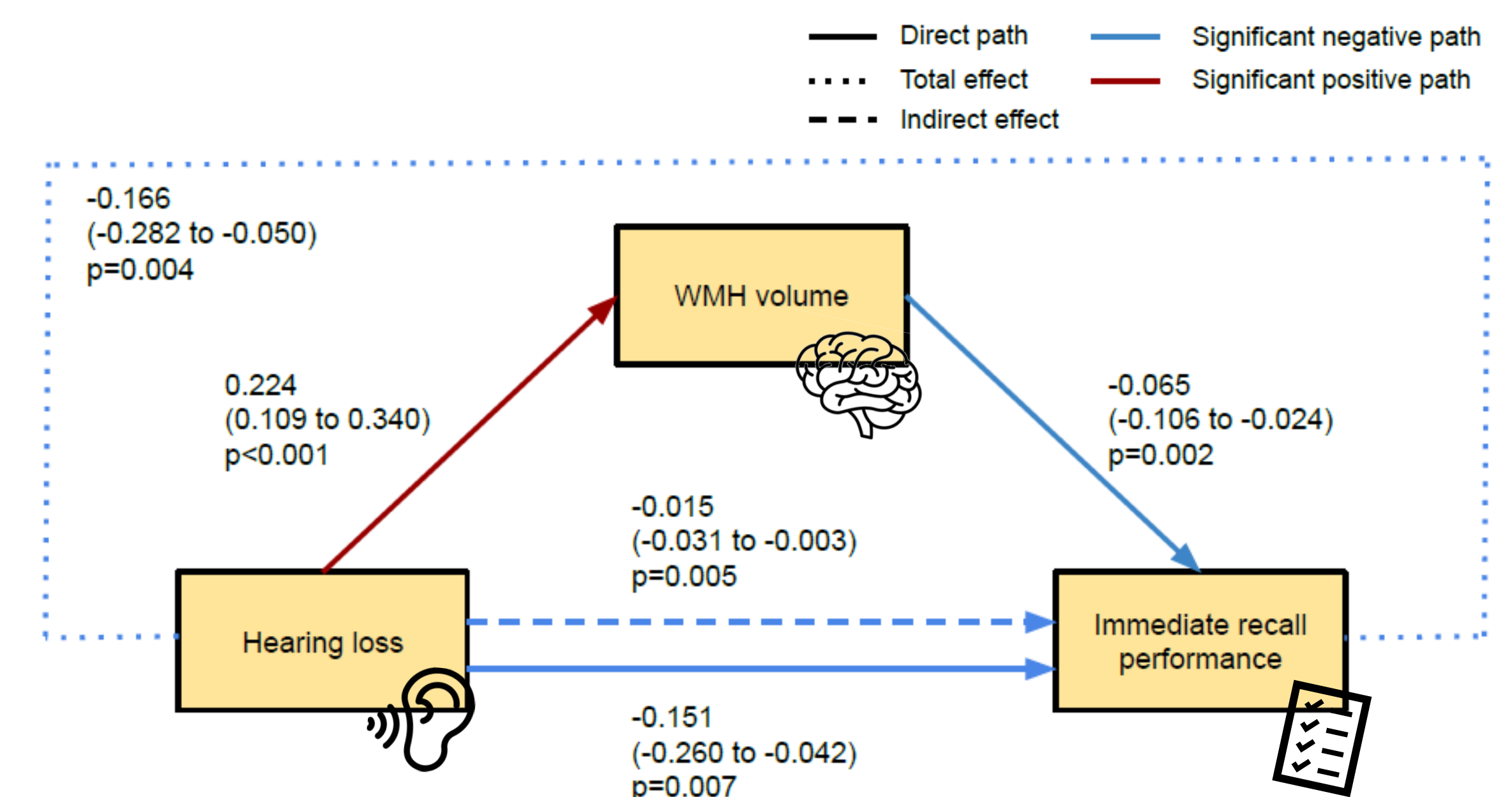


Fig.2: Mediating role of WMH volume on the relationship between hearing loss and memory performance.

CONCLUSIONS

This study confirmed independent associations of self-reported hearing loss with memory performance and structural brain measures; and further suggested a pathophysiologic link between hearing loss and cerebrovascular disease. Our findings support hearing loss—but not tinnitus—as a modifiable contributor to cognitive decline and dementia, highlighting it as a key target for early prevention strategies.

References

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