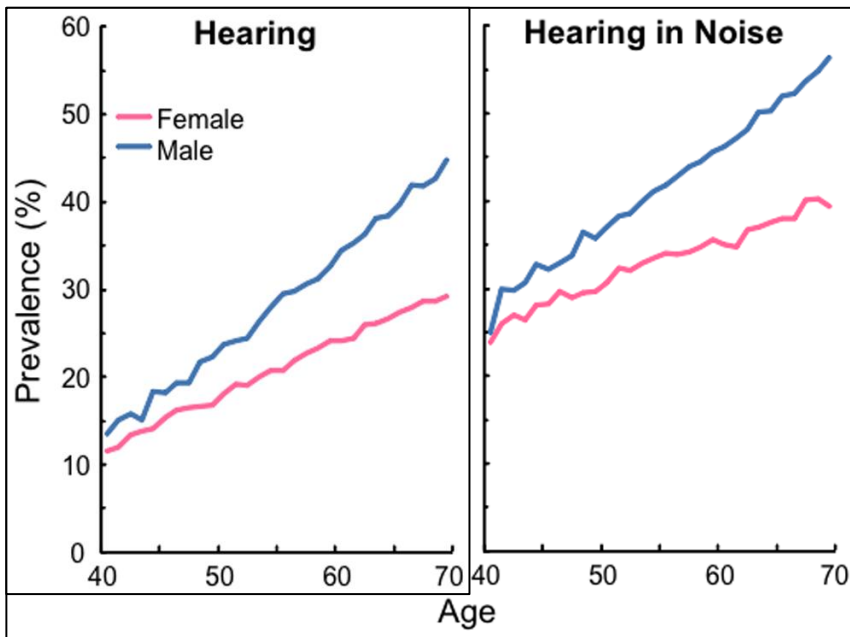
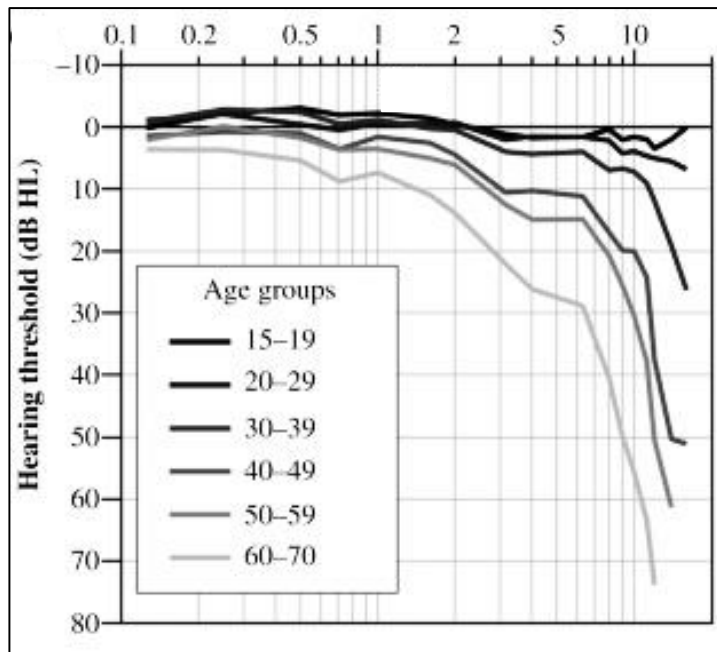
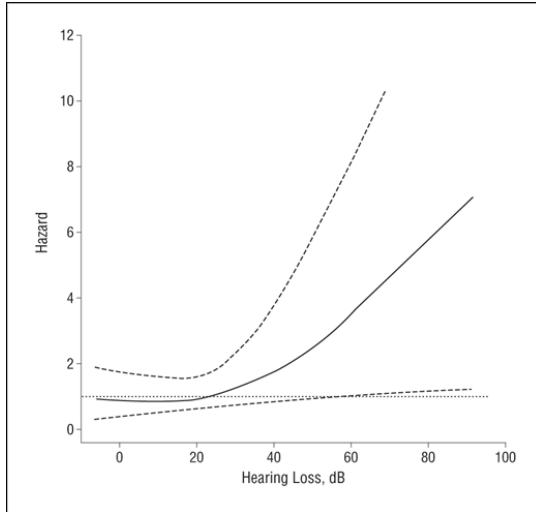


# Hearing Loss and Dementia

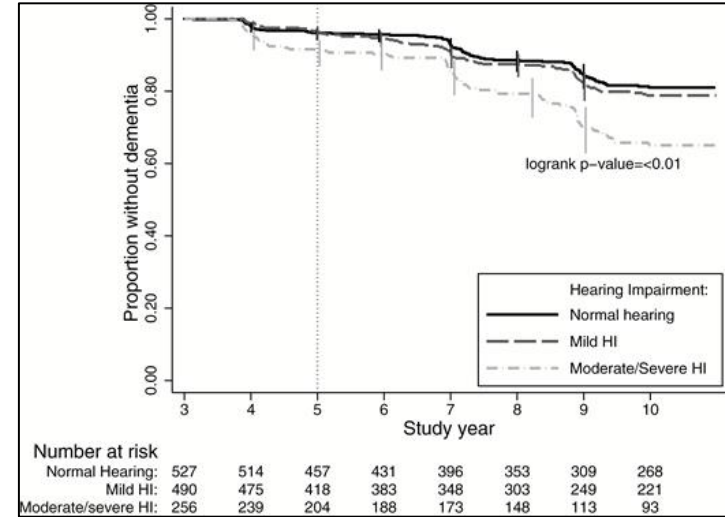
Meher Lad  
MRC Clinical Research Training Fellow  
Newcastle University



Moore et al. PlosONE. 2014



Lin et al. Arch Neurol. 2011



Deal et al. J Geront. 2017

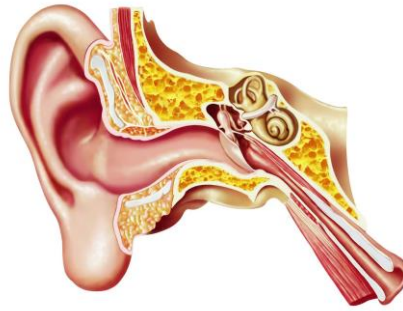
**SOUND**



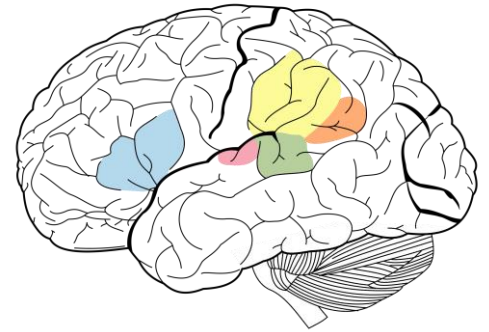
**ENERGY**



**DECODING**



*peripheral*



*central*

Neuron



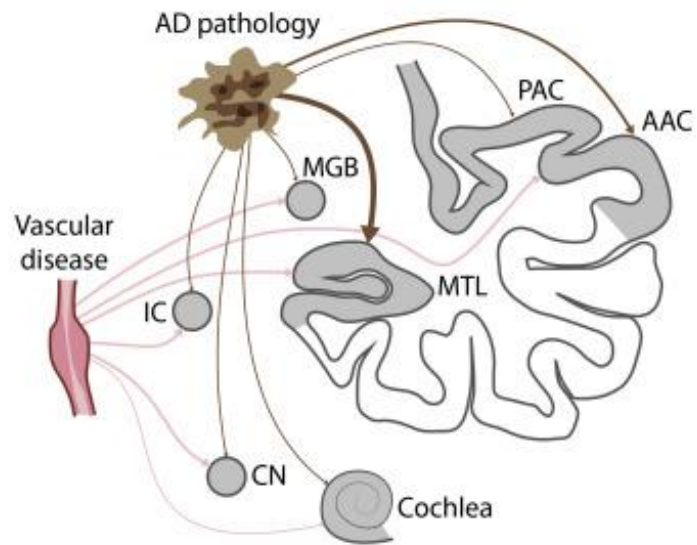
Perspective

## How Can Hearing Loss Cause Dementia?

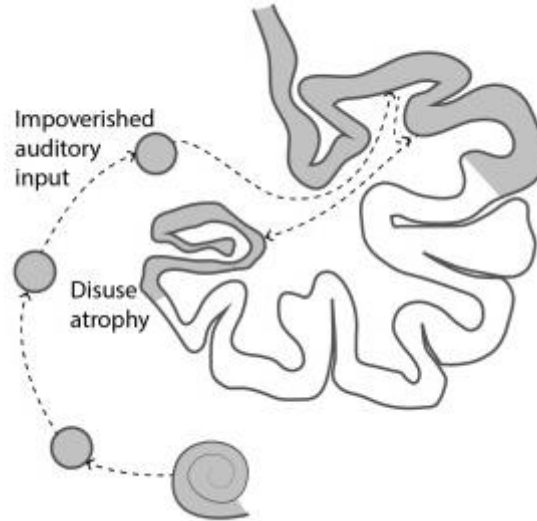
Timothy D. Griffiths,<sup>1,2,3,8,\*</sup> Meher Lad,<sup>1</sup> Sukhbinder Kumar,<sup>1</sup> Emma Holmes,<sup>2</sup> Bob McMurray,<sup>4</sup> Eleanor A. Maguire,<sup>2</sup> Alexander J. Billig,<sup>5,6,7</sup> and William Sedley<sup>1,6,7</sup>

Griffiths et al. Neuron. 2020

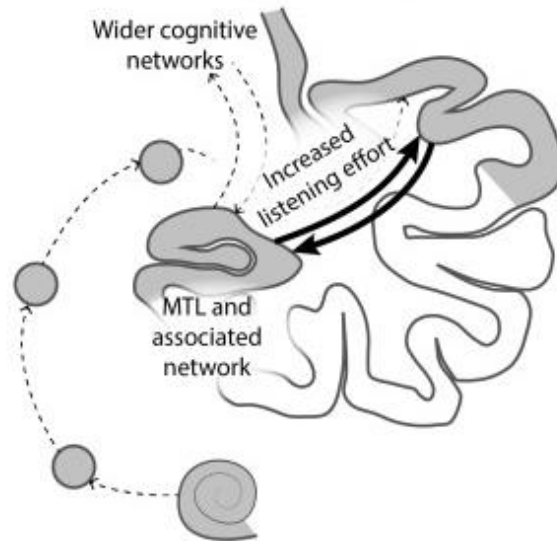
**Mechanism 1: Common pathology**



## Mechanism 2: Impoverished input

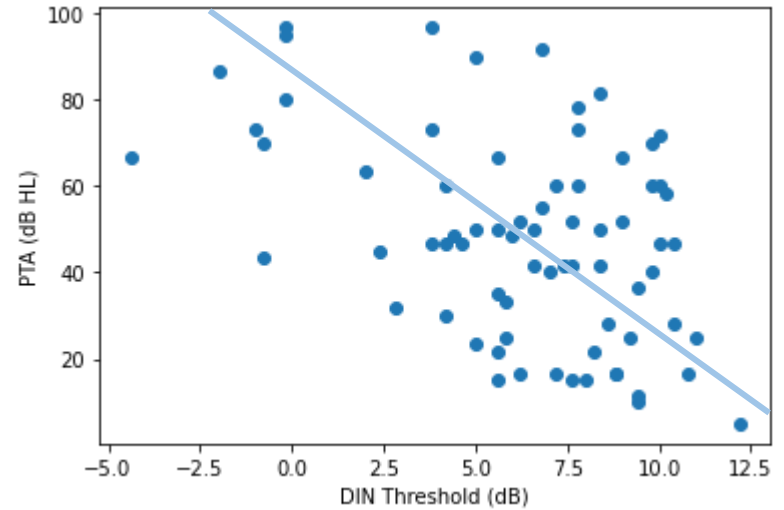
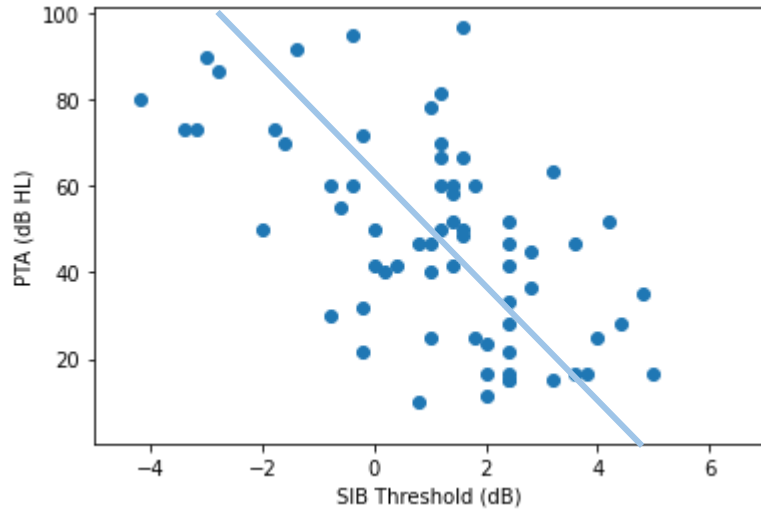


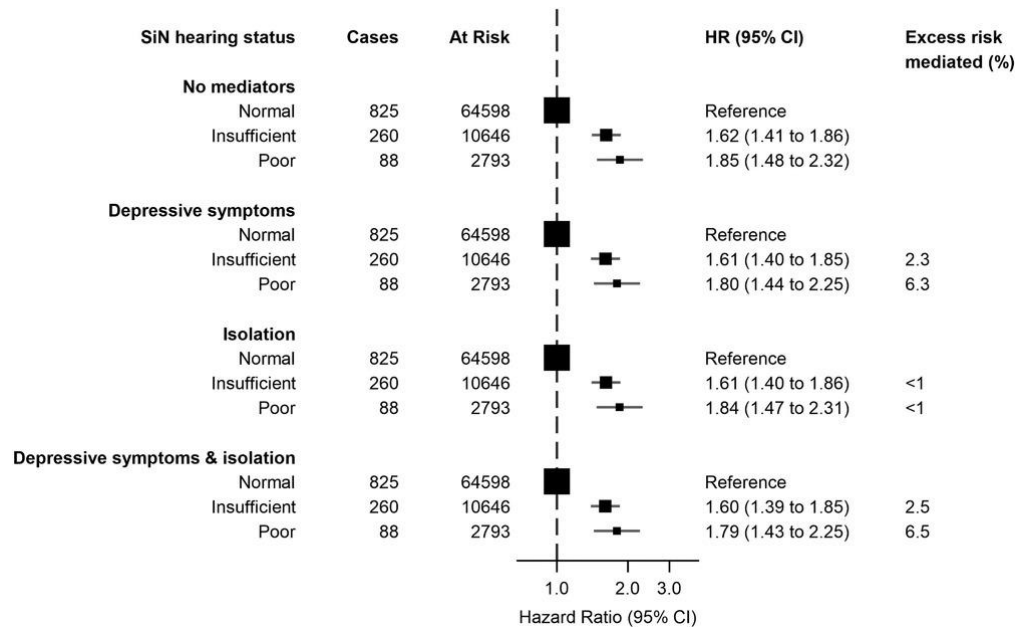
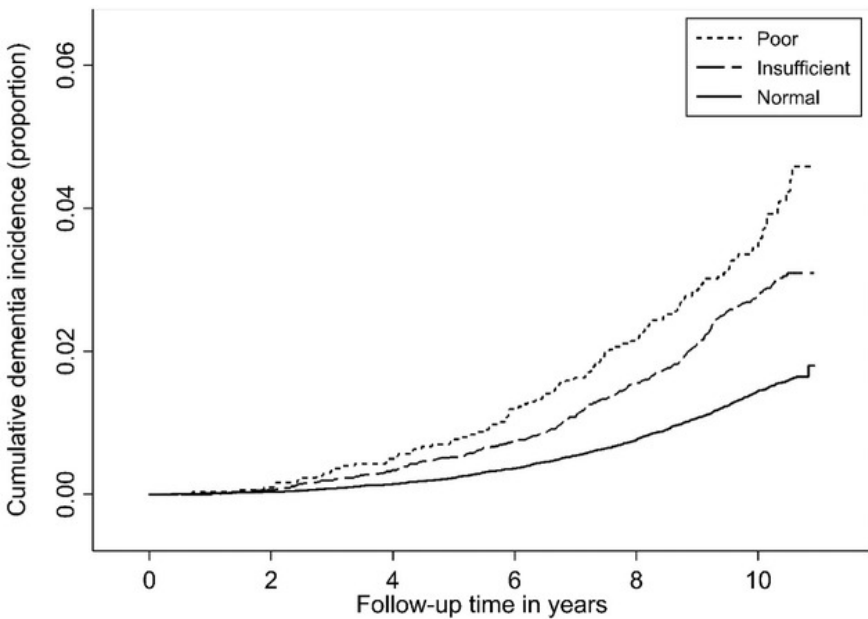
**Mechanism 3:** Occupation of cognitive resources



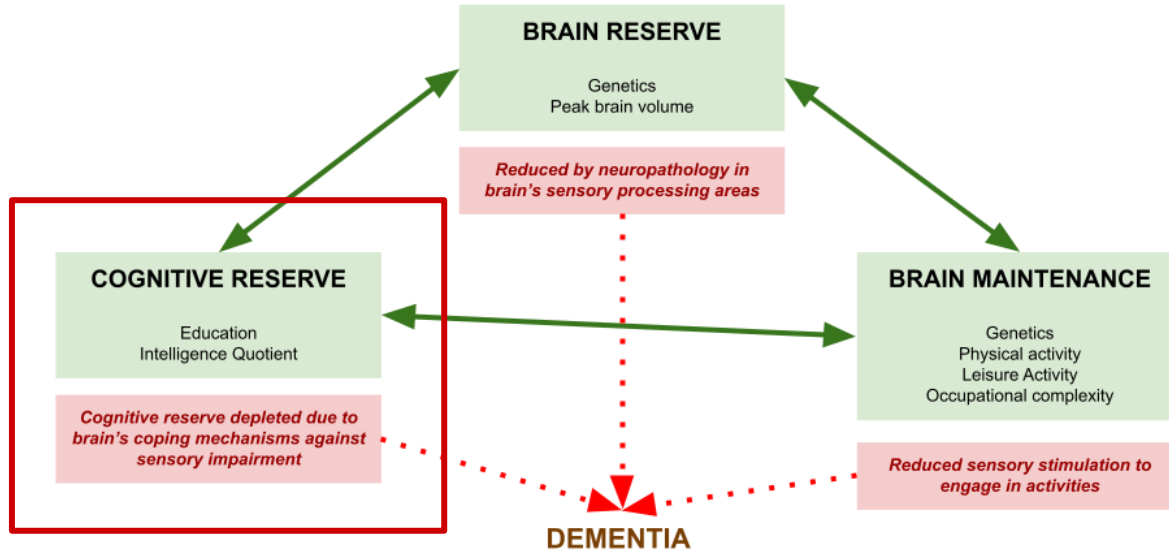


# Peripheral and Central hearing correlate



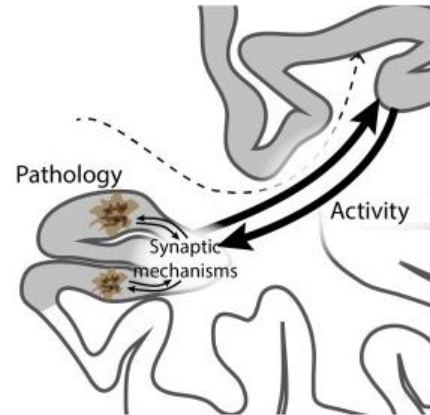


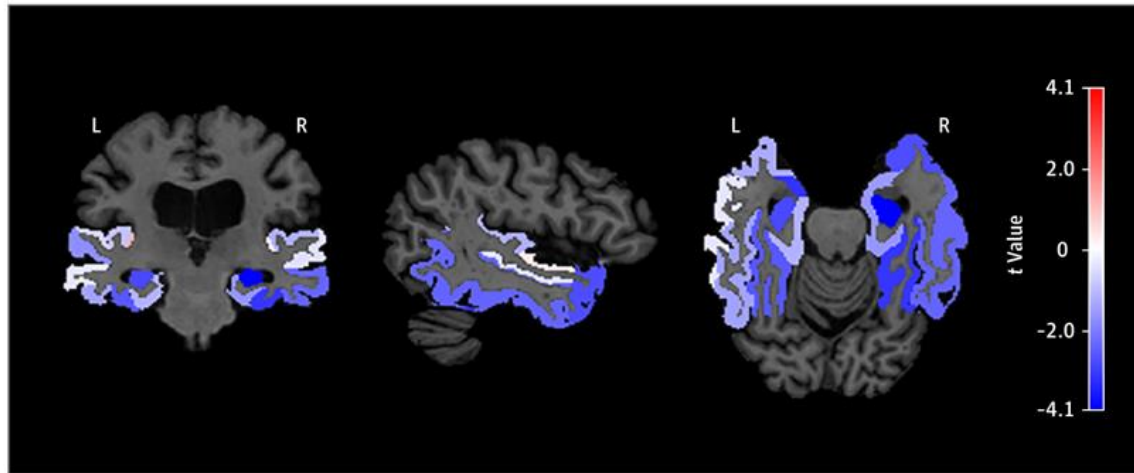
Stevenson et al. Alz Dem. 2021



Lad et al. PsyArXiv. 2022

**Mechanism 4:** Function-pathology interaction





Armstrong et al. JAMA OHNS. 2019

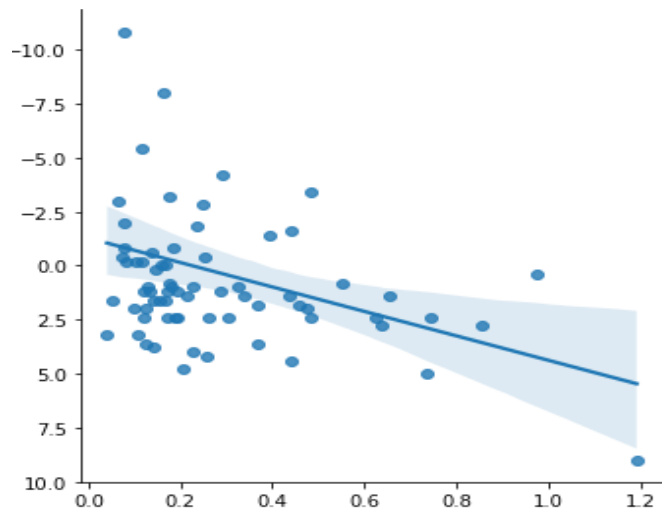
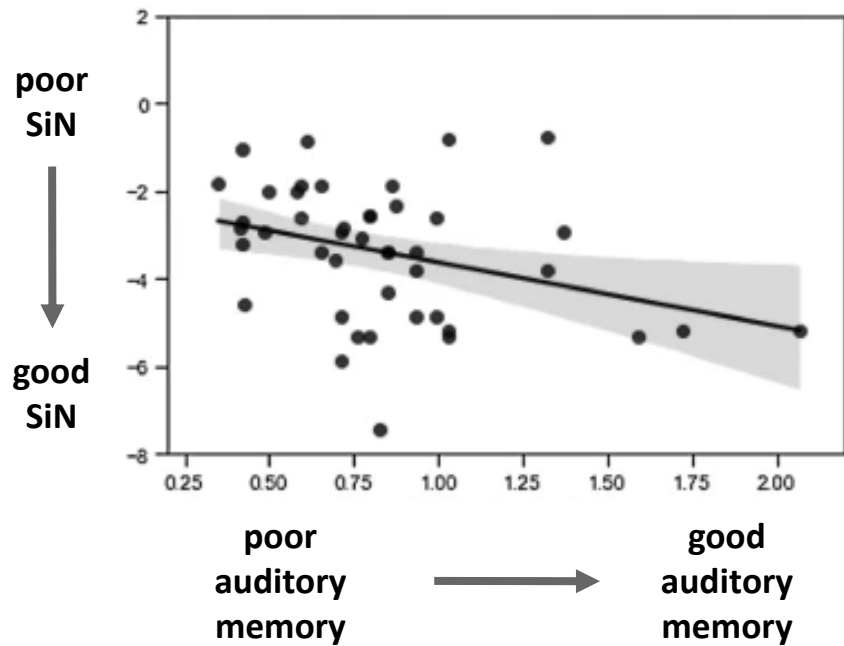
# Links to Alzheimer's disease neurobiology

Sentence in noise perception ability associates with

- Entorhinal cortex, hippocampal structural metrics
- Total tau and phosphorylate

**Tuwaig et al. J Alz Dis. 2017**

Lad et al. Sci Rep. 2020

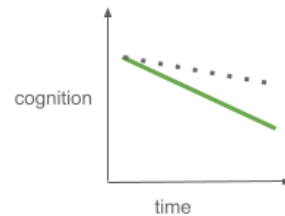
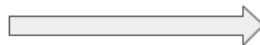


**Will  
Hearing Aids  
help?**

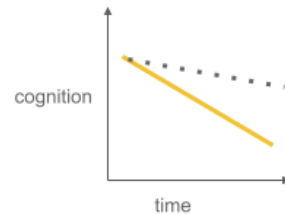
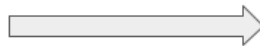


# Other senses

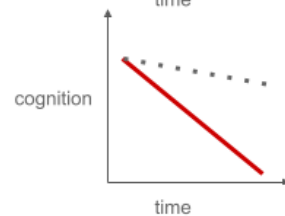
Olfactory impairment



Olfactory impairment +  
Hearing impairment



Olfactory impairment +  
Hearing impairment +  
Visual impairment



Lad et al. PsyArXiv. 2022



## **Sensory Loss and Dementia**

Meher Lad, William Sedley & Tim Griffiths

# Thanks for listening



Medical  
Research  
Council

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**NIHR** | National Institute for  
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