

# Perceptual Restoration of Degraded Speech is Preserved with Advancing Age

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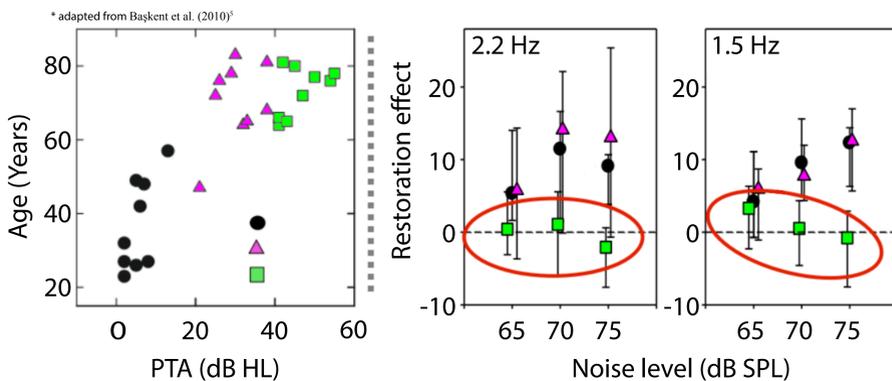


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## Introduction

- Aging comes with cognitive decline in fluid intelligence, but crystallized intelligence can improve or stay the same.<sup>1</sup>
- Perhaps due to age-related decline in fluid intelligence, older people encounter problems with communicating in noisy environments.<sup>2</sup>
- Young normal hearing listeners use a top-down repair mechanism to enhance speech intelligibility, namely phonemic restoration, where they use linguistic knowledge and expectations based on situational and linguistic context.<sup>3,4</sup>
- Older adults with hearing impairment show reduced phonemic restoration.<sup>5</sup>



## Research question

Is the ability to perceptually restore degraded speech reduced due to aging or due to hearing impairment?

## References

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## Acknowledgements

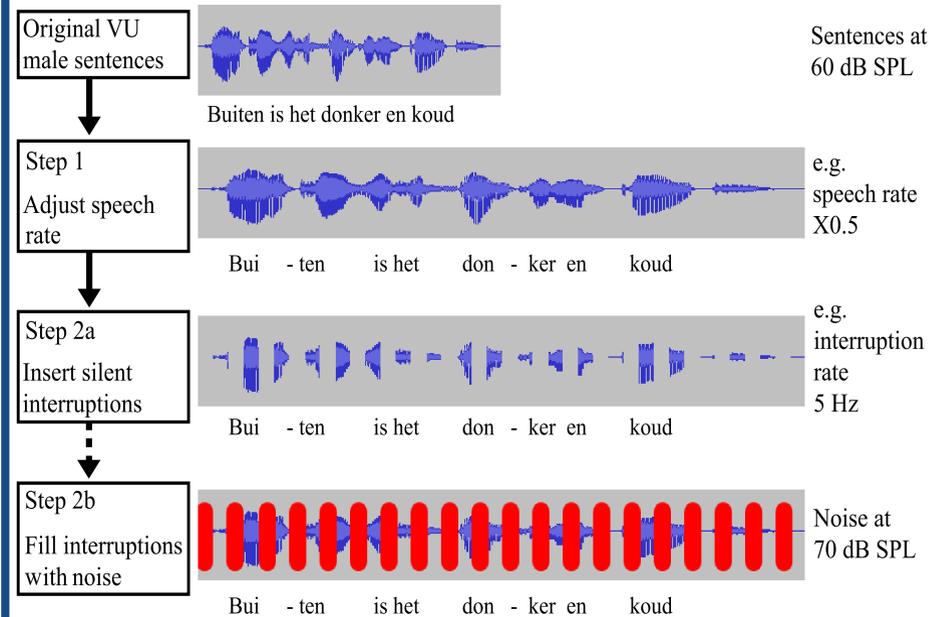
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## Methods

Subjects: All **normal hearing** listeners  
 - Young (<= 26 years, mean = 22 years)  
 - Older (>= 62 years, mean = 66 years)

Stimulus manipulation:

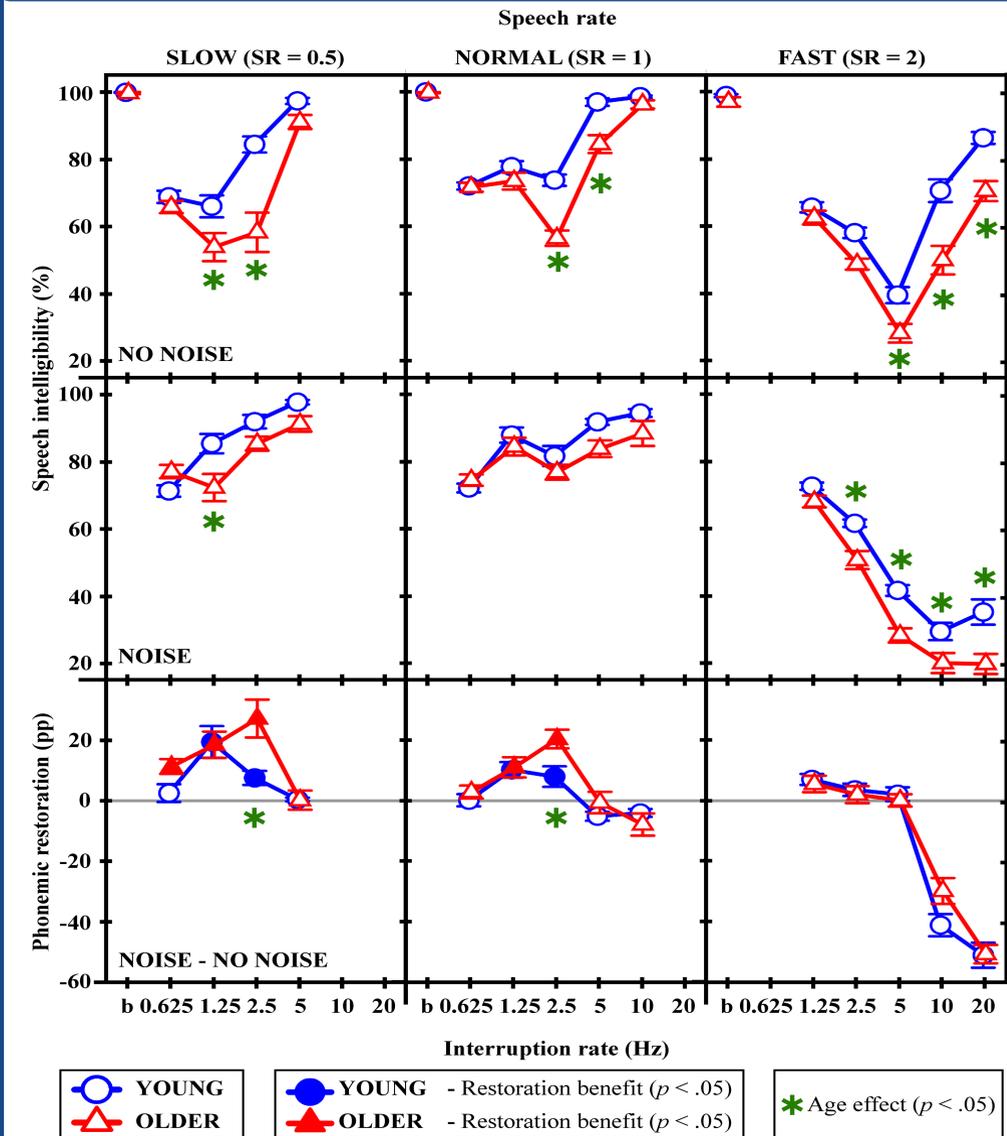
1. Speech rates = slow, normal and fast
2. Interrupted with silence at various rates
3. In half of the conditions, loud noise filled the silent intervals



Measurement:

- Measure speech intelligibility for interrupted sentences with and without noise
- Phonemic restoration is the improvement in intelligibility observed by adding noise to the interruptions

## Results



- The addition of noise to the interruptions increased intelligibility, hence older adults showed reliable restoration effects.
- Older adults showed more restoration than young adults with slowed speech.

## Conclusion

In general:

- Older adults show lower speech intelligibility than young adults.
- However, they are able to use top-down processes to extract cues and restore meaningful sentences when noise is added to the interruptions.
- Older adults might rely on their life-long experience with language, as well as their rich vocabulary accumulated over a long time.<sup>6</sup>

Slow speech:

- Slow speech perhaps gives older adults more time to process the speech, extract its cues and derive its content.
- This might be an indication of age-related cognitive slowing.