

Speech pause and speech rate for evaluating Alzheimer's and Mild Cognitive Impairment: A meta-analysis

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INTRODUCTION

- Automated speech analysis (ASA) offers promising solution for improving reliability, validity, and efficiency in AD/MCI assessment ^{1,2}
- Speech pauses reflect verbal, attentional, working memory, and long-term memory processes
- Pauses are face valid, interpretable as reaction times (milliseconds), and computationally simple to derive

Research Questions:

- Do pauses/speaking rates differ between CHOA and people with MCI/AD?
- Do effects vary by speaking task?

METHODS

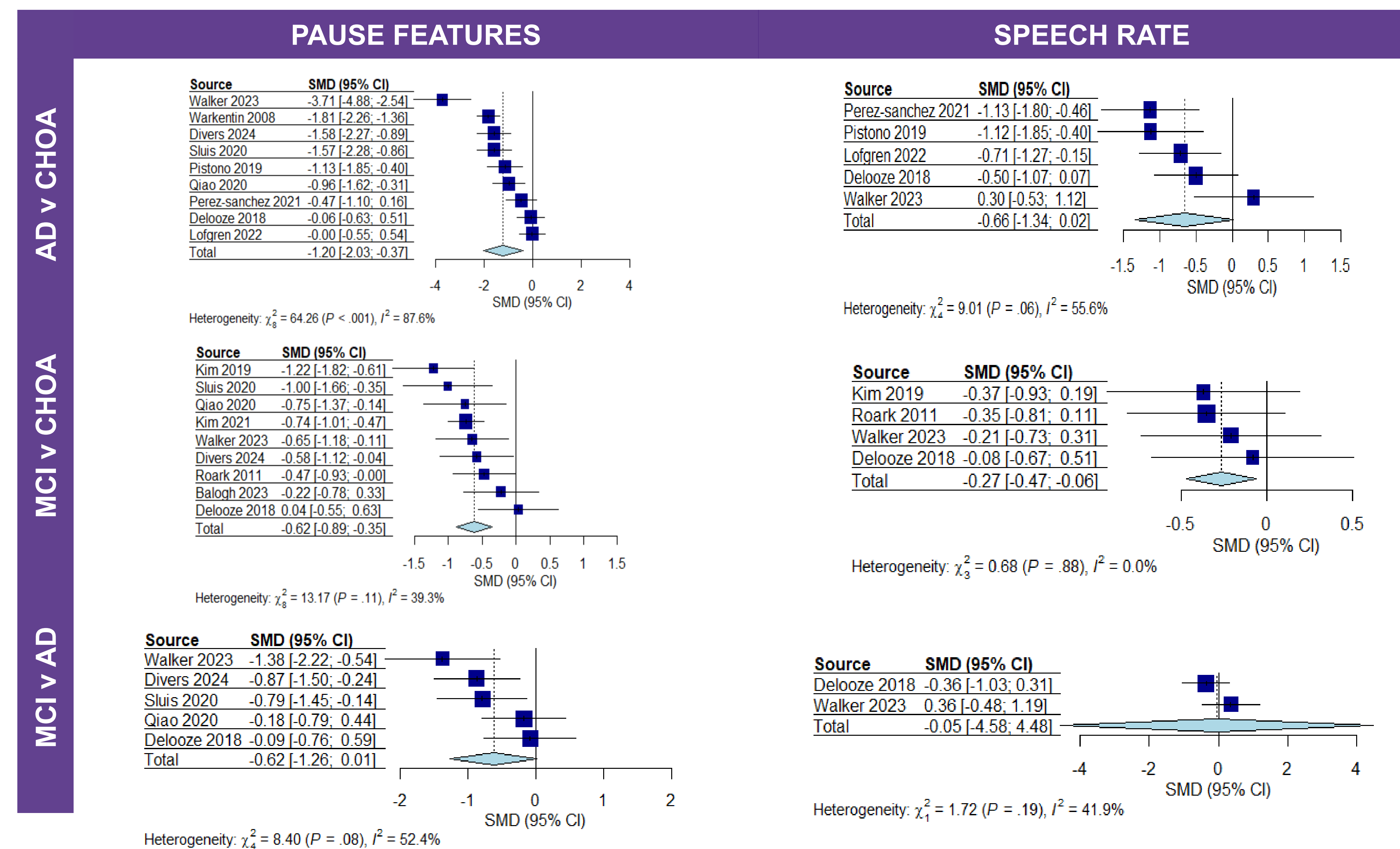
We identified 13 studies comparing with AD/MCI with CHAO groups using pause, or speech rate related metrics:

Sample: 13 pause studies, 8 speech rate studies

- AD: n=170 (pause), n=81 (rate)
- MCI: n=276 (pause), n=109 (rate)
- CHOA: n=492 (pause), n=231 (rate)

Q: Do pauses and speech rate distinguish AD/MCI from healthy aging?

A: YES - Pauses show large effects, speech rate medium effects



Q: Do effects vary by speaking task?

A: NO significant moderation [though underpowered], but . . . memory tasks distinguish groups best

Want to learn more:

Cohen, Alex S., et al. "Speech pause and speech rate for evaluating Alzheimer's and mild cognitive impairment: A meta-analysis." *Journal of the International Neuropsychological Society* (2025): 1-8.

Divers, R., Cohen, A. S., Elvevåg, B., Chandler, C., Turner, R. S., Reynolds, B., & Diaz-Asper, C. (2025). Speech production as an artificial intelligence-based 'process' measure of cognition sensitive to mild cognitive impairment and Alzheimer's disease. *The Clinical Neuropsychologist*, 1-16.

CONCLUSIONS

Pauses are most robust for differentiating AD/MCI from CHOA.

Benefits:

- Face-valid, reaction time measure
- Socio-cognitive links
- Computationally simple
- Widely applicable across tasks/platforms

Largest effects: interactive, memory-based tasks (Walker et al., 2023).

Limitations: Homogeneous samples, task variety limited, medication effects unassessed.
Future Directions: Validation across languages/cultures, establish norms, test longitudinal stability.

Conclusion: Automated pause detection can compliment assessment and improve early AD detection.

REFERENCES

For references, see

Cohen, Alex S., et al. "Speech pause and speech rate for evaluating Alzheimer's and mild cognitive impairment: A meta-analysis." *Journal of the International Neuropsychological Society* (2025): 1-8.