

# Time perception among individuals living with and without dementia: A scoping review

## INTRODUCTION

- Considerable efforts have been made to prevent or delay the onset or modify the course of dementia, but clinical trials of pharmacological interventions have ultimately demonstrated little to no clinical benefit
- For this reason, policy and practice landscapes have shifted from attempting to find a cure for dementia to an emphasis on living well with dementia
- Dementia-friendly initiatives are often aimed at improving the well-being of people living with dementia, but the focus is typically on space (and not time) considerations
- Integrating time considerations into these initiatives may further improve the well-being of people living with dementia, but we first need to understand how people with dementia experience time

## RESEARCH QUESTIONS

- In which ways do time perceptions differ across individuals living with and without dementia?
- In which ways do time perceptions differ across individuals living with different types of dementia?

## METHODS

- Search strategy employed the terms “dementia” and “time perception” in controlled vocabulary (i.e., MeSH) fields on April 7, 2023 in CINAHL, Embase, MEDLINE, PsycINFO, ScienceDirect, and Web of Science
- Inclusion criteria:
  - Conducted in any country or setting
  - Published in any year
  - Quantitative study designs
  - At least one dementia
  - At least one time perception test
  - At least one time perception score

## RESULTS

### SEARCH STRATEGY

- A total of 12 studies were included in this scoping review (Figure 1)

### STUDY CHARACTERISTICS

- **Participants:** Samples with Alzheimer’s disease (n = 8) any dementia (n = 3), dementia with Lewy bodies (n = 1), and frontotemporal dementia (n = 1)
- **Paradigms:** Six studies employed a prospective paradigm, five studies employed a retrospective paradigm, and one study used both paradigms
- **Tests:** Most studies employed a verbal estimation test
- **Scores:** All studies measured absolute error values and most studies measured average time estimation or coefficient of variability (Figure 4)

### STUDY FINDINGS

- A summary of study findings is presented in Table 1.

## DEFINITIONS

### PARADIGMS

- **Prospective paradigm:** Participants are told in advance they need to estimate, (re)produce, or compare time intervals
- **Retrospective paradigm:** Participants are not told in advance they need to estimate or reproduce a time interval

### TESTS

- **Verbal estimation:** Participants provide estimations of the duration of temporal stimuli using time units
- **Interval production:** Participants are asked to produce a pre-specified duration
- **Interval reproduction:** Participants are presented with temporal stimuli of a given duration and asked to reproduce that duration using a similar modality of production
- **Interval comparison:** Participants are presented with more than one temporal stimuli of different durations and asked to identify which duration was shorter or longer than the other

### SCORES

- **Average time estimation:** Mean of estimated durations
- **Absolute error values:** Difference between mean of estimated durations and true duration regardless of sign
- **Coefficient of variability:** Absolute error values divided by average time estimation



## SEARCH STRATEGY

Figure 1. PRISMA flow diagram

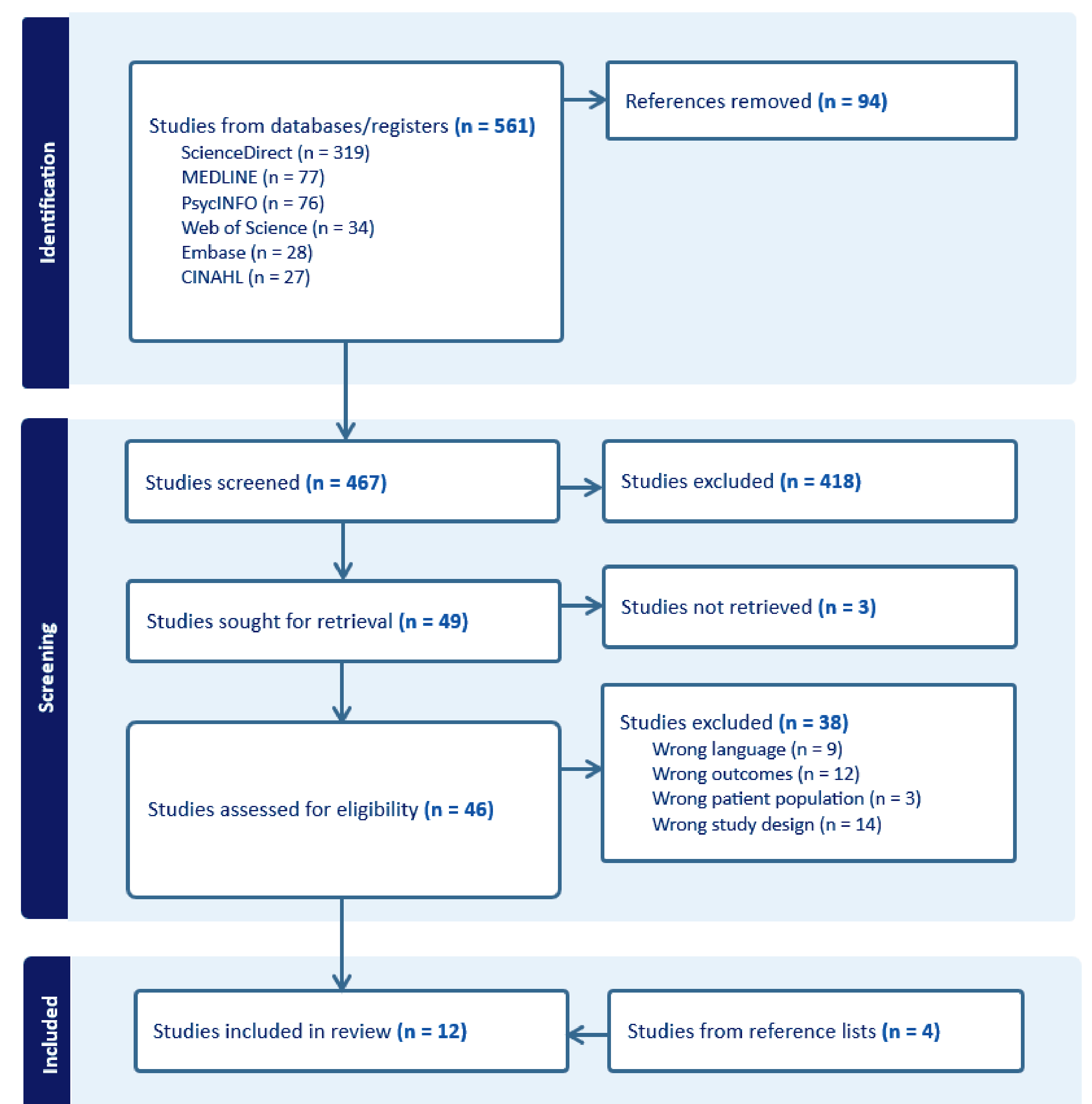


Table 1. Summary of study findings

|                            | Verbal estimation   | Interval production                     | Interval reproduction                | Interval comparison     |
|----------------------------|---|---|--------------------------------------|-------------------------|
| Average time estimation    | prAD < or = HC<br>prFTD > HC<br>Dementia = HC<br>Dementia = MCI<br>Dementia = SCI     | prAD > HC<br>prDLB > prAD<br>prFTD < HC | prFTD = HC<br>prAD > HC<br>prAD < HC | prAD = HC               |
| Absolute error scores      | prAD > HC<br>Dementia > or = HC<br>Dementia = MCI<br>Dementia = MCI<br>Dementia = SCI | prAD > HC                               | prAD > HC                            | prAD = HC               |
| Coefficient of variability | prAD > HC<br>prFTD > HC<br>prAD > prDLB   | prAD > HC<br>prFTD < HC                 | prFTD > HC                           | prAD > HC<br>prFTD > HC |

Note. HC = healthy controls; MCI = mild cognitive impairment; prAD = probable Alzheimer’s disease; prDLB = probable dementia with Lewy bodies; prFTD = probable frontotemporal dementia; SCI = subjective cognitive impairment

## DISCUSSION

- Based on this scoping review, the body of literature on time perception in dementia is quite limited, but findings generally indicate that people living with dementia perceive time differently than people living without dementia.
- Future research should focus on replicating findings while extending the research to look beyond the dementia vs non-dementia dichotomy as differences between different types of dementia may exist
- If people living with dementia (and, in particular, different types of dementia) experience time differently from those experiencing normal aging, we need to begin to address these differences to improve well-being for this population
  - Development of self-report or observational tools to assess altered time perceptions for early detection of dementia
  - Development or improvement of psychological treatments that include a time-based component (e.g., reminiscence therapy)
  - Design of technology to better integrate our understanding of time perception in dementia to facilitate the use of technology
  - Integration of time considerations into dementia-friendly initiatives across healthcare and home settings

