



Ontology of **visuospatial memory**

Remembering where things are

Type of measure: Active task.

Definition of measure: A score on a cognitive task representing visuospatial memory ability.

Considerations: The task should relate to day-to-day life and can include recalling objects in a room or remembering where objects were placed in a virtual environment.

Outcomes to be measured: Task score, reaction time, accuracy.

Example: In a virtual space, ask participant to place sunglasses on the counter, a wallet on the shelf, and a file folder in the desk. [Time lapse.] Have the subject identify items and where items were placed, naming and retrieving the items.

Instrumental activities of daily living (IADL) memory tasks in the literature: [Place and find](#), [object in room recall](#)

From patients and care partners:

“I would not remember where I left anything and it would be difficult.”

- Patient, USA

“I will not be able to ... put away my dishes, or remember where I placed my money.”

- Patient, USA

“It takes a long time to find things and makes a mess in the house.”

- Patient, Japan

“I hope she remembers where her things are, doesn't get confused around the house, knows her toilet, bathroom, otherwise it will be very bad for her, she will worry a lot.”

- Care partner, Bulgaria



Resource quicklinks

View the full [Core Digital Measures of AD/AR conceptual model](#) or jump to another ontology:



Visuospatial memory

View the [discussion guide](#) for visuospatial memory



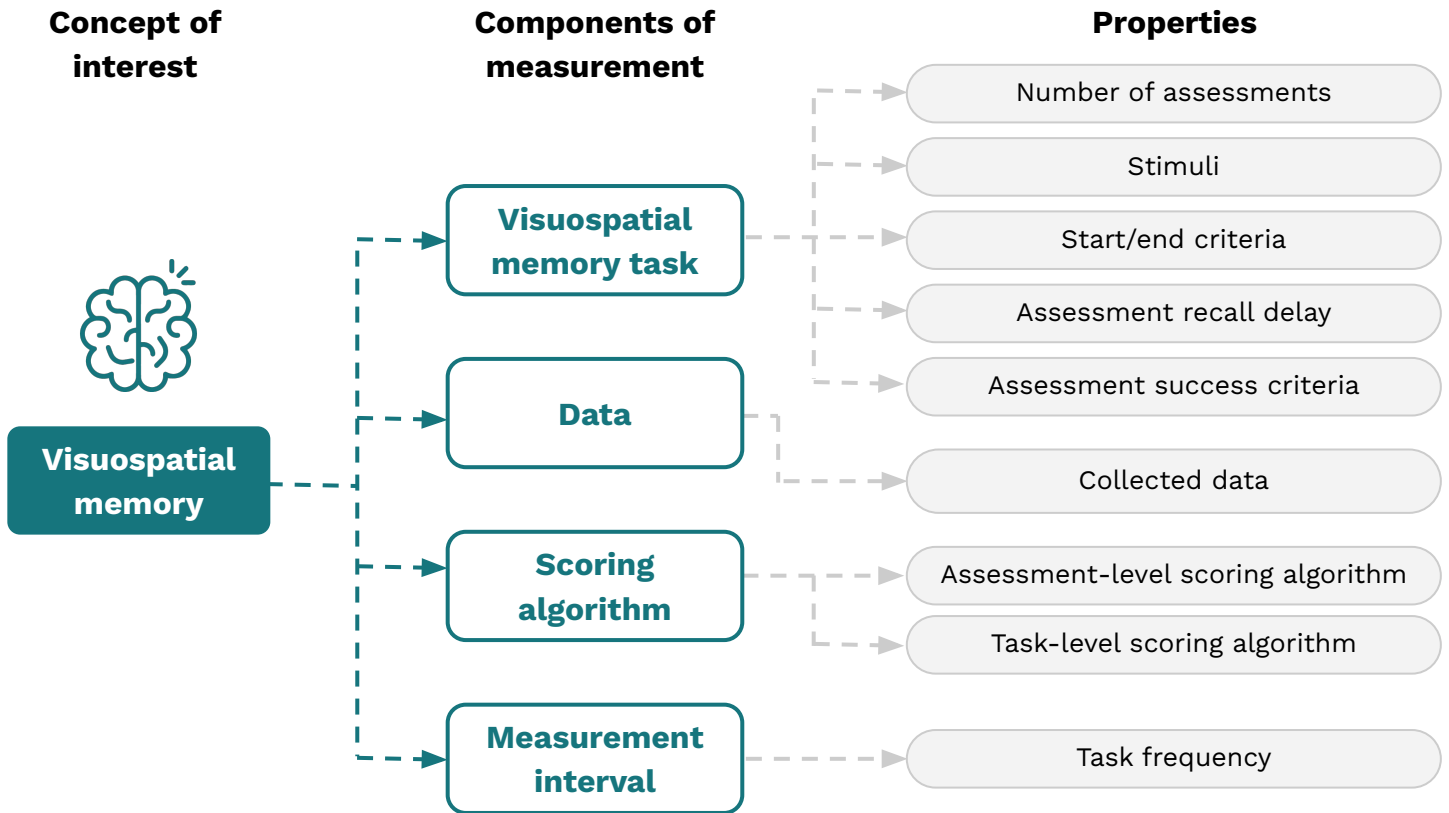
[Expressive communication](#)



[Sleep disruption](#)



[Non-sedentary behavior](#)



Visuospatial memory task



It is necessary to give a broad overview of the task, the reasons it was selected, and the support rationale for use in the intended population, with evidence as to why the task is both relevant and appropriate for a given ADRD diagnosis and stage. In addition, the following task properties should be defined:

Number of assessments

Report and document rationale for chosen number of assessments within each task.
E.g., three assessments per task were chosen as this number has been shown to lead to a reliable total score.

Start/end criteria

Report the start/end criteria of each assessment
E.g., Start: presentation of trial objective, End: Successful completion of trial, unsuccessful completion (after Xs).

Assessment success criteria

Define success criteria for an assessment.
E.g., selecting the correct missing object, locating the correct object in augmented reality (AR) space.

Stimuli

Report the stimuli description, the rationale for their selection, and the standardization evidence.
I.e., if assessed daily for 3 days prior to each clinic visit, these 3 days should have unique stimuli to prevent learning effects and interference.

Assessment recall delay

Report the delay between stimuli presentation and recall and justify the rationale.
E.g., immediate recall to test understanding, delayed recall after intervening task to test visuospatial memory.

Data



It is necessary to report and specify the data collected by the technology employed. This reporting enables the specification of scoring. An additional advantage is that this data can then be available to individuals appraising the planned or conducted work. In research activities where data is made available for secondary research (i.e., data hosted on the [Alzheimer's Disease Data Initiative](#)), users can assess the feasibility of the data for their own study aims.

Collected data

Report the features output by the technology for each assessment.

E.g., response, timestamp of assessment start/end, path deviation to object.

Scoring algorithm



It is necessary to report how the data collected will be used to create a metric representing the visuospatial ability of the individual completing the task. For tasks with several assessments, the assessment-level and task-level algorithms should be specified.

Assessment-level scoring algorithm

Report the metric used for assessment level scoring.

E.g., reaction time as the ms difference between assessment start/end timestamp, score as an integer: 0 or 1 based on success/failure criteria.

Task-Level scoring algorithm

Define the task “total” score across assessments, supported by evidence for validity and how it relates to the intended population.

E.g., a sum of correct assessment responses, a score derived from collected data.

Measurement interval



It is necessary to specify the frequency of assessment. Although at-home digital metrics can be collected frequently, patient burden when completing tasks must be accounted for. Deliberately selecting a set period of time, linked to time periods with rich clinical data (i.e., clinic visits), will help to increase the utility of the data collected (e.g., for validation efforts) and can aid in patient adherence to the task. The exact frequency of data collection is likely task-specific and can be supported through a data-driven approach showing the ideal frequency for a specific measure, like reliability.

Task frequency

Define the period of data collection and the rationale.

E.g., daily for several days linked to a clinic or trial visit.