

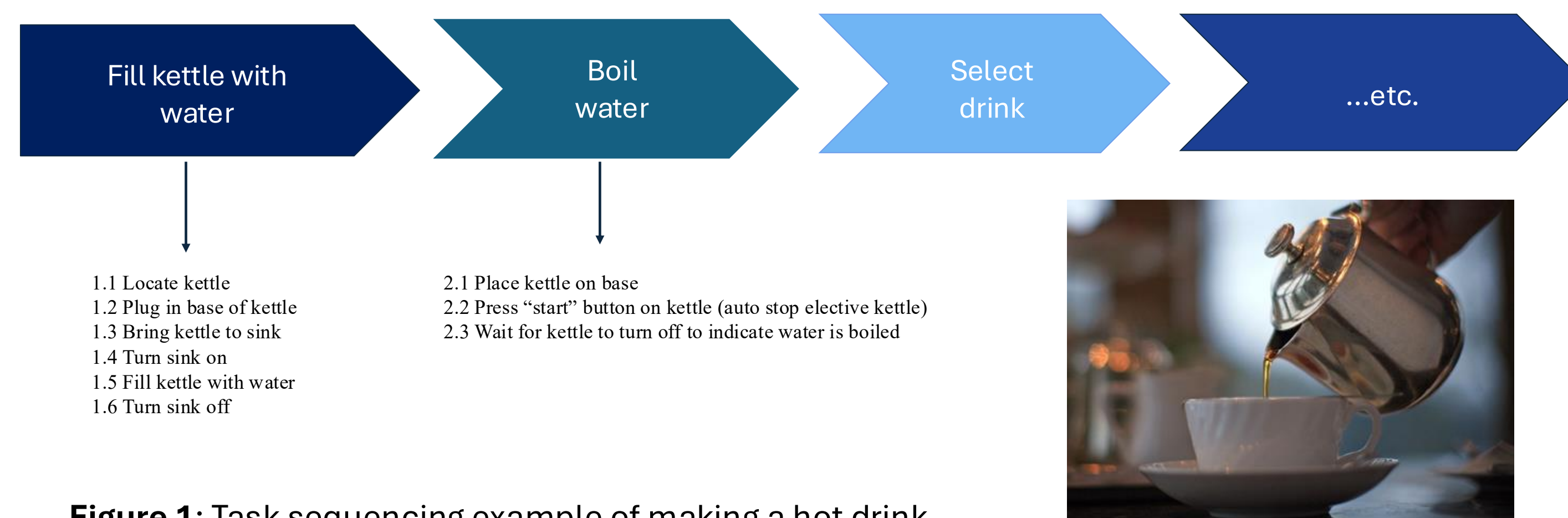
The impact of cognitive impairment on eye gaze during everyday task completion by older adults

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Introduction

- Reduced independence in daily activities decreases quality of life in people living with dementia^{1,2}
- Gaze typically precedes hand movements (i.e., anticipatory gaze) in cognitively normal individuals when completing familiar tasks such as making a hot drink³



- Studies show altered eye behaviours in dementia⁴
- Studying eye gaze during everyday task completion by people with and without cognitive impairment can inform strategies to support independence

Objectives

- To investigate eye gaze and hand movements when older adults with and without cognitive impairment complete everyday tasks



Figure 2: Camera footage of participants executing the three household tasks in the HomeLab at Toronto Rehabilitation Institute

Methods

- Participants complete three household tasks at the Home Lab: (1) make a cup of coffee/tea, (2) fold laundry, and (3) make a bed
- Participants complete Montreal Cognitive Assessment (MoCA) for cognitive screening

Intended number of participants:

- N=15 participants **without** cognitive impairment
- N=15 participants **with** cognitive impairment

1. Video cameras record task completion



2. EmbracePlus sensor watch monitors physiological indicators of stress (e.g. heart rate, sweat, skin temp).



3. Eye-tracking glasses monitor and gaze, duration of fixations, duration of eye saccades to gain insight into anticipatory gaze

- Behavior coding schemes for each task developed in Noldus Observer XT to analyze video data.
- Distinguish individual variation in task completion and identify cueing behavior in both groups

Results

- N=15 participants without cognitive impairment enrolled
- N=15 participants with cognitive impairment enrolled
- 89/90 tasks were successfully completed
- No significant difference in eye fixations, saccades, and task durations
- Participants across the cognitive range displayed anticipatory eye gaze movements 80% of the time before executing hand movements



Figure 3: Visualization of behaviours for participant **without** cognitive impairment showing behavioural actions during waiting period of kettle boiling



Figure 4: Visualization of behaviours for participant **with** cognitive impairment showing behavioural actions during waiting period of kettle boiling

Discussion

- Findings show anticipatory gaze is still maintained in those with mild-to-moderate cognitive impairment while they complete familiar tasks.
- Contrasts research proposing alterations in eye gaze as early indicators of cognitive impairment⁴
- Findings could help inform prompting technologies that predict the next action in the task sequence

References

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