MemeXerciser

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Lifelogging Technology for People with Episodic Memory Impairment

problem

Episodic memory impairment is common for over 26 million Alzheimer's disease sufferers.

Lifelogging technologies generate an overwhelmingly large amount of data. How can we select and present these data as memory cues?

goals

Support episodic memory through *active* recollection

Promote mental exercise

Reduce caregiver burden

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1 ### Passive
Capture

Record personal experiences automatically using wearable sensors such as a camera, audio recorder, GPS logger, accelerometer, passive infrared, light, and temperature sensors.

2 ### Hybrid
Selection

Automatically suggest cues from lifelog data based on content and context analysis such as movement, location, voice, and face detection. Leverage human (caregiver) expertise to select and annotate personally significant cues.
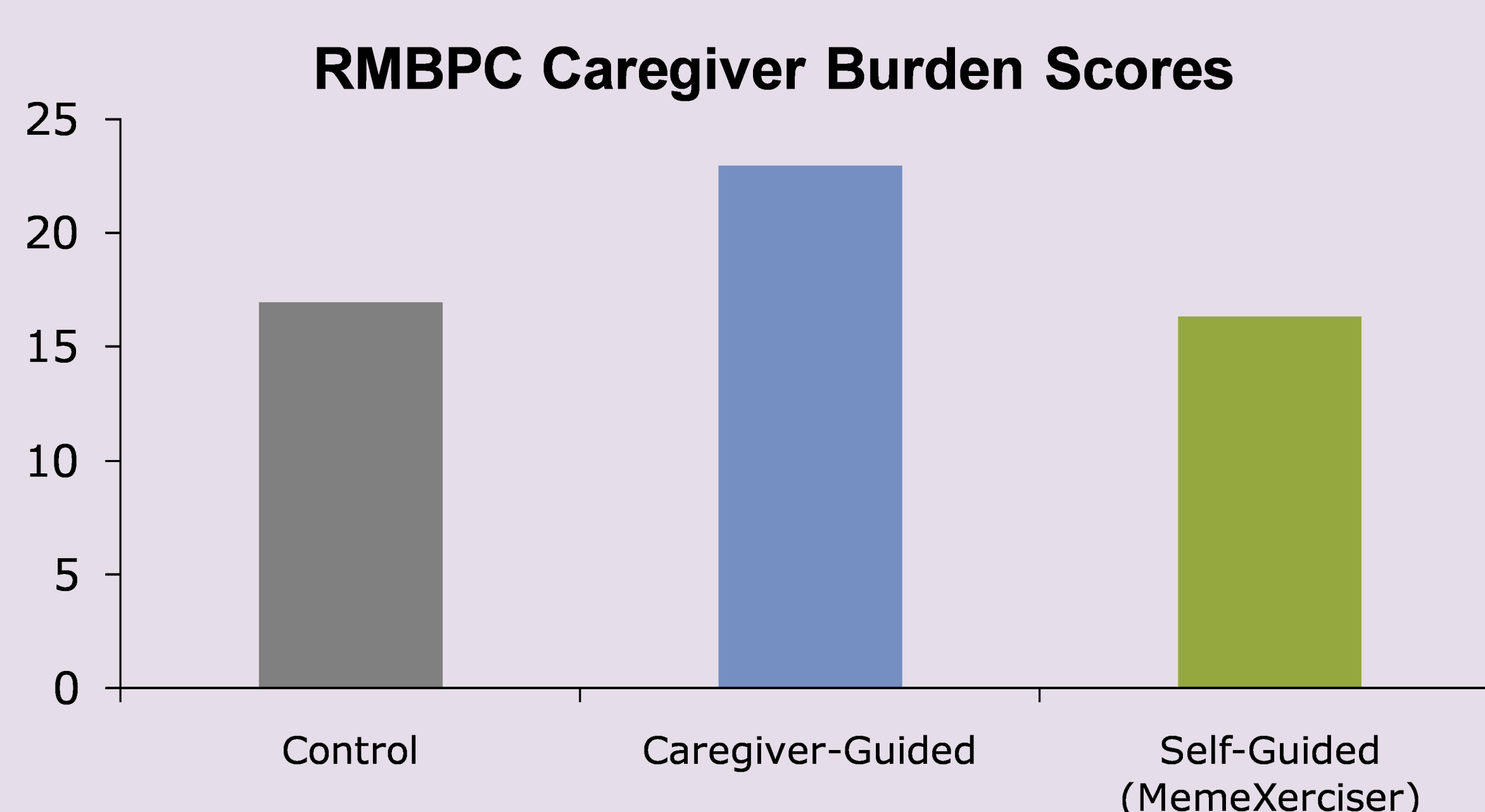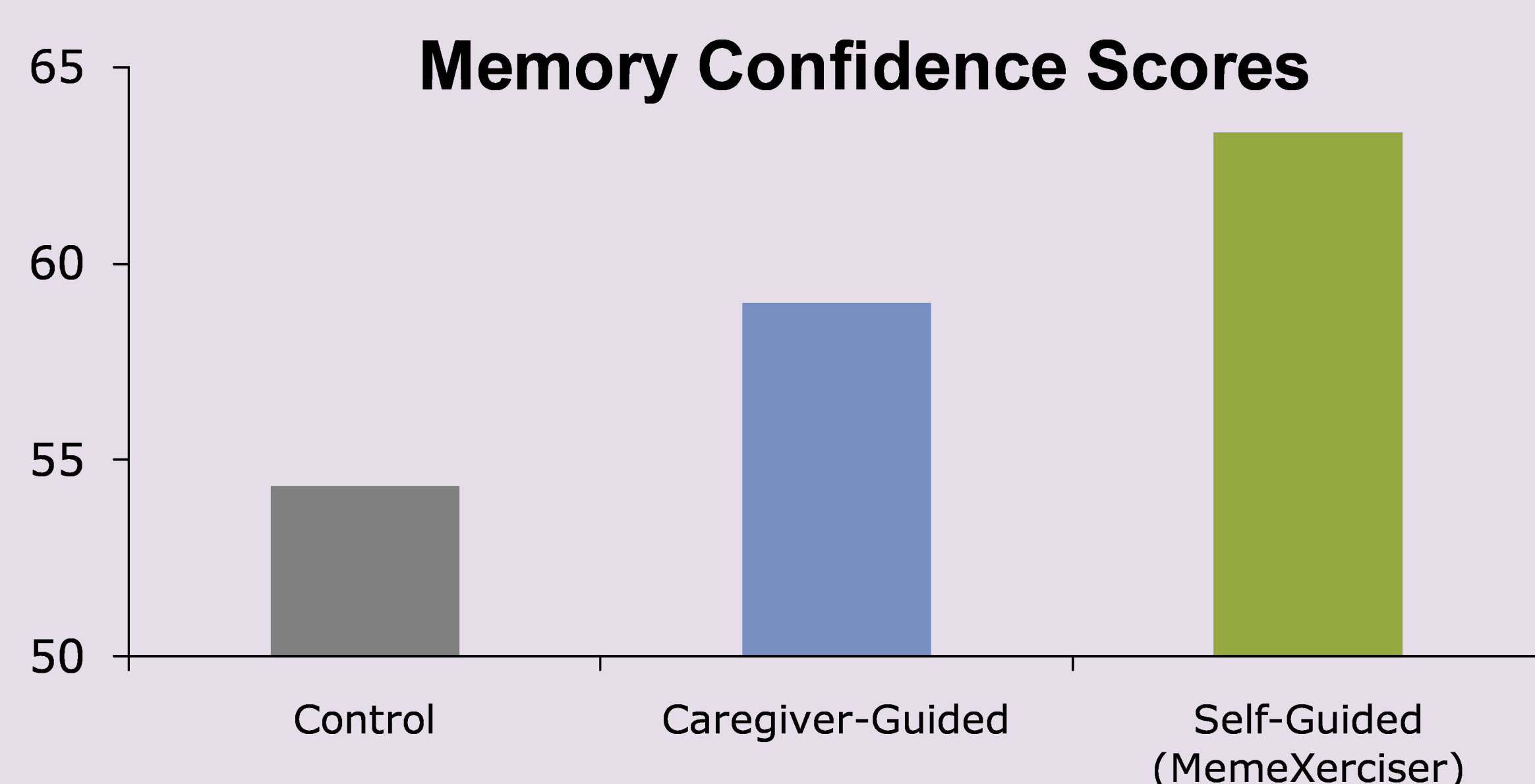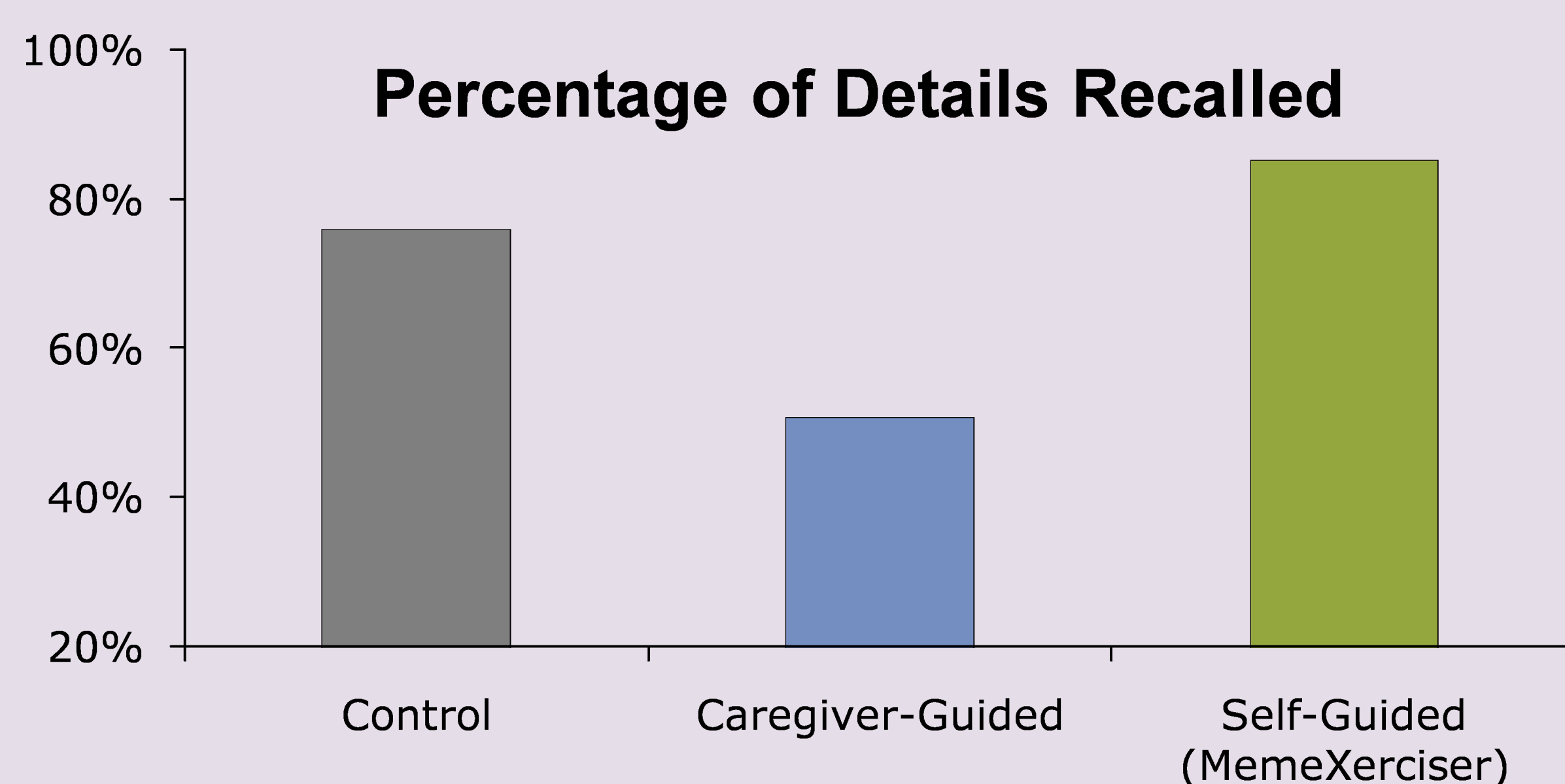
3 ### Active
Review

Provide an engaging, memory-stimulating interaction to exercise memory abilities. Maximize opportunities to recognize and recollection experiential details on their own. Repeat reviewing without burdening caregiver.

Tablet-based, caregiver-constructed narrative viewer supports memory-stimulating self-recollection.

Visual annotation by caregiver to highlight important details.

Caregiver's voice annotation playback

Lots of food at Mary's house

Summer Dinner Party at Mary's
7/9/2007

Start Over

Simple stylus tapping interaction to progressively reveal more cues

evaluation results

Percentage of Details Recalled

Control	76%
Caregiver-Guided	50%
Self-Guided (MemeXerciser)	85%

Memory Confidence Scores

Control	54
Caregiver-Guided	59
Self-Guided (MemeXerciser)	63

RMBPC Caregiver Burden Scores

Control	17
Caregiver-Guided	23
Self-Guided (MemeXerciser)	16

preliminary findings

We conducted a pilot study with three participants with Mild Cognitive Impairment and their caregiver spouses. Using the MemeXerciser's self-guided approach resulted in significantly ($p < 0.05$) more details recalled and greater self-reported confidence in memory abilities when compared with using a passive approach where the patient listens to the caregiver describe the lifelog data.

Caregiver burden was also lower when using MemeXerciser's hybrid cue selection approach but the difference did not reach statistical significance.

Our future work will focus on refining the content and context analysis techniques to further reduce the caregiver burden and improve the quality of cues for the patient.