Impact of Cognitive Status on Technology-Based and Traditional Strategy Use Supporting Prospective Memory in Aging T. Hale, N. Whiteley, M. Schmitter-Edgecombe. *Gerontechnology* 25(s*)*

Purpose This study explores how healthy older adults and those experiencing mild cognitive impairment (MCI) use cognitive strategies, including technology-based strategies, to support everyday prospective memory (PM). PM refers to the ability to remember to carry out intended actions in the future, such as managing appointments or taking medication [1]. Strategies range from external aids using technology (e.g. digital calendars or alarms) and non-technological aids (e.g. loose notes, planners, environmental reminders) to internal techniques (e.g. mental rehearsal, association, use of routine). Technology-based cognitive strategies offer centralized, easily editable reminders [1], yet it is unclear how cognitive status relates to the quantity and quality of strategies employed, and whether these differences relate to accuracy of performance on real-world PM tasks. We hypothesize that older adults with MCI will perform more poorly on the PM tasks and will use fewer cognitive strategies overall, as well as poorer quality strategies, compared to healthy older adults. **Method** Participants were 196 (HOA = 153, MCI = 43) older adults (M_{age} = 69.05 (8.57), 75% female, $M_{education}$ = 16.91 (2.07)). The groups did not differ on demographic variables. In the first testing session, participants received two PM based tasks to complete independently before and during the second testing session, using strategies they typically employ in everyday life. At session two, PM task accuracy and cognitive strategies utilized for task completion were recorded and scored for by quantity (number of strategies used), quality total (each part of strategy coded on 4-point scale: none, incorrect/error information, inefficient, efficient), and type (i.e., technology-based, paper planners, loose paper, internal, organization, simplify, part of routine, alarm, asking for help, and environmental cues). Efficient strategies were those that facilitated task completion with minimal steps, whereas inefficient strategies reflected suboptimal or indirect approaches, and error strategies included incorrect information that did not assist task completion. Independent samples t-tests assessed group differences in PM accuracy and cognitive strategy quality, quantity, and type. Exploratory analyses included additional t-tests to examine strategy quality. **Results** Independent sample t-tests showed that HOA (M = 6.62, SD = 1.62) performed significantly better in PM accuracy (M = 5.88, SD = 1.84), $t(194) = 2.56$, $p = .01$, and utilized significantly higher quality cognitive strategies $t(194) = 2.88$, $p = .004$, compared to MCI. However, the groups did not differ in quantity of strategies employed ($p > .05$) or in the types of strategies utilized across the ten strategy types ($p > .16$). The most commonly used strategies by HOA included technology-based strategies (18%), environmental cues (17%), and loose paper (16%), while most used by the MCI group included environmental cues (17%), loose paper (15%), and technology (13%). Exploratory analyses revealed that HOA used significantly more efficient quality strategies ($t(194) = 3.19$, $p = .002$), while the MCI group used significantly more strategies containing errors ($t(194) = -2.92$, $p = .005$). However, groups did not differ in inefficient strategies ($p > .05$). **Discussion** Findings indicate that cognitive status influences both real-world PM performance and the effectiveness of cognitive strategies, including technology-based tools such as digital reminders. For both groups, technology-based strategies were among the most frequently used, consistent with the appeal of utilizing a centralized and easily editable reminder system. Although HOA and MCI did not differ in quantity or types of strategy used, with both using similar numbers and methods of strategy use, they differed significantly in quality. HOA demonstrated higher PM accuracy and employed more effective strategies, while individuals with MCI showed reduced strategy quality and more errors. These results suggest that while individuals with MCI are aware of the need to utilize strategies, implementation is less effective. Future research should focus on improving strategy quality to minimize errors and increase successful task completion, supporting independent living.

References

1. Beech B.F., Almeria A.T., Schmitter-Edgecombe M. (2024) Efficacy of digital and non-digital compensatory strategies in supporting prospective memory task completion among community-dwelling mid-life and older adults. *Arch Clin Neuropsychol.* 2024;39(7):849–859. doi:10.1093/arclin/acae030.

Keywords: prospective memory, mild cognitive impairment, cognitive strategy, aging

Affiliation: Neuropsychology and Aging Laboratory, Department of Psychology, Washington State University, United States

Email: travis.hale@wsu.edu

Acknowledgement: *National Institute on Aging*. #R25 AG046114 and #R35 AG071451