Prospective memory in the fourth age: Evidence from the ALSA Daily Life Time Sampling (ADuLTS) study

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Declaration

I certify that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text.

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Abstract

Prospective memory (PM) is defined as remembering a future delayed intention, for instance, remembering to take medication at the appropriate time or post a letter on the way home from work. As such PM supports day-to-day functioning and is critical for maintenance of independence into older age. In light of mixed findings from laboratory based studies as to the nature and direction of age-related changes in PM and a paucity of research with oldest-old adults, this thesis investigated PM performance in adults over the age of 85 years in naturalistic environments, and examined the effect of bio-physiological and cognitive predictors on performance during a 7-day micro-longitudinal diary study.

In Study 1, PM was examined in terms of task characteristics, target cue focality, and age. Seventy-four participants from the Australian Longitudinal Study of Ageing (ALSA) or a community sample (*M* age = 88.7 years, range = 84 – 102 years, 68% female) completed six self-report questionnaires daily over seven days. A time-based PM task, and focal and non-focal event-based PM tasks were presented across the week. Performance on event-based tasks was better relative to performance on time-based PM. Although overall proficiency was slightly higher for non-focal PM than for focal PM, there were no significant differences between forgetting and recovery ratios for the two event-based categories. Chronological age showed a small linear association (r = -.22) with successful focal PM performance.

The role of interindividual differences and intraindividual variation in physiological stress on PM performance was examined in Study 2. Stress was determined by salivary cortisol levels collected concurrently with each daily questionnaire. Generalised linear mixed modelling showed lower odds of proficiency on focal event-based PM to be associated with a higher cortisol awakening response. Overall,

physiological stress was not a strong predictor of performance. Basal cortisol levels and intraindividual lability in cortisol were not associated with event-based PM. Participants with increased cortisol secretion at task execution showed better time-based PM performance. Interestingly, covariate predictors revealed associations with PM. Higher education predicted performance on focal tasks and higher depressive symptoms were related to poorer time-based performance.

Study 3 found that executive function and working memory were significant predictors of prospective memory. Regression analysis showed performance on focal event-based PM was strongly related to higher executive functioning, with working memory predicting performance on non-focal tasks, after controlling for speed of perceptual processing. Better retrospective memory predicted lower forgetting ratios for event-based PM. Finally, time-based PM showed no association with the three cognitive measures.

These findings indicate that event-based PM is relatively spared in healthy oldest-old adults tested in naturalistic environments, in contrast to marked impairment in time-based PM. However, across the studies, and challenging predicted outcomes, performance on focal event-based tasks was generally poorer than on non-focal tasks and more vulnerable to intraindividual differences in bio-physiological and cognitive factors. Consistent with these findings, results are discussed in terms of dual-task processing and PM – ongoing task interference effects.