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Imagining a Better Future: Identifying Cognitive Mechanisms to Improve Prospective Memory

Craig P. McFarland

University of Montana - Missoula, craig.mcfarland@umontana.edu

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Final Report: *Imagining a Better Future: Identifying Cognitive Mechanisms to Improve Prospective Memory*

Life is filled with intentions, from taking medications in the morning to picking up milk on the way home from work or writing a grant proposal by a certain deadline. As such, the development and execution of intentions comprises much of daily life. Many of those intentions are pre-processed via prospection, or the imagining of future scenarios. Prospection has recently emerged as a concentrated field of empirical study and benefits everything from planning (Gilbert & Wilson, 2007, 2009) and decision-making (Boyer, 2008), to self-control (Daniel, Stanton, & Epstein, 2013). It is also intricately linked with prospective memory (PM), which refers to remembering to complete previously formed intentions.

Given the importance of completing PM tasks (e.g., taking medication), a growing body of research has been designed to identify strategies to improve PM. Two of the more promising strategies are implementation intentions (i.e., 'if, then' statements) and visual imagery (i.e., imagining completing a task), both of which involve prospection, and have been shown to be effective means of improving PM among a variety of populations (Chasteen, Park, & Schwartz, 2001; Grilli & McFarland, 2011; McFarland & Glisky, 2011, 2012).

Several authors have speculated about the cognitive mechanisms underlying implementation intentions and imagery, positing that they increase awareness of contextual cues and/or strengthen associations between contextual cues and intentions, and may, as a result, produce spontaneous retrieval of intentions (Rummel, Einstein, & Rampey, 2012). However, only a handful of studies have been designed to specifically test these hypotheses (McDaniel & Scullin, 2010; McFarland & Glisky, 2012; Meeks & Marsh, 2010), and the results are by no means definitive, rendering both open, empirical questions.

The aims of this UGP funded project were to 1) to develop a clearer understanding of the mechanisms that support implementation intentions and visual imagery (e.g., heightened awareness to intention-relevant stimuli, strengthened stimulus-intention associations), and 2) to apply that increased understanding of mechanisms to the development of more effective PM strategies.

Due to recruitment difficulties, we were able to conduct only one study during the funding period. That study was designed to investigate whether implementation intentions and visual imagery improve PM via strengthened stimulus-intention associations. Using a classic PM paradigm, participants were asked to complete a computerized multiple-choice general knowledge trivia task. During the trivia task, participants were required to complete a PM task in which they were to press the '6' key whenever they encountered questions that contained the word 'president.' Participants were placed into one of four instructional conditions to investigate the potential impact of repetition of an intention ('press the 6 key'), repetition of the stimulus-intention association ('press 6 for president'), implementation intention ('if I see president, I will press the 6 key'), and visual imagery (imagine seeing 'president' and imagine myself pressing the '6' key).

We were able to test 37 participants (we had hoped for a minimum of 60) in this study. Results indicated no main effect of instructional condition, $F(3, 33) < 1$ on

PM performance. These results are somewhat surprising, given that the imagery condition could have been expected to provide more contextual details for retrieval of the PM intention. Overall, the current results suggest that when the amount of time spent with instructions is equated across groups, implementation intentions and visual imagery are no more advantageous than are rote repetition of an intention without reference to a PM cue or repetition of a stimulus-intention pairing. The small number of participants that we were able to recruit limits the interpretations of this study. Future work in our lab will continue to investigate this and related questions with the aim of identifying the cognitive mechanisms that underlie the effectiveness of implementation intentions and visual imagery, with an eye towards increasing their effectiveness for both clinical and non-clinical populations.