**An Assessment of Learning Rates in Habitual Prospective Memory**

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### Introduction

- Episodic Prospective Memory (PM) refers to a one-time execution of an intention (Kvavilashvili & Ellis, 1996).
- With repeated execution, these one-time episodic PM intentions become habitual and are likely performed more efficiently.
- Cost to ongoing task performance are found in many PM tasks (Smith, 2003). Costs may be reduced when PM intentions become habitual.
- Additionally, cue detection, setting verification, retrieval, and coordination processes may change with habitual PM intentions (Marsh, Hicks, & Watson, 2002).
- To evaluate these hypotheses, learning rates were modeled from a habitual PM task based on Logan’s (1988) power law of learning.

### Methods

![Image of experimental setup](Image)

**2 (Intention vs No Intention) x 7 (Block) Mixed Design**

- N = 114 (55 Intention and 59 No Intention)

#### Same-Different Ongoing Task

- 882 trials
- 7 blocks
- 756 ongoing trials, 63 PM trials, and 63 control trials
- 7.14% PM frequency
- “B” keypress if the images are the same
- “N” keypress if the images are different
- “SPACE” to advance next trial

#### Color Detection PM Task

- White shape
- Same/different judgment
- Press “ENTER” to advance next trial
- Reminder slide if PM task is not executed

### Results

**Prospective Memory Performance**

![Graph of Prospective Memory Performance](Image)

**Task Interference Power Function Parameter Estimates**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Intention</th>
<th>95% CI lower</th>
<th>95% CI upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>835.637</td>
<td>786.175</td>
<td>885.099</td>
</tr>
<tr>
<td>B</td>
<td>-0.156</td>
<td>-0.251</td>
<td>-0.136</td>
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</tbody>
</table>

**Cue Interference Power Function Parameter Estimates**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Intention</th>
<th>95% CI lower</th>
<th>95% CI upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>674.743</td>
<td>656.988</td>
<td>692.498</td>
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<tr>
<td>B</td>
<td>-0.1</td>
<td>-0.12</td>
<td>-0.08</td>
</tr>
</tbody>
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### Discussion

Costs to the ongoing task changed over time in a manner consistent with the power law of practice. Additionally, increases in prospective memory performance and decreases in cue interference across bins may be due to any of the underlying mechanisms of the microstructure displayed below.

![Microstructure of successful PM](Image)

To better understand which aspects of PM are changing with repeated execution, we are currently evaluating electrophysiological data (Meier et al., 2014). Prospective memory cues cause differences in the N300, P3b, and late parietal positivity ERP components.

### References


