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Practice Effects and Outcome of Cognitive Training: Preliminary Evidence from a Memory Training Course

Kevin Duff, Ph.D., Leigh J. Beglinger, Ph.D., David J. Moser, Ph.D., Susan K. Schultz, M.D., and Jane S. Paulsen, Ph.D.

Department of Psychiatry, University of Iowa, IA

Practice effects (PE) are improvements in cognitive test performance due to repeated exposure to the tests,¹ and these artificial improvements have traditionally been viewed as error. However, recent data suggest that PE may have diagnostic and prognostic information in older adults with mild cognitive impairments.^{2,3} A logical extension of this research is to see whether PE are related to outcomes of interventions, which is the focus of this study.

Twenty-three community-dwelling older adults (age: mean = 72.5 years, SD = 8.9; education: mean = 16.1, SD = 2.4; 78% female, 100% white) completed a 5-week memory training course, based on The Memory Bible.⁴ After providing informed consent, pretesting included: self-report ratings on the Memory Functioning Questionnaire, shortened version of the Rey Auditory Verbal Learning Test (RAVLT), Brief Visuospatial Memory Test—Revised, Digit Symbol, Controlled Oral Word Association Test, and Trail Making Test. At the end of this session, the learning trials of the RAVLT were repeated to assess within-session practice effects (WISPE). Alternate forms were not used within session to maximize PE. Posttesting, approximately 1 week postcourse, included the same measures as the pretesting. Alternate forms were used for RAVLT, Brief Visuospatial Memory Test—Revised, Digit Symbol, Controlled Oral Word Association Test, and Trail Making Test to avoid between-session PE. Participants were compensated \$25.

PE, usually viewed as error, were related to change in cognitive test scores after a 5-week interval. Modest correlations existed between WISPE and outcome change scores on four cognitive measures. All these correlations went in the expected direction, with better PE being related to improvement on these tasks. To our knowledge, this is the first study to prospectively study PE in relation to treatment outcome, although we have observed that PE provide diagnostic and prognostic information.^{2,3} Others have also touched on this topic. Baltes et al.⁵ developed methods to tap “learning potential” and found them to be useful for diagnostic and intervention purposes. However, those methods consume more time and resources than the WISPE in this study. All these measures, including PE, seem to broadly tap into a person’s cognitive plasticity, flexibility, or reserve, which might be useful in identifying individuals who still have some learning potential to benefit from cognitive rehabilitation.

Although there are several limitations for this study (e.g., no control group, small samples, unvalidated memory course, and brief follow-up), additional investigation of PE in treatment studies seems warranted. If these cognitive plasticity proxies demonstrate predictive value, then PE could enrich samples in clinical trials, leading to more effective training programs and better allocation of limited resources.

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TABLE 1

Correlations Between WISPE on the RAVLT and Prepost Test Changes

Measure	<i>r</i>	<i>p</i>
RAVLT total recall	0.43	0.04
RAVLT delayed recall	0.01	0.96
BVMT-R total recall	0.49	0.02
BVMT-R delayed recall	0.58	0.01
Digit symbol	−0.05	0.82
TMT Part A	−0.42	0.04
TMT Part B	−0.22	0.31
COWAT	0.02	0.93
MFQ	0.22	0.31

Notes: BVMT-R: Brief Visuospatial Memory Test-Revised; TMT: Trail Making Test; COWAT: Controlled Oral Word Association Test; MFQ: Memory Functioning Questionnaire; *r*: Pearson correlation; *p*: *p* value of correlation with *df*= 21.