On the nature and measurement of neurocognitive adaptability in older adulthood

by

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Abstract

Objective: This dissertation was undertaken to explore the clinical utility of physiological and behavioural metrics of neurocognitive adaptability in the screening of older adults for possible early signs of pathological cognitive aging.

Methods: This was an intensive, multi-method study of 43 healthy (non-demented) Victoria-area older adults (ages 65 to 80 years). Study 1 examined timescale-specific differences in resting electroencephalographic (EEG) adaptability as a function of subtle cognitive decline. Study 2 described differences in retest practice effect -- within and across a burst of 4 to 6 occasions of computerized cognitive testing - - with respect to individual variation in estimated premorbid function and self-reported conscientiousness. Study 3 considered whether practice effects from Study 2 were related to individual differences in the resting EEG marker derived in Study 1, above and beyond the differences due to premorbid function and conscientiousness.

Results: Study 1 revealed that older adults with neuropsychological performance indicators of subtle cognitive decline also showed subtle, timescale-specific differences in resting EEG adaptability. Study 2 illustrated the differentiable effects of individual differences in estimated premorbid function and conscientiousness on within- and across-occasion improvement on a computerized attentionshifting (switch) task. Study 3 demonstrated the unique promotional effects exerted by conscientiousness and resting EEG adaptability on the rate of across-occasion improvement in cognitive performance.
Conclusions: Useful yet under-used tools for detecting early signs of neurocognitive decline include rigorous, standardized neuropsychological diagnostic criteria, the magnitude of practice-related improvement in cognitive performance, and characteristics of the brain's resting electrical activity. Future multi-method, ecologically-situated studies are needed to establish standardized protocol that can be used to screen growing worldwide numbers of older adults for losses in neurocognitive adaptability that may herald the earliest stages of pathological neurocognitive aging.