Associations between AQT Processing Speed and Neuropsychological Tests in Neuropsychiatric Patients

Niels Peter Nielsen, MD,1 Roland Ringström, MS,2 Elisabeth H. Wiig, PhD,3 Lennart Minthon, MD, PhD4

Associations between A Quick Test of Cognitive Speed (AQT) perceptual and cognitive speed and neuropsychological tests, including the Wechsler Adult Intelligence Scale-Third Edition (WAIS-III), Mini Mental State Examination (MMSE), and the Trail Making Test (TMT), were evaluated in 41 neuropsychiatric patients. Neuropsychological and neurological tests, including CT scan, were administered to all of the patients. AQT was also administered to 75 controls. All AQT means differed significantly for patients and controls. Dual-dimension naming time means in the patient group were in the atypical range and indicated generally reduced cognitive speed, whereas controls performed in the normal range.

In the patient group, WAIS-III verbal, performance, and full-scale IQ means were in the normal range. AQT perceptual and cognitive speed correlated negatively with WAIS-III P IQ and MMSE scores, and the relationships were nonlinear. The findings support that AQT dual-dimension naming evaluates cognitive speed (i.e., attention, set shifting, working memory) and can be used for first-line or complementary screening for mild or progressive cognitive impairments.

Keywords: AQT; WAIS-III; MMSE; AD; cognitive impairment; cognitive tests; processing speed

In neuropsychological practice, cognitive impairments are traditionally assessed with neuropsychological tests that probe verbal learning (paired-associate or word-list), memory, retention, and recall. Tests of broad cognitive abilities and visual-spatial construction are also commonly used, as are screening tests for cognitive impairments and decline associated with neurological disorders. An alternative approach to assessing cognitive function is to use processing speed tests, such as A Quick Test of Cognitive Speed (AQT),1,2 the Trail Making Test (TMT),3 or the Stroop Color-Word Test.4 These measures include reaction and response time; they use single tasks to measure perceptual speed and dual tasks to measure cognitive speed, including attention, set shifting, and working memory; and performance times are outcome measures.1,5 Processing speed tests have been used to examine cognition in normal aging, executive function disorders, frontal- and temporal-parietal lobe involvement, dementia, and other neurological conditions.6-10

AQT, the experimental measure, evaluates perceptual (i.e., reaction + response time), and cognitive speed (i.e., perceptual speed + cognitive overhead resulting from increased demands for attention, set shifting, and working memory). It has been subjected to clinical research and validation with functional neuroimaging.9,11 It provides objective, timed measures (seconds) of naming speed

1Department of Psychiatry, Hvidovre Hospital, Copenhagen, Denmark
2Department of Psychiatry, Västervik Regional Hospital, Sweden
3Knowledge Research Institute, Inc., Arlington, Texas
4University Hospital MAS, Malmö and Lund University, Sweden

The authors have reported no conflicts of interest. The staff and patients of the Department of Psychiatry, Västervik Hospital, Sweden made this study possible by giving us access to patient records. We want to especially acknowledge the data collection by Roland Ringström, neuropsychologist and facilitation of “data mining” by Annette Petterson, Administrative Assistant, Department of Psychiatry, Västervik Hospital, Sweden. The study received no funding from outside sources.

Please address correspondence to Elisabeth H. Wiig, PhD, 7101 Lake Powell Drive, Arlington, TX 76016; Phone: (817) 572-6254; Fax: (817) 478-1048; E-mail: ehwiig@krii.com.