

# Digital neuropsychological assessment may become standard after COVID-19

August 6 2021

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The COVID-19 pandemic has significantly altered the delivery of health care including neuropsychological evaluations. Telehealth procedures may become a standard feature in healthcare after the crisis has

resolved. In a mini-forum published in the *Journal of Alzheimer's Disease* experts describe how neuropsychological tests that combine digital technology with standard paper and pencil tests can reveal behavioral information not otherwise obtainable and facilitate earlier identification of individuals with emergent neurodegenerative and other neurological illness.

Technology has transformed the science and practice of medicine. In this special mini-forum, guest-edited by David J. Libon, Ph.D., Ganesh Baliga, Ph.D., Rod Swenson, Ph.D., and Rhoda Au, Ph.D., experts describe how coupling digital technology with standard [neuropsychological tests](#) can benefit patients. Neurocognitive markers obtained using this technology may be able to flag early emergent neurodegenerative illness. The data presented in these five papers collectively show the importance of time-based parameters as related to brain and cognition.

"Necessity is the mother of invention," explained the guest editors. "Perhaps a serendipitous effect of the COVID-19 crisis is that it has helped us understand that the standard paper and pencil tests used to evaluate patients with neuropsychological disorders can be replaced by a digital medium. This also makes it possible to [test](#) more patients who cannot come to the office, perhaps because of medical reasons or location."

The articles in this issue cover techniques such as the Backward Digit Span Test; the Digit Symbol Substitution Test; digital speech analysis; and the widely used Digital Clock Drawing Test.

"Standard paper and pencil neuropsychological tests are powerful tools to assess the integrity of brain and cognition, but they tend to focus on a final test score," noted David J. Libon, Ph.D., Department of Geriatrics, Gerontology, and Psychology, New Jersey Institute for Successful

Aging, School of Osteopathic Medicine, Rowan University. "The traditional measure we use to calculate a final test score is the total time to completion. However, digital technology calls our attention to the time spent during which output is not produced, i.e., the thinking time or 'latent content' versus time spent generating output, i.e., the 'manifest content.'"

Both of these time-based parameters provide the basis for a rich, three-dimensional analysis of underlying neuropsychological constructs associated with neurodegenerative illness. These make it easier to appreciate the underlying process patients use to initiate and ultimately bring to fruition complex neuropsychological operations.

"Digitally obtained behavior is able to detect [cognitive processes](#) that underlie early brain changes due to Alzheimer's disease and related neurodegenerative diseases. Moreover, digital neuropsychological parameters may help refine new statistical criteria for subtle or pre-mild cognitive impairment syndromes," added Dr. Libon.

Before digital assessment technology was available, Edith Kaplan, Ph.D., a pioneer of neuropsychological testing, championed the analysis of errors and the process by which tests are completed as a means of understanding brain and cognition. She emphasized, "If they want numbers . . . provide numbers that are meaningful."

"As digital assessment methods mature, identification of persons with emergent neurodegenerative and other neurological illness at an earlier stage may be possible," concluded the guest editors.

"I welcome this special collection of papers that demonstrates how [digital technology](#) can calculate potentially sensitive clinical neurocognitive biomarkers," said George Perry, Ph.D., editor-in-chief, *Journal of Alzheimer's Disease*, and Semmes Foundation Distinguished

University Chair in Neurobiology at The University of Texas at San Antonio. "The data presented here open up the possibility of being able to flag emerging illnesses such as mild cognitive impairment or dementia, including Alzheimer's disease or vascular dementia, before patients actually meet current diagnostic criteria."

**More information:** David J. Libon et al, Digital Neuropsychological Assessment: New Technology for Measuring Subtle Neuropsychological Behavior, *Journal of Alzheimer's Disease* (2021). [DOI: 10.3233/JAD-210513](https://doi.org/10.3233/JAD-210513)

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Provided by IOS Press

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