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Large-scale study on Lumos Labs' online cognitive assessment published in Frontiers in Psychology

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Lumos Labs, the makers of Lumosity, today announced the publication regarding its NeuroCognitive Performance Test (NCPT), a brief, repeatable, web-based cognitive assessment platform. Neuropsychological assessments are designed to measure cognitive functions in both healthy and clinical populations and are used for research studies, clinical diagnoses, patient outcomes, and intervention monitoring. The study, titled "Reliability and validity of the NeuroCognitive Performance Test, a web-based neuropsychological assessment," was published in the peer-reviewed journal, *Frontiers in Psychology* on November 3, 2015, and discusses the reliability and validity of the NCPT battery as a measure of cognitive performance.

"Pencil-paper neuropsychological assessments have been used for decades to measure cognitive function, and an online, repeatable, and customizable cognitive assessment tool such as the NCPT has a wide range of potential uses in clinical and research settings," said Glenn Morrison, PhD, lead author of the study and Director of Clinical Trials at Lumos Labs. "We are committed to building tools and technology that advance research, and in the future, the NCPT has the potential to facilitate more efficient clinical trial recruitment, serve as an outcome measure to support efficacy, aid in the diagnosis of cognitive impairment, and monitor cognitive change over time."

The NCPT is designed to measure functioning across working memory,

visuospatial memory, psychomotor speed, fluid and logical reasoning, response inhibition, numerical calculations, and selective and divided attention. The modular platform includes 18 assessments that are online adaptations of widely used conventional neuropsychological tests, which can be arranged into customized batteries.

Study data were drawn from a sample of 130,140 healthy volunteers aged 13 to 89 years who took an NCPT battery of eight assessments, including Arithmetic Reasoning, Digit Symbol Coding, Forward Memory Span, Reverse Memory Span, Grammatical Reasoning, Progressive Matrices, Trail Making A, and Trail Making B. Participants took the 25-30 minute NCPT battery remotely and without supervision. Test-retest reliability was evaluated in a subset of 35,779 participants who took the battery again on average 78.8 days later. The analyses show that the NCPT assessments are moderately intercorrelated, grouping into 4 putative cognitive domains, have good test-retest reliability, and are sensitive to expected age-related cognitive change. Concurrent validity to widely accepted neuropsychological tests was demonstrated in an additional sample of 73 healthy volunteers who took both an NCPT battery and the comparable pencil-paper assessments.

Future and ongoing research plans include building on the current data to further address validity, reliability and stability, and specificity and sensitivity of the NCPT by running large-scale online and in-clinic studies to generate data for all NCPT subtests. Lumos Labs is currently working with research collaborators worldwide to study the use of the NCPT in online registries as a screening tool to accelerate the clinical trial recruitment process, for longitudinal patient monitoring, to map NCPT assessment data with genomic and other data sets, and to facilitate large-scale studies that can lead to a better understanding of the cognitive profiles of both healthy and clinical populations.

More information: Glenn E. Morrison et al. Reliability and validity of

the NeuroCognitive Performance Test, a web-based neuropsychological assessment, *Frontiers in Psychology* (2015). DOI: 10.3389/fpsyg.2015.01652