

The Clinical Applicability of the Arithmetic, Digit Span Subtests of the Taiwan WAIS-III, and their Composite in Reflecting the Working Memory Index: A Retrospective Study

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There are many issues in regards to whether or not the composite of Arithmetic and Digit Span subtests used to determine the working memory index of the Taiwan WAIS-III is compatible with that of the English WAIS-III, and whether the individual Arithmetic and Digit Span subtests, and the span scores of the Digit Span subtest are adequate for measuring working memory. This study was thus to make an attempt to examine these issues.

In this retrospective study, receiver operating characteristic (ROC) analyses were employed, using brain imaging data of 179 patients with various CNS diseases as the gold standard, to identify the working-memory-related scores in the Taiwan WAIS-III. The results, as estimated by a composite of the Arithmetic and the Digit Span subtests, revealed all the specificity, negative predictive value, and positive predictive value of the Taiwan WAIS-III working memory index were each at or above 94%, yet the sensitivity was only 63%. The sensitivities of the Arithmetic and the Digit Span subtests were even poorer, measuring only 50%. However, the positive predictive value of the Digit Span subtest was 86% while the Arithmetic subtest was 67%. In addition, the forward and backward span scores of the Digit Span subtest had good negative predictive value (all of them were above 92%), but poor sensitivity (all of them were below 58%).

Based on the present findings, it appears that all the Taiwan WAIS-III working memory index, the single Arithmetic and the Digit Span subtests, and the span scores of the Digit Span subtest could adequately discriminate individuals without working memory impairment, but had poor sensitivity on detecting the patients who evidenced working memory impairment. Accordingly, it is suggested that clinicians should gauge the working memory index by a composite of the Arithmetic, the Digit Span, and the Letter-Number Sequencing subtests if possible. Otherwise, a caveat should be taken with care to interpret the working memory index, as estimated by a composite of the Arithmetic and the Digit Span subtests, because the chance of the increasing false negative rate becomes ineludible. Respecting the limitations of retrospective study, however, it is necessary to make a prospective study to re-approach this issue.

Keywords: *WAIS-III, working memory, arithmetic, digit span*

