

Introduction to the Culture-fair Assessment of Neurocognitive Abilities Test (CANAs)

The CANA Test is a screening instrument for multiple areas of neurocognitive function that is usable with patients of diverse cultural backgrounds. The cross-cultural aspects of the CANA Test make it applicable to cultures in which the concepts of geometric shapes, elephants, flowers, rocks, water, trees, hands, boats, drums, hair, clouds, rivers, numbers, animals, and mazes have meaning. The CANA Test is easy to administer and requires minimal equipment. It takes approximately 20 - 30 minutes for a complete administration including scoring time. The CANA Test consists of 10 quantitative domain-specific subscales, which are: Language; Immediate Verbal Recall; Immediate Visual Recall; Orientation; Attention; Visuospatial; Verbal Reasoning; Visual Reasoning; Delayed Verbal Recall; and Delayed Visual Recall. Additionally, the CANA Test allows the clinician to obtain more general measures of verbally processed information with the Verbal Quotient (VQ) and nonverbally processed information with the Performance Quotient (PQ). The Problem Solving Quotient (PSQ) allows an interpretative view of the ability to perform inductive reasoning, sequencing, synthesis, and analysis tasks. Finally, the overall cognitive functioning is measured with the Total Cognitive Quotient (TCQ).

The Alertness and Communication Subscale, used before the administration of the test, evaluates the level of alertness and ability to communicate. Performance on this subscale determines whether the remainder of the CANA Test should be administered.

The Language Subscale consists of eight items. There are four items measuring auditory comprehension by following single to multi-step commands. These items are similar to the Token Test created by Boller and Vignolo (1966). Three items require confrontation naming of common items found in nature similar to other naming tests such as the Multilingual Aphasia Exam (Benton & Hamsher, 1989) and the Boston Naming Test (Kaplan, Goodglass, & Weintraub, 1983). The last item is a category fluency test, which requires naming as many animals as possible within a limited time. This is based on work done by Spreen & Strauss (1991).

The Immediate Verbal Recall Subscale consists of four items. The subject is required to recall words from a five-word list during the first presentation. Three successive presentations of the list build a practice effect to obtain a subjective learning curve. This item is similar to the Auditory Verbal Learning Test (Rey, 1964; Taylor, 1959).

The Immediate Visual Recall Subscale consists of three presentations of geometrical figures (various arrangements of circles, squares, and triangles), which must be reproduced after a ten-second exposure. These items are patterned after the Benton Visual Retention Test (Benton, 1955) and the Wechsler Memory Scale - Revised (Wechsler, 1987).

The Orientation Subscale consists of eight items. The questions ask age, date of birth, place, city, year, month, day of week, and time. The one common question about the date of the month has been omitted. Actual experience with hospital patients showed that they were most likely oriented in all respects except the date of the month (Brown, 1990). Age and date of birth are robust components of memory and should be included in an orientation screen (Lezak, 1995).

The Attention Subscale consists of seven items. It includes the repetition of four and five digits forwards, and three and four digits backwards, and the repetition of a sentence. Finch (1997) reported repeating random numbers given by an examiner backwards to be highly sensitive to brain dysfunctions. Finch (1997) also suggested that sentence repetition is important in a screening battery even though it is less predictive than other tasks. The Multilingual Aphasia Examination includes an entire subtest on sentence repetitions (Benton and Hamsher, 1989). The final two items require the subject to count the taps of a pen on a table and count backwards from 30 to one. The tapping of the pen is an auditory, sustained attention task. Counting backwards is similar to the Mental Control Subtest from the Wechsler Memory Scales-Revised (Wechsler, 1987). All but the most grossly impaired should be able to complete these tasks (Lezak, 1995).

The Visuospatial Subscale consists of eight items. It includes numbers arranged randomly that are to be touched in correct numerical order forwards, and then backwards; an abstract visual pattern to be matched to one of six choices; a picture of a common object with a prominent feature missing which needs to be identified; and a photograph divided into four pieces which must be reassembled mentally. These items are similar to the Raven's Standard Progressive Matrices (Raven, 1960), the Picture Completion Subtest used in the Wechsler Intelligence Scale (Wechsler, 1955), and the Hooper Visual Organization Test (Hooper, 1983) respectively. The geometric figures from the Immediate Visual Recall Subscale are again reexamined for size, distortion, and rotational errors. A template is provided and can be used to quickly score these test items.

The Verbal Reasoning Subscale consists of four items. The first two items require the identification of similarities between two common objects. Finch (1997) found this task to be sensitive to brain dysfunctions. These items are patterned after the Similarities Subtest of the Wechsler Intelligence Scales (Wechsler, 1955). The next two items require the identification of the opposite of a word, which are simple tasks and should be easily performed.

The Visual Reasoning Subscale consists of seven items. The first item requires the identification of an abstract, logical pattern to determine what would follow to complete the pattern. According to Prigatano (1991) and Thurstone (1962), this is a frequently used construct for measuring reasoning abilities. The second item requires the identification of the correct sequence of events from four pictures of a story. This item is similar to the original Picture Arrangement subtest of the Wechsler Adult Intelligence Scale (Wechsler,

1955), which has been included in numerous forms in neuropsychological instruments. The third and fourth items require tapping hands or feet to a specific pattern. These motor tasks are similar to those found in the Luria-Nebraska Neuropsychological Battery (Golden, Purisch, & Hammeke, 1985). The fifth item is maze tracing patterned after the Porteus Maze Test (1959). Maze scores are highly sensitive to brain damage (Meirer, Ettinger, & Arthur, 1982; Porteus, 1965; Smith, 1960). The sixth and seventh items are a reexamination of Items 28 and 29 from the Visuospatial Subscale to determine if the numbers were touched in the correct numeric sequence both forwards and backwards. The patient needs to demonstrate the ability to sequence with this task.

The Delayed Verbal Recall Subscale consists of recalling the five words presented in the Immediate Verbal Recall Subscale after a delay of 10 to 15 minutes. This is similar to the delayed recall in the Auditory Verbal Learning Test (Rey, 1964; Taylor, 1959).

The Delayed Visual Recall Subscale consists of reproducing the three arrangements of the geometric figures presented in the Immediate Visual Recall Subscale after a delay of 10 to 15 minutes. These items are similar to those on several other tests (Prigatano, 1991; Wechsler, 1955; Rey, 1964; Taylor, 1959).

The sum of the Language, Immediate Verbal Recall, Attention, Verbal Reasoning, and Delayed Verbal Recall Subscales comprise the Verbal Quotient. The sum of the Immediate Visual Recall, Visuospatial, Visual Reasoning, and Delayed Visual Recall Subscales comprise the Performance Quotient. Many items have the ability to measure function in more than one area. Therefore, some of these items are included in the Problem Solving Quotient to measure ability to perform inductive reasoning, sequencing, and general analysis tasks.

The Total Cognitive Quotient of the CANA Test is comprised of the Verbal Quotient and the Visual Quotient and is used to identify the general level of cognitive functioning.

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