



Manual 9

Neurocognitive Function Summary

Investigators: Use Investigator's Manual

January 23, 2008 - Version 1

Study website - <http://www.csc.unc.edu/hchs/>

1. Introduction

Participants 45 years of age and older will be administered a brief battery of neurocognitive tests in the baseline HCHS/SOL examination. These measures will provide new information on cognitive functioning and its association with risk factors (behavioral, biochemical, and genetic) in Hispanics, a population that has been largely under-represented in studies of brain and cognitive aging to date. This first assessment will also establish a baseline for cognitive functioning in HCHS/SOL participants which, with repeated cognitive measurements in subsequent exams, will provide the opportunity to identify risk factors associated with change in cognitive functioning over time.

The baseline cognitive measures were chosen for their broad but efficient coverage of major cognitive domains. Additional factors considered in measurement selection included validation in Hispanic samples, comparability to measures used in previous cohort studies, feasibility with respect to the standardization of administration and scoring procedures, evidence of sensitivity in normal samples including a wide age range, and finally the feasibility of possible administration by phone in subsequent exams.

The measures of cognitive function administered in the HCHS/SOL baseline examination include the six-item screener, the Spanish English Verbal Learning Test, the Word Fluency Test of the Multilingual Aphasia Examination, and the Digit Symbol Substitution Test of the Wechsler Adult Intelligence Scale-Revised (WAIS-R). These measures tap five cognitive domains: global mental status, verbal learning and memory, word fluency, and psychomotor speed, respectively. In order to preserve the integrity of the HCHS/SOL neurocognitive battery, an abbreviated Manual of Procedures follows below.

2. Field Center Procedures

A trained examiner administers the cognitive function tests in a fixed order, one right after the other, during a single session in a quiet room. The tests are administered following the instructions printed on the Neurocognitive Assessment paper forms. Test results are tabulated by the interviewer after the participant has completed the tests and left the room. Test results are entered on the Neurocognitive Function DES screen by the examiner.

The order of test administration is as follows: (1) six-item screener, (2) Spanish English Verbal Learning Test, (3) Word Fluency Test, and (4) Digit Symbol Substitution Test. The testing environment and examiner behavior should be geared toward optimizing the participant's performance on each of the cognitive measures. General testing procedures are detailed below.

Testing should be conducted in a quiet area free of extraneous background noise and interruptions, as these distractions may affect test results.

Always inquire if the participant uses reading glasses or wears a hearing aid. If so, these items should be worn during testing.

The testing room must have a table with sufficient work space and appropriate lighting for the participant to comfortably complete the Digit Symbol Substitution Test.

A good quality stopwatch is necessary to time components of the cognitive function exam. The stopwatch should be simple to use, easy to read, and preferably one that allows the examiner to begin and end timing silently (some stopwatches produce a sound upon starting and stopping).

Timing should always be as discrete as possible to avoid producing anxiety and affecting test results.

Always read scripts exactly as written.

Each participant should be allowed to attempt every task, unless it is determined that the participant cannot do the task due to an obvious physical impairment.

Participant should never be told of any time limit on any measure.

Do not indicate to the participant whether specific responses are correct or incorrect.

Many participants may feel challenged by these tasks. It is important for the interviewer's attitude to be friendly, non-threatening, reassuring and supportive throughout the testing. Examiners should be sensitive to provide positive reinforcement after each test if appropriate.

2.1 Six-item Screener

The six-item screener is a short measure of global mental status. Following the script on the paper form, the examiner briefly explains the purpose of the cognitive function portion of the HCHS/SOL examination and then proceeds with the instructions for the six-item screener.

Callahan CM, Unverzagt FW, Hui SL, Perkins AJ, & Hendrie HC (2002). Six-item screener to identify cognitive impairment among potential subjects for clinical research. *Medical Care*, 40: 771-781.

2.2 Spanish English Verbal Learning Test

The Spanish English Verbal Learning Test (SEVLT) is a measure of new learning and verbal memory. The participant is asked to recall a list of common words over multiple trials and following a short delay.

Gonzalez HM, Mungas D, Reed BR, Marshall S, & Haan MN. (2001). A new verbal learning and memory test for English- and Spanish-speaking older people. *Journal of the International Neuropsychological Society*, 7: 544-555.

2.3 Word Fluency Test

The Word Fluency Test is a measure of verbal functioning. In this task, participants are asked to produce as many words as possible that begin with certain letters within a fixed time period, avoiding proper nouns, variations, plurals, and repetitions.

Spreen O & Strauss E (1998). *A Compendium of Neuropsychological Tests*, 2nd ed. New York: Oxford University Press.

2.4 Digit Symbol Substitution Test

The Digit Symbol Substitution Test (DSST) is a measure of psychomotor speed and sustained attention. In this task, the participant is asked to translate numbers to symbols using a key provided at the top of the form.

Lezak MD (1983). *Neuropsychological Assessment*, 2nd ed. New York: Oxford University Press.

3. Quality Control Issues and Procedures

3.1 Training and Certification

Prior to the first HCHS/SOL examination, examiners will be trained centrally to a common level of proficiency in the administration and scoring of the neurocognitive measures. Following central training, examiners will obtain approval from the field center lead examiner or study coordinator and submit five audio-taped neurocognitive assessments along with copies of the associated paper protocols to the Neurocognitive Reading Center at the University of Mississippi Medical Center for review. Certification assessments should not be performed on HCHS participants. Examiner certification for the neurocognitive portion of the HCHS/SOL exam is achieved by the successful administration and scoring of the five certification assessments reviewed and approved by the Neurocognitive Reading Center.

The field center lead examiner or study coordinator is responsible for the basic training of all new field center examiners. Following basic training and approval by the field center study coordinator, new examiners will submit five audio-taped neurocognitive assessments for review and approval by the Neurocognitive Reading Center for certification.

Maintaining proficiency in the administration of the neurocognitive measures requires regular exposure to the protocol. In order to maintain certification, examiners will administer the neurocognitive measures at least twice per month.

Recertification will be performed annually and requires the successful administration and scoring of one audio-taped neurocognitive examination reviewed and approved by the Neurocognitive Reading Center. An actual participant assessment may be submitted for recertification purposes.

3.2 Quality Assurance

Several procedures are in place to monitor data quality.

With participant approval, all assessments are routinely audio-taped for quality control. During the first six months of the study, two audio-taped exams and associated paper protocols for each examiner will be review by the Neurocognitive Reading Center to ensure appropriate pacing and technique, adherence to protocol, and accuracy of recorded responses and scoring. Notes about any inconsistencies and deviations from the established protocol will be sent to the field center lead examiner or study coordinator. After the initial 6 month period, one audio-taped exam and associated paper protocol for each examiner will be reviewed for accuracy and adherence to protocol by the Neurocognitive Reading Center

General feedback pertaining to all examiners is provided on monthly conference calls involving field center study coordinators. These calls also provide an opportunity to discuss and problem-solve any exam issues that arise.

The Neurocognitive Reading Center will conduct an annual site visit to the field centers to observe examiner performance and ensure an optimal testing environment.

Test score means and standard deviations are regularly tracked and reported for each examiner by the Data Coordinating Center allowing detection of outliers and investigation of possible systematic differences by examiner.