

NIH Toolbox

Administering the NIH Toolbox INTRODUCTION eLearning Module

Version 001



NIH Toolbox

Assessment of Neurological and Behavioral Function

EMOTION

Sensation

Cognition

MOTOR



NIH Toolbox

Assessment of Neurological and Behavioral Function

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NIH Toolbox | eLearning Overview

- What is covered
- What isn't covered
- Who benefits from eLearning



NIH Toolbox

Assessment of Neurological and Behavioral Function

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NIH Toolbox | Introduction

- The NIH Toolbox was an initiative of the National Institutes of Health (NIH).
- The NIH Toolbox is a set of brief, comprehensive assessment measures for use by clinicians and researchers.
- The NIH Toolbox focuses on measuring outcomes in longitudinal, epidemiologic studies and in prevention or intervention trials across the lifespan.
- The measures of the NIH Toolbox were developed simultaneously and normed together.



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NIH Toolbox Domains and Tests

Cognition	Motor	Emotion	Sensation	Supplemental
Picture Vocabulary Flanker Inhibitory Control and Attention List Sorting Working Memory Dimensional Change Card Sort Pattern Comparison Processing Speed Picture Sequence Memory Oral Reading Recognition	9-Hole Pegboard Dexterity Grip Strength Standing Balance 4-Meter Walk Gait Speed 2-Minute Walk Endurance	Psychological Wellbeing - Life Satisfaction - Meaning & Purpose - Positive Affect Negative Affect - Sadness - Fear - Anger Stress and Self-Efficacy - Self-efficacy - Perceived stress - Social Relationships - Social support - Companionship - Social distress - Positive social development	Pain Surveys Odor Identification Visual Acuity Dynamic Visual Acuity Toolbox Hearing Threshold Regional Taste Intensity	Cognition - Auditory Verbal Learning (Rey) - Oral Symbol Digit Emotion - Various Child and Proxy Report Measures - Apathy 18+ Sensation - Words-in-Noise - Hearing Handicap Inventory for Adults & Elderly Screening Version - Vision-Related Quality of Life



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Assessment Center | Where you begin

Assessment Center (AC) is the browser-based platform where you can access, practice, and administer the NIH Toolbox instruments.

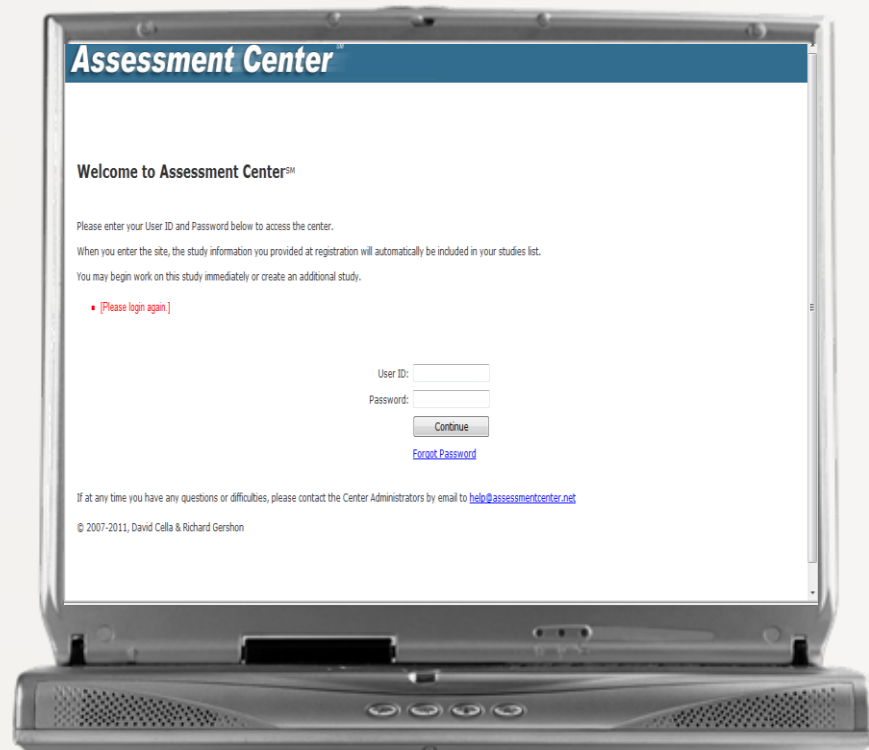
All Toolbox users must be registered in AC.

Toolbox users need to understand AC.

To do this, print the Training Manual section entitled Introduction to Assessment Center and follow the instructions provided.

One member of your team must setup the study in Assessment Center before any practice or testing can begin.

**For video tutorials, go to:
www.assessmentcenter.net**





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Introduction | Computer and Equipment

NIH Toolbox users need to set-up their computers in a specified manner.

-To do this, print out the Training Manual section entitled Introduction to the Computer & Special Equipment

Watch the video entitled: Setting up the Computer

Then follow the instructions in the manual regarding: the required cables, basic and special equipment, dual screen settings, laptop settings, and maintenance.





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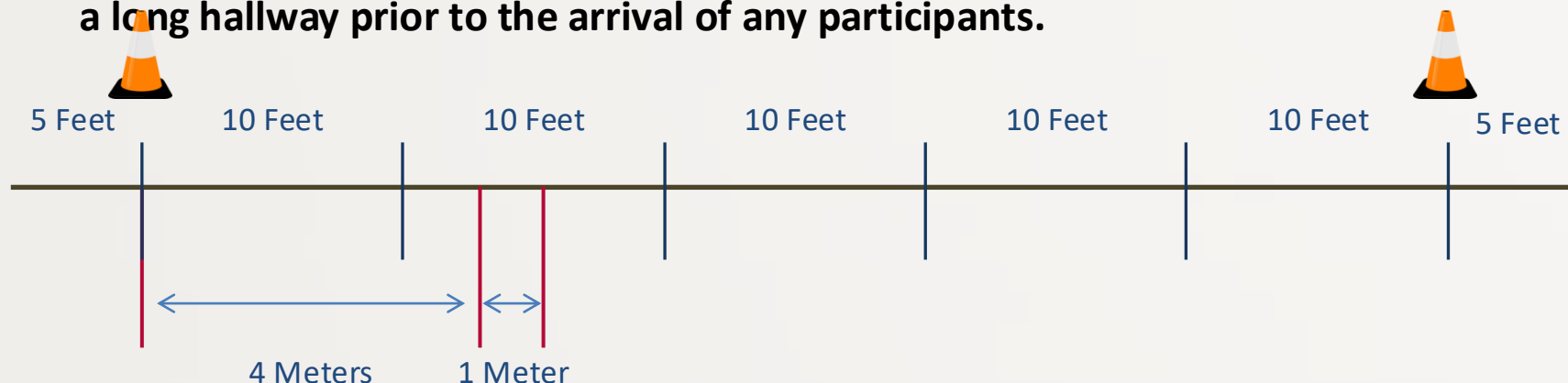
Computer Setup – Before Beginning

If you want to administer the Standing Balance Test, the Dynamic Visual Acuity Test or the Hearing Threshold Test, you need special equipment.

Instructions for these are in the Before Beginning part of the Training Manual section entitled Introduction to the Computer & Special Equipment.

Follow these printed instructions to learn the procedures.

In addition, if you are administering the two walking tests, a course needs to be set up in a long hallway prior to the arrival of any participants.





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Please Take A Moment to Print

Training Manual

Review which test batteries (or individual tests) are included in your study.

Then print the requisite materials, to do this:

- Click on the Attachments Button and then the Training Manual.
- Click on the introductory sections of the manual.
- Click on each test you wish to administer.
- Click on the Introduction to each test you chose.
- Click on the training instructions of the age(s) and language(s) of the group(s) you wish to test.

Print the materials selected.



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Learning to Administer Tests

Once you have printed the training materials, you are ready to learn to administer the NIH Toolbox. Start this process by:

- Clicking on the domain | test you wish to review.
- Reading the associated manual sections.
- Reviewing the associated e-Learning material.
- Reviewing the associated video demonstrations.
- Setting up computer and equipment for testing.
- Practicing the administration of the tests you have selected.
- Practicing at least 8 to 10 times with a live person.
- Printing the Administration Manual for your study.



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Main Menu

Select the Domain
in the Left Pane of
this Window



Cognition | Introduction

As a group, the measures of cognitive function assess a wide variety of activities that contribute to brain health. More specifically, this collection of measures includes activities such as: language; ability to plan and execute tasks in a goal oriented manner; various aspects of memory; processing speed; and attention.

These activities were chosen for their sensitivity to change across the life span. They can be used to assess functioning at a given point in time or change over the course of many years.



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Cognition

Select the Test(s)
in the Left Pane
of this Window





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Cognition Tests

Picture Vocabulary

Flanker Inhibitory Control & Attention

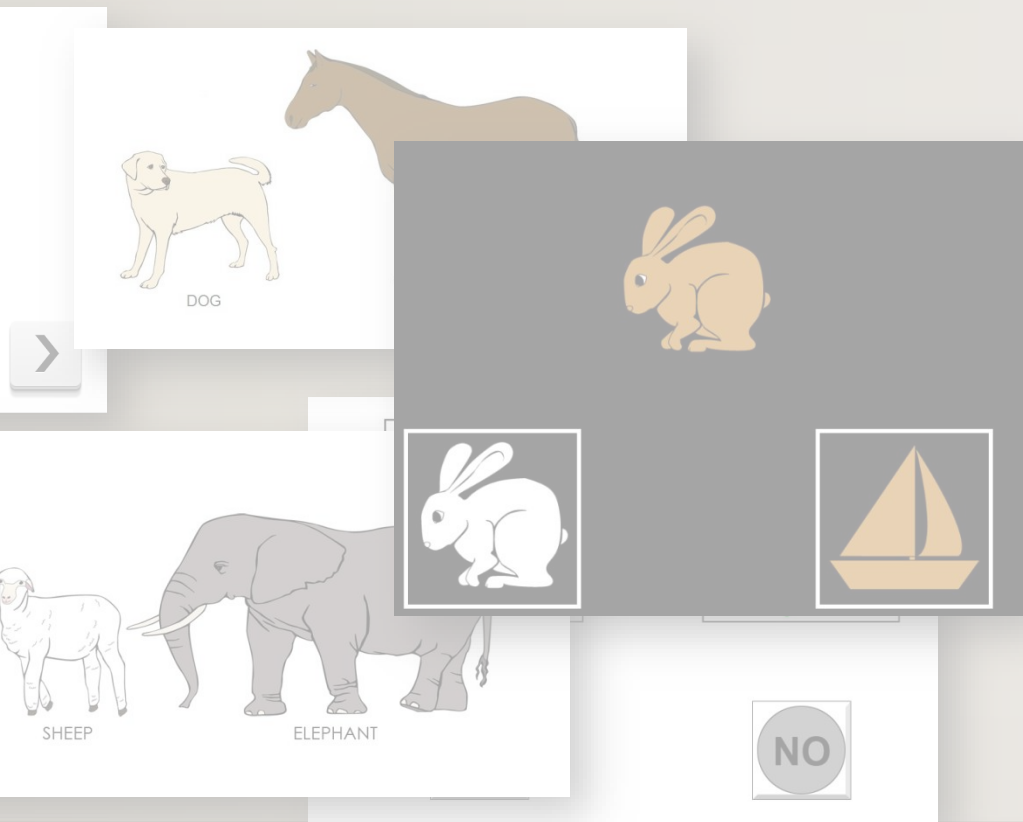
List Sorting Working Memory

Dimensional Change Card Sort

Pattern Comparison Processing Speed

Picture Sequence Memory

Oral Reading Recognition





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Cognition | Picture Vocabulary Test

Basic Information:

- This measure assesses receptive vocabulary.
- It is administered in a computer-adaptive format.
- Participants are presented with a recorded voice saying a word and four pictures on the computer screen.
- The participant is instructed to use the mouse to click on the picture that most closely shows the meaning of the word that was said.

Materials:

- Laptop, Monitor, Speakers, and Mouse





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Cognition | Picture Vocabulary Test

Administration/Set up:

- The examiner reads the opening/introductory instructions.
- All other instructions are pre-recorded.
- The speaker should be on and set to an appropriate level.
- The participant should be able to use the mouse.
- If the participant cannot use the mouse, he/she may point and the examiner can click for the participant.
- After the examiner reads the instructions, he/she provides feedback as needed during the practice items.
- The examiner starts the test.
- If the participant does not understand the word after several repetitions, the examiner may say the word one more time.





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Cognition | Flanker Inhibitory Control & Attention Test

Basic Information:

- This is a measure of executive function that measures attention and ability to inhibit automatic responses that may interfere with achieving goals.
- For young children (ages 3-7), fish are flanked by two fish on each side. For older children and adults, arrows are flanked by two arrows on each side.
- There are two types of trials, congruent and incongruent. In the test, the congruent and incongruent trials are mixed.
- The word *middle* appears in the middle of the screen; for younger participants (ages 3-11), a prerecorded voice says "MIDDLE" as well.
- All participants are instructed to use their index finger to choose the arrow on the keyboard that matches the direction which the MIDDLE fish or arrow is pointing.
- The examiner should remind the participants, if needed, to use only their index finger (and not to toggle two fingers over the arrow keys).
- All the instructions are on the screen.





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Cognition | Flanker Inhibitory Control & Attention Test

Materials:

- A laptop, a monitor, speakers, and a keyboard

Administration/Set up:

- Keyboard is in front of the participant and the mouse is out of the participant's view.
- Ensure speakers are working.
- Instructions are on the screen.
- Read the instructions to and/or with the participant and points out the relevant aspects of the stimuli on the screen.
- At times, start practice or test items from the examiner's screen.
- For four practice trials, if the participant responds incorrectly, the computer voice prompts him/her to choose the correct button.
- The participant must get at least 3 out of 4 practice trials correct to advance to the test trials. If a participant gets fewer than 3 out of 4 practice trials correct, he/she will complete up to two more sets of 4 practice trials.
- There is one block of 20 test trials for all participants. If a participant, age 3-7, achieves 90 percent correct on the fish trials, he/she will also receive a set of 20 arrow trials.





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Cognition | List Sorting Working Memory Test

Basic Information:

- This measures assesses the capacity to process information across a series of tasks and modalities.
- It requires the participant to sequence increasingly lengthy sets of visually and orally presented stimuli in size order from smallest to biggest.
- Pictures of different foods and animals are displayed with both a sound clip and written text that names them.
- There are two conditions: 1-List and 2-List.
- In the 1-List condition, participants are required to order a series of objects (either food or animals) in size order from smallest to biggest. In the 2-List condition, participants are presented both food and animals and are asked to order the food first in from smallest to biggest, then to order the animals in from smallest to biggest.
- Younger children have 4 practice items in each condition.
- Older participants have 2 practice items that both are “flashing” in each condition.
- The instructions vary for different age and language groups.
- The same test items are administered to all participants regardless of age.
- All of the actual test items are presented in a “flashing” manner.





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Cognition | List Sorting Working Memory Test

Materials:

- A laptop, a monitor, speakers, and a mouse

Administration / Set up:

- The examiner should ensure that the speakers are turned on and working.
- All instructions are on the screen.
- The participant answers verbally and must name all the stimuli in the correct order without any intrusions.
- The examiner records the correctness of participant responses on the examiner's screen.
- For some items, participants may give a synonym for either a food or animal item.
- The examiner may remind the participants to pay attention to the size of the object on the screen.
- There are several discontinue rules embedded in the software.
- The examiner introduces the test items in the 2-conditions.
- During the 2-List condition, the examiner may remind participants of the rules.
- The test ends when a participant does not succeed with either item at a given level of difficulty.



HORSE



Go Back

Back to Tests



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Cognition | Dimensional Change Card Sort Test (DCCS)

Basic Information:

- It is a measure of executive function that also assesses cognitive flexibility and attention.
- There are two target pictures presented; these vary along two dimensions-- shape and color.
- Participants are asked to match sets of two test pictures that differ in color to the target pictures. The relevant dimension for sorting is indicated by a cue word—"shape" or "color" that appears in the middle of the screen.
- For younger children, the relevant dimension is also spoken by a prerecorded voice.
- Practice items use White and Brown colors and Rabbits and Sailboats as shapes.
- Test items used Blue and Yellow colors and Balls and Trucks as shapes.
- All participants are instructed to use their index/pointer finger to choose the arrow on the keyboard that matches which of two pictures on screen corresponds to the relevant aspect of the stimulus presented.
- The examiner should remind the participants, if needed, to use only their index finger.
- All the instructions are on the screen.

Materials:

- A laptop, a monitor, speakers, and a keyboard





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Cognition | Dimensional Change Card Sort Test (DCCS)

Administration / Set up:

- The keyboard should be in front of the participant and the mouse is out of the participant's view.
- The speakers should be working and at an appropriate level.
- All the instructions are on the screen.
- The examiner reads the instructions to and/or with the participant and points out the relevant aspects of the stimuli on the screen.
- The examiner must start practice or test items from the examiner's screen.
- The participant is given four practice trials with each dimension.
- If the participant responds incorrectly, the computer prompts him/her to choose the correct image.
- The participant succeed with at least 3 out of 4 practice trials to advance to the test trials. If the participant gets fewer than 3 out of 4 practice trials correct, he/she will complete up to two more sets of 4 practice trials with the same cutoff. If the participant does not meet the cutoff, the task will automatically terminate.





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Cognition | Dimensional Change Card Sort Test (DCCS)

- The examiner does not prompt the participant to respond during the test trials.
- If the participant does not respond after 10 seconds, the program will automatically advance to the next test trial.
- There are different test trial configurations for 3-7 year olds and those older than 7 years of age.
- Participants, ages 3-7 years, complete an introduction to the new color and 5 color items, followed by an introduction to the new shapes and 5 shape items. Then these participants are presented with a mixed block of 30 shape or color items.
- Participants, 8 and older, are only presented with a mixed block of 30 shape or color items.



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Cognition | Pattern Comparison Processing Speed Test

Basic Information:

- This task is designed to measure processing speed.
- This task requires participants to discern whether two side-by-side pictures are the same or not.
- Younger children make this decision by choosing either a smiley face or a frown face.
- Older children and adults make this decision with YES or NO buttons on the screen.
- All participants are instructed to use their index finger to choose the arrow on the keyboard that matches either the smiley or frown face or the yes or no buttons.
- The examiner should remind the participant, if needed, to use only the index finger (and not to toggle two fingers over the arrow keys).
- The test itself takes only 90 seconds.

Materials:

- Laptop, a monitor, speakers, and a keyboard





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Cognition | Pattern Comparison Processing Speed Test

Administration / Set up:

- The examiner should ensure the keyboard is in front of the participant and that the mouse is out of the participant's view.
- The examiner should ensure that the speakers are working.
- All the instructions are on the screen.
- The practice items for young children differs from practice items for older children and adults.
- All participants use the arrow keys on the keyboard to make their choices.
- The practice items are not timed.
- If a participant continues to make errors after being corrected on two practice items, the computer will not administer the test items.
- During practice items only, a recorded voice will follow give feedback.
- During testing, the examiner can give participants prompts to stay on task.



Pattern Comparison | Test Your Knowledge

Question 1 of 3

Point Value: 10



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Test Your Knowledge

This is a measure of processing speed.

- ☐ True
- ☐ False

Please select your answer and click the **Submit** button.

PROPERTIES

On passing, 'Finish' button:

On failing, 'Finish' button:

Allow user to leave quiz:

User may view slides after quiz:

User may attempt quiz:

Goes to Next Slide

Goes to Next Slide

After user has completed quiz

At any time

Unlimited times



Properties...



Edit in Quizmaker



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Cognition | Pattern Comparison Processing Speed Test

Click Next to return to the Cognition Test List or if you are finished with the Cognition Test (or tests) you wish to learn, click on the Best Practices in the navigation pane on the left hand side of the screen.



Next





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Cognition | Picture Sequence Memory Test

Basic Information:

- This measure assesses episodic memory using sequences of pictured objects and activities that are presented in a particular order.
- Participants are asked put the pictures back in the sequence that was shown.
- The examiner teaches the participants to move pictures on the screen before beginning the test.
- After the training, there are different practice and test sequences for participants of differing ages.
- Examiners may need to remind participant to watch the screen.
- Examiners should not allow participants to use the mouse while the pictures are being presented.
- Initially, the examiner and participant should be seated next to each other so that both are able to access the participant's screen.
- The examiner has a different screen from the participant.

Materials:

- Laptop, monitor, speakers, mouse





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Cognition | Picture Sequence Memory Test

Administration/ Set up:

- The examiner should set up the computer so that both the participant and the examiner can view the participant's screen.
- Only the examiner should be able to see the examiner's screen.
- Most of the examiner's instructions are on the examiner's screen.
- There is a training sequence; this is the same for all ages. The training involves demonstration & practice of 3 steps:
 - 1) Moving pictures from the yellow box to the gray boxes
 - 2) Moving pictures from the gray boxes back to the yellow box;
 - 3) Moving pictures between the gray boxes.
- After the training sequence, there are practice sequences with feedback.





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Cognition | Picture Sequence Memory Test

- The examiner introduces the practice sequences with a standardized instruction.
- Each practice and test item is introduced with a statement that the examiner is going to show the participant how to ... go camping, have a birthday party, play in the park, etc.
- After the examiner starts the sequence, pictures will appear on the participant's screen and a voice recording will say the appropriate labels.
- When the sequence is completed, the examiner will say: That's how to... go camping, have a birthday party, play in the park, etc.
- Once computer has scrambled pictures, the examiner says: Now, I want you to move the pictures to show me how to... go camping, have a birthday party, play in the park, etc. I want you to show them back to me in the same way, in the same order that I showed you.
- The practice and test sequences follow the same format.





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Cognition | Oral Reading Recognition Test

Basic Information:

- Assesses a participant's ability to read and pronounce letters and words as accurately as possible.
- In both English and Spanish, the administration is individualized using a computerized adaptive format.
- For the youngest children, the initial items require identify of letters in an array with 3 symbols or to identify a specific letter in an array of 4 letters.
- In both English and Spanish, the administration is individualized using a computerized adaptive format.
- Items are presented in order of difficulty – the computer adjusts the difficulty level of items depending on the participant's performance.
- The number of items presented will depend on age and competence, but will be approximately 25 for most participants.

Materials:

- Laptop, monitor, speakers, mouse





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Cognition | Oral Reading Recognition Test

Administration/Set up:

- The examiner must learn the pronunciation of the words and letters presented to be able to assess the correctness of a participant's response.
- Each participant will see a series of letters and words presented one at a time on the computer screen.
- Items are presented in order of difficulty – the computer adjusts the difficulty level of items depending on the participant's performance.
- The number of items presented will depend on age and performance, but will be about 25 for most participants.
- The computer will administer each item one by one, in an untimed fashion, until the test is completed.
- The examiner introduces the task with standard instructions.
- For children ages 3-4 years, the first item(s) require them to point to a letter rather than to name it.
- Most instructions are on screen.
- If the participant says: I don't know this one or I can't read it, the examiner can reassure the participants with a standard prompt.





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Best Practices

- Set up computer and equipment for testing.
- Practice administering the tests with a live person.
- Practice at least 8 to 10 times with a live person.
- Print the administration manual for your study.

If Finished Click Here
(Link to Next Slide)

Click Here for Additional
Domains
(Link to Slide109)

Motor | Introduction

As a group, the measures in the motor domain help assess a person's overall physical health, ability to perform activities of daily life, and his/her health status.

This group of measures taps into a variety of activities including: how strong a person's muscles are; how quickly a person can manipulate objects; how well a person can maintain balance; a person's usual walking speed; and a person's endurance.



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Select the Test(s)
in the Left Pane
of this Window





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Motor Tests

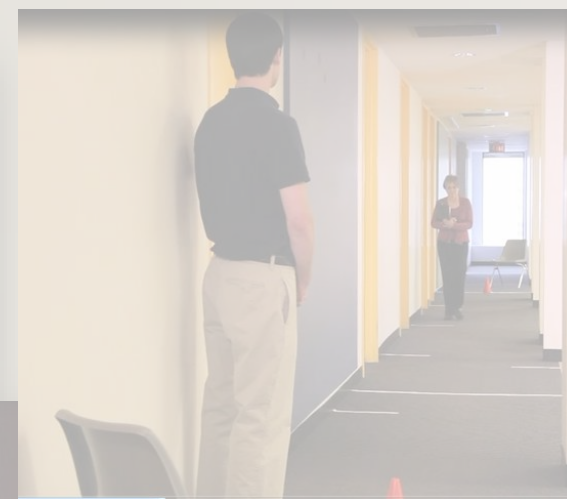
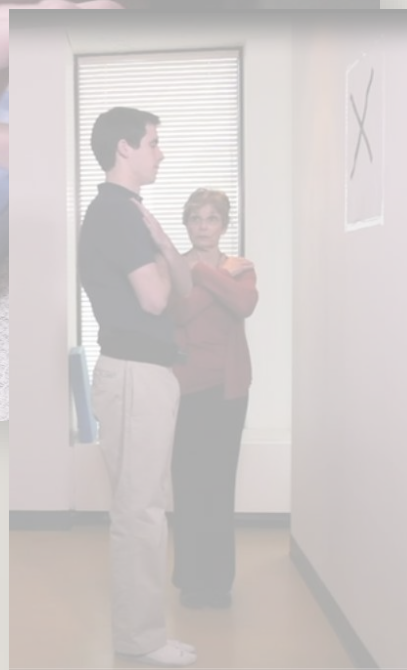
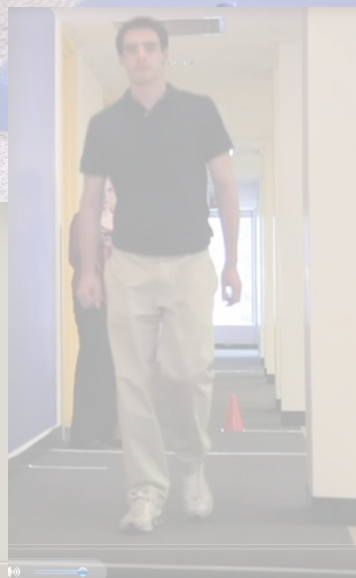
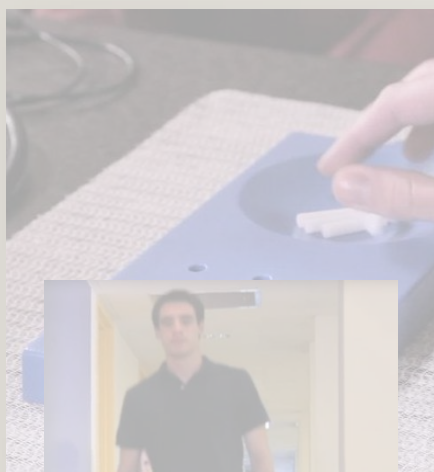
9-Hole
Pegboard
Dexterity

Grip Strength

Standing
Balance

4-Meter Walk
Gait Speed

2-Minute Walk
Endurance





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Motor | 9-Hole Pegboard Dexterity Test

Basic Information:

- This measure assesses fine motor dexterity.
- Data is recorded using an on-screen timer (or a motor data sheet).
- Instructions are in English and Spanish
- Administered to participants ages 3 and older

Materials:

- 9-Hole Pegboard with extra pegs, Laptop (or Stopwatch and Data Sheet with clipboard, if needed)





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Motor | 9-Hole Pegboard Dexterity Test

Administration/Set up:

- The pegboard is positioned on the table with the cup on the side of the hand being tested.
- The examiner demonstrates the task.
- The examiner holds spare pegs in his/her hand should the participant drop a peg.
- There are practice and test trials for each hand.
- Specific instructions are read by the examiner and outlined on the screen.
- The practice and test trials begin when the examiner says “Go” and end when the last peg is returned to the cup.



Motor | 9-Hole Pegboard

Question 1 of 3

Point Value: 10



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Test Your Knowledge

This is a measure of processing speed.

- ☐ True
- ☐ False

Please select your answer and click the **Submit** button.

PROPERTIES

On passing, 'Finish' button:

On failing, 'Finish' button:

Allow user to leave quiz:

User may view slides after quiz:

User may attempt quiz:

Goes to Next Slide

Goes to Next Slide

After user has completed quiz

At any time

Unlimited times



Properties...



Edit in Quizmaker



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Motor | 9-Hole Pegboard Test

Click [Next](#) to return to the Motor Test List or if you are finished with the Motor Test (or tests) you wish to learn, click on the Best Practices in the navigation pane on the left hand side of the screen.



Next





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Motor | Grip Strength Test

Basic Information:

- This measure assesses upper extremity strength.
- The instructions are on the examiner's screen.
- This measure is administered by an examiner and the data entered on the computer.

Materials:

- Laptop (or data sheet) & Dynamometer





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Motor | Grip Strength Test

Administration/Set up

- The examiner must turn on the dynamometer, and press RESET and TEST between each trial.
- Participant sits in a chair with his/her feet flat on the floor and his/her knees at a 90-degree angle.
- The arm being tested should be at a 90-degree angle, next to but not touching the participant's body.
- The examiner supports the dynamometer during testing.
- The examiner demonstrates, explains the testing procedures, and asks the participant to squeeze.





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Motor | Standing Balance Test

Basic Information:

- This measure assesses postural sway and can be used to determine a participant's vestibulo-spinal function.
- There are 5 Poses for participants ages 7 and older; 4 poses for ages 3 to 6.
- The examiner demonstrates each pose and then the participant has 2 trials to hold the pose/position for 50 seconds.

Materials:

- Laptop, mouse, flip chart paper, accelerometer unit, Blue Airex Balance Pad





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Motor | Standing Balance Test

Exclusions:

- See the Training Manual for a full list of exclusion criteria

The five poses are:

- Pose 1: flat surface, feet together, eyes open
- Pose 2: flat surface, feet together, eyes closed
- Pose 3: on foam, feet together, eyes open
- Pose 4: on foam, feet together, eyes closed
- Pose 5: flat surface, tandem stance, eyes open





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Motor | Standing Balance Test

Administration/Set up:

- Go to the Introduction to the Computer section entitled Before Beginning to pair the equipment with the computer.
- Participants do this test without their shoes on.
- Participants wear an accelerometer on a gait belt; the accelerometer communicates with the computer via blue tooth.
- The examiner demonstrates each pose.
- Participants have up to two trials to succeed.
- Participants should be told to step out of the pose if they are feeling unsafe or unable to hold the pose.
- There are discontinuation rules built into the computer program.





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Motor | 4-Meter Walk Gait Speed Test

Basic Information:

- This measure of assesses the usual walking speed.
- It is administered in an open hallway .
- It is timed with a stop watch.
- There are two timed trials and one practice trial.
- The times are recorded on a data sheet for later transfer to the computer.
- This measure should not be done in comfortable shoes.

Materials:

- Stopwatch, measuring tape, 2 cones, marker tape, data sheet and clipboard





NIH Toolbox

Assessment of Neurological and Behavioral Function

EMOTION
Sensation
Cognition
MOTOR

Motor | 4-Meter Walk Gait Speed Test

Administration/Set up:

- The examiner sets up the walking course before testing begins and the participant arrives.
- The examiner demonstrates the task before having the participant do a practice walk.
- The participant himself /herself is given 2 test trials
- The examiner needs to carefully time the participant's speed.
- The examiner begins timing when the participant steps (first footfall) over the starting line.
- The examiner walks behind and to the side of the participant as he/she walks.
- The examiner stops timing when one of the participant's feet is completely across end/finish line (the line at 4 meters – not the line at 5.0 meters).
- The examiner records the data on the record form and later transfers it to the computer.
- If the participant stumbles or tries to run, the examiner should void that trial and ask the participant to do another trial.





NIH Toolbox

Assessment of Neurological and Behavioral Function

EMOTION

Sensation

Cognition

MOTOR

Motor | 2-Minute Walk Endurance Test

Basic Information:

- This measure assesses stamina
- It is administered in an open hallway.
- The examiner starts timing and then using the data sheet, marks off the laps on grid as they are completed.
- Each time participant goes around a cone, the examiner marks off a lap on the data sheet grid.
- At the end of two minutes, the examiner marks the place where the participant stops.
- The measurements are recorded on a data sheet and later transferred to the computer.
- Participants must wear comfortable shoes.

Materials:

- Laptop, stopwatch, measuring tape, 2 cones, marker tape, chair, data sheet, and clipboard





NIH Toolbox

Assessment of Neurological and Behavioral Function

EMOTION

Sensation

Cognition

MOTOR

Motor | 2-Minute Walk Endurance Test

Administration/Set up:

- Before the participant arrives and testing begins, the examiner sets up the walking course.
- The examiner should have the Administration Instructions and data sheet on a clipboard.
- The examiner describes the task to the participant.
- The examiner introduces the task by asking the participant if there are any reasons why he/she cannot do the task.
- The examiner demonstrates the task and has the participant try one round before beginning the actual test.
- When the test is completed, the examiner transfers the data from the data sheet to the computer.



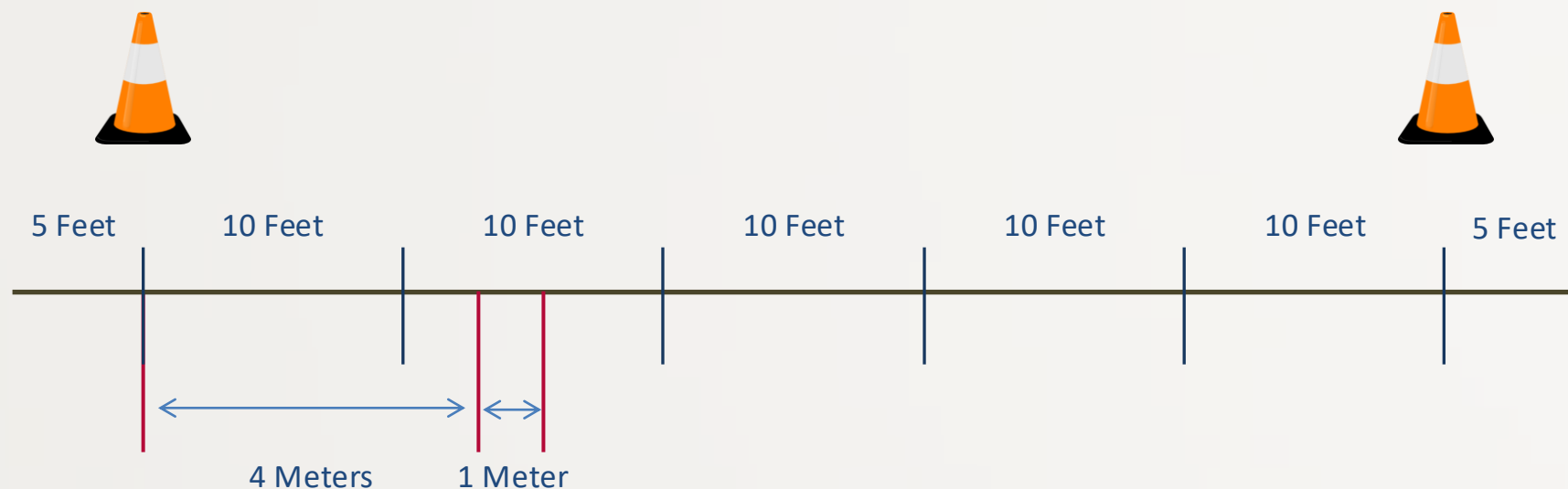


NIH Toolbox

Assessment of Neurological and Behavioral Function

EMOTION
Sensation
Cognition
MOTOR

Setup for 2-Min and 4-M Walking Test





NIH Toolbox

Assessment of Neurological and Behavioral Function

EMOTION
Sensation
Cognition
MOTOR

Best Practices

- Practice administering the tests with a live person.
- Practice at least 8 to 10 times with a live person.
- Print the administration manual for your study.



NIH Toolbox

Assessment of Neurological and Behavioral Function

EMOTION
Sensation
Cognition
MOTOR

Emotion

Select the Test(s)
in the Left Pane
of this Window





NIH Toolbox

Assessment of Neurological and Behavioral Function

EMOTION
Sensation
Cognition
MOTOR

Sensation

Select the Test(s)
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NIH Toolbox

Assessment of Neurological and Behavioral Function

EMOTION
Sensation
Cognition
MOTOR

Supplemental

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