NIH Toolbox®—Changes from V2 to V3

Summary of Key Differences

NIH Toolbox V2 users may understandably have questions about what has changed in the NIH Toolbox V3 app. _Please note that the changes below only pertain to NIH Toolbox V3._ **_These changes DO NOT in any way impact NIH Toolbox V2._** _NIH Toolbox V2 users must continue to use the NIH Toolbox V2 app and materials as-is._

The following list summarizes the key differences between these two apps.

- The NIH Toolbox V3 app is a new app that is separate from the NIH Toolbox V2 app. To use V3, users will need to install the new NIH Toolbox V3 app and purchase a separate subscription.
- NIH Toolbox V2 subscriptions, participants, custom batteries, and collected data cannot be copied or moved to V3.
- NIH Toolbox V3 Subscriptions:
    - There are 3 NIH Toolbox V3 subscription options available in 1-year increments:
        - Up to 2 Devices for $600
        - Up to 6 Devices for $1,500
        - Up to 10 Devices for $2,500
    - NIH Toolbox V3 subscriptions are not offered for single iPads.
    - Subscriptions are linked to specific iPads. Subscriptions can be deactivated from one device and activated on another if needed. For more information, please refer to NIHToolbox.org.
- New shell features were added to enhance users' experience with the V3 app, such as expandable test card details, quick links on the landing page, and buttons on the left side of the screen allow users to quickly navigate to any section of the app. Additional features will continue to be added to the NIH Toolbox V3 app through 2025.
- Some changes have been made to the Participant Demographics screen.
    - Date of Birth is now a required field. This allows the app to calculate the participant's age. If users are concerned about entering the exact date of birth (for PHI or other reasons), one alternative is to enter 01. For instance, if a participant is born on 04/04/2015 but the examiner wishes to protect this PHI, they may elect to enter 04/01/2015 instead. Please note that this may impact calculated age.
    - NIH Toolbox V3 data collection efforts recruited participants based on their sex assigned at birth. For this reason, the "Gender" field was renamed to "Sex Assigned at Birth". A "Gender Identity" field will be added in a future update. Both fields are optional and will not impact how normative scores are produced by the app.

- - The "Unknown" option in the Handedness field was renamed "Ambidextrous/Unknown".
- Examiner passcodes have been updated from 4 digits to 8 digits for stronger app security.
- The examiner interface and user experience (UX/UI) have been updated for streamlined workflows and simpler navigation.
- Participant-facing tests have consistent UX/UI across the app (e.g., consistent background color and font).
- Title screens that appear before each test now have colored banners that correspond to the given test's domain, as well as icons noting if extra equipment or materials are needed to administer the test.
- The "Touch and hold here to continue" button was replaced with "Slide to continue".
- Where appropriate, the test instructions were recorded and are now played by audio to facilitate more standardized test administration. "Play again" buttons have been added for certain instruction screens in the event the participant needs to hear the instructions again.
- Where appropriate, a "Next" button and a "Back" button have been added to many test screens to give examiners more flexibility with replaying the instructions in case of distractions or if the participant did not clearly hear or understand the instructions the first time. "Next" and "Back" buttons were not added to live items.
- Test names within the app have been shortened to make it easier to navigate the test list (e.g., "NIH Toolbox Pattern Comparison Processing Speed Test Age 7+ v2.1" has been shortened in the V3 app to "Pattern Comparison Processing Speed").
- New tests have been added and are detailed in Chapter 4 of the NIH Toolbox V3 Administration Manual: Face Name Associative Memory Exam, Face Name Associative Memory Exam Delay, Rey Auditory Verbal Learning Delay, Speeded Matching, and Visual Reasoning.
- Images in the Dimensional Change Card Sort, List Sorting Working Memory, and Pattern Comparison tests have been updated, and select outdated images from Picture Vocabulary have been replaced (e.g., old flip phone).
- The 'Home Base' sheet which was used for the V2 administration of Dimensional Change Card Sort and Flanker Inhibitory Control and Attention is no longer required for these tests in V3. Removing this administration requirement eliminated a relatively significant motor component for participants who needed to return their finger to Home Base after each item. It also allows participants to use a tapping strategy that works best for them (e.g., finger hovering approach).
  - **NIH Toolbox V2 users MUST continue to use Home Base, as detailed in the NIH Toolbox V2 Administrator's Manual, V2 support documentation, and V2 training materials.**

- The Administrator Gesture has been updated. Instead of placing two fingers on the screen and turning clockwise like in V2, V3 users should place three fingers vertically on the screen and swipe to the left.
- The 'Stop Assessment' and 'Skip Instrument' reasons have been revised.
- It is possible to delay tests in an administration by moving them after other tests.
- Score reports have been updated in V3. Longitudinal reports are planned to be added in 2025, and interpretive reports are planned for 2026.
- In a major update in 2024, several changes were made to the V3 app, including the addition of five new tests, the addition of a new preset battery, and the addition of a new Cognition composite score. These updates are detailed in the sections below.

Available Tests

The following tables contain the list of NIH Toolbox tests that were available in V2, their names in V3, and the key differences between them. All tests have updated UX/UI (e.g., universal background color, font, and buttons). Where appropriate, the test instructions were recorded and are now played by audio to facilitate more standardized test administration. "Play again" buttons have been added to certain instruction screens in the event the participant needs to hear the instructions again.

Cognition

- Instructions for Cognition tests have been streamlined and made consistent across tests where possible. Except for Oral Symbol Digit, all instructions for tests in the Cognition domain are read by the audio for consistent administration.
- Consistent UI has been implemented to help examiners and participants better understand feedback (e.g., buttons blink in red if a response is incorrect). When possible, multiple ways to convey a message, like correct or incorrect, were added to the app. For example, responding correctly on practice items might show a green checkmark as well as audio saying the response was correct. Incorrect responses might show a red X in addition to audio saying the response was incorrect.
- Many tests in V2 had separate instructions for different age groups and simpler practice items for younger participants. These instructions and practice items were revisited in V3 so there is now one version of each test that is appropriate for participants of all ages. For example, the three V2 NIH Toolbox Dimensional Change Card Sort Tests (for ages 3-7, ages 8-11, and ages 12+) were streamlined into one Dimensional Change Card Sort test in V3.
- New normative data were collected for Cognition tests, and the resulting analyses informed some updates to the scoring; updates to item calibrations, updates to basal rules, ceiling rules, and fail rules; and slight changes to appropriate test age ranges.
- In an update in 2024, process scores were added to the Score Report and exports for the following Cognition tests: Dimensional Change Card Sort, Face Name Associative Memory Exam Delay, Flanker Inhibitory Control and Attention, Pattern Comparison Processing Speed, Rey Auditory Verbal Learning, Rey Auditory Verbal Learning Delay, and Speeded Matching.
- In an update in 2024, the age range for the Visual Reasoning test was downward extended from ages 4+ to ages 3+.
- A new Cognition preset battery was added in 2024: Early Childhood Cognition Battery—Crystallized-Fluid-Processing Speed (CFPS) (Ages 3-6). This battery was designed to be developmentally appropriate for participants ages 3–6, but it can also be administered to participants up to age 8 ½ and will produce "extended" normative data. This battery includes tests that assess executive function, processing speed, and language. Tests in this battery include Picture Vocabulary, Visual Reasoning, and Speeded Matching. Administering all tests in the Early Childhood Cognition Battery (CFPS) will produce the newly added Early Childhood CFPS Composite score.
- In addition to the Summary of Key Differences listed above, the following changes have been made to the Cognition tests:

Test Name in NIHTB V2	Test Name in NIHTB V3	Key Differences
NIH Toolbox Dimensional Change Card Sort Test Ages 3-7 NIH Toolbox Dimensional Change Card Sort Test Ages 8-11 NIH Toolbox Dimensional Change Card Sort Test Age 12+	Dimensional Change Card Sort	• Age range changed from 3+ to 4+ • Home Base has been removed • Images have been redrawn (but are the same content) • Orange images have replaced the yellow images • The star in the middle of the screen has been removed • The target dimension (i.e., color or shape) is now said aloud and presented visually
N/A	Face Name Associative Memory Exam	New test
N/A	Face Name Associative Memory Exam Delay	New test
NIH Toolbox Flanker Inhibitory Control and Attention Test Ages 3-7 NIH Toolbox Flanker Inhibitory Control and Attention Test Ages 8-11 NIH Toolbox Flanker Inhibitory Control and Attention Test Age 12+	Flanker Inhibitory Control and Attention	• Age range changed from 3+ to 4+ • Home Base has been removed • All participants see the same stimuli (fish with arrows placed over them) • The "MIDDLE" audio and text has been removed from practice and live items to reduce language dependence • All participants get 5 practice items

NIH Toolbox List Sorting Working Memory Test Ages 3-6 NIH Toolbox List Sorting Working Memory Test 7+	List Sorting Working Memory	• Age range changed from 3+ to 5+ • V2 Items C and D were removed; failing items A and B ends the test • Each list has 2 practice items, with 2 trials each (additional practice items were removed) • All images were redrawn • Blueberry was replaced with Bean • Pumpkin was replaced with Cake • A chime sound was added to the end of each list to signify to the participant the list has ended and they can start responding • Age-based start points were introduced • Both images of a given sequence are presented, even if the participant answered the first item in the sequence correctly
NIH Toolbox Oral Reading Recognition Test Age 3+	Oral Reading Recognition	• Age range changed from 3+ to 7+
NIH Toolbox Oral Symbol Digit Test 8+	Oral Symbol Digit	• Age range changed from 8+ to 5+ • The symbol and number grids were reformatted and reoriented to portrait orientation so the number of symbols on each row on the paper lines up with the app; 1 symbol was removed in this process • This test provides normed scores
NIH Toolbox Pattern Comparison Processing Speed Test Ages 3-6 NIH Toolbox Pattern Comparison Processing Speed Test Age 7+	Pattern Comparison Processing Speed	• Age range changed from 3+ to 5+ • Entering the participant's dominant hand is no longer required and does not impact scoring • Images have been redrawn (but are the same content) • Smile/Frown faces have been removed; all participants have Yes/No response options • There are now 3 practice items all participants • Live test response time has been updated from 85 seconds to 80 seconds

NIH Toolbox Picture Sequence Memory Test Ages 3-4 Form A NIH Toolbox Picture Sequence Memory Test Ages 5-6 Form A NIH Toolbox Picture Sequence Memory Test Age 7 Form A NIH Toolbox Picture Sequence Memory Test Age 8+ Form A NIH Toolbox Picture Sequence Memory Test Ages 3-4 Form B NIH Toolbox Picture Sequence Memory Test Ages 5-6 Form B NIH Toolbox Picture Sequence Memory Test Age 7 Form B NIH Toolbox Picture Sequence Memory Test Age 8+ Form B NIH Toolbox Picture Sequence Memory Test Ages 3-4 Form C NIH Toolbox Picture Sequence Memory Test Ages 5-6 Form C NIH Toolbox Picture Sequence Memory Test Age 7 Form C NIH Toolbox Picture Sequence Memory Test Age 8+ Form C	Picture Sequence Memory Form A Picture Sequence Memory Form B	• The tutorial/training has been animated • Participants ages 3-5 see the ice cream and birthday practice items; everyone else sees the camping practice item • Each practice item (regardless of age) has 2 trials • The direction to move the pictures after they have been presented has been shortened in V3 • Form A always presents the *Fair* theme first and Form B always presents the *Park* theme first; the participant's performance determines how many images are in the next trial and whether the next trial will show the same theme or the opposite one • PSM Form C has been removed
NIH Toolbox Picture Vocabulary Test Age 3+	Picture Vocabulary	• Outdated images were replaced • The "Touch the picture of…" audio for young children was removed
NIH Toolbox Auditory Verbal Learning Test (Rey) 8+	Rey Auditory Verbal Learning	• Age range changed from 8+ to 5+ • A chime sound was added to the end of each list to signify to the participant the list has ended and they can start responding • This test provides normed scores
N/A	Rey Auditory Verbal Learning Delay	New to V3
N/A	Speeded Matching	New test
N/A	Visual Reasoning	New test

Emotion Domain

- In the Emotion domain, a new scoring engine has been implemented and computer-adaptive test (CAT) stopping rules have been updated.
- Emotion short forms have been dropped.
- Many fixed forms (FF) have been converted to CAT tests, and each test is presented in one format. Changes from FF to CAT won't impact final scoring in a statistically meaningful way.
- In 2024, new tests were added to the Emotion domain: Anger CAT Ages 8-17, Fear/Anxiety CAT Ages 8-17, and Sadness/Depressing CAT Ages 8-17.
- In addition to the Summary of Key Differences listed above, the following changes have been made to the Emotion tests:

Test Name in NIHTB V2	Test Name in NIHTB V3	Key Differences
NIH TB Anger FF Ages 8-17	Anger CAT Ages 8-17	Updated from FF to CAT
NIH TB Anger-Affect CAT Age 18+	Anger CAT Ages 18+	Renamed 'Anger'
NIH TB Anger Parent Rpt FF Ages 3-7	Anger Parent Rpt CAT Ages 3-7	Updated from FF to CAT
NIH TB Anger Parent Rpt CAT Ages 8-12	Anger Parent Rpt CAT Ages 8-12	No change
NIH TB Anger-Hostility FF Age 18+	Anger/Hostility FF	No change
NIH TB Anger-Physical Aggression FF Age 18+	Anger/Physical Aggression FF	No change
NIH TB Apathy FF Age 18+	Apathy FF	No change
NIH TB Emotional Support FF Ages 8-17	Emotional Support CAT Ages 8-17	Updated from FF to CAT
NIH TB Emotional Support FF Age 18+	Emotional Support CAT Ages 18+	Updated from FF to CAT
NIH TB Empathic Behaviors Parent Rpt CAT Ages 3-12	Empathic Behaviors Parent Rpt CAT	No change
NIH TB Fear FF Ages 8-17	Fear/Anxiety CAT Ages 8-17	Updated from FF to CAT, renamed 'Fear/Anxiety'
NIH TB Fear-Affect CAT Age 18+	Fear/Anxiety CAT Ages 18+	Renamed 'Fear/Anxiety'
NIH TB Fear Parent Rpt CAT Ages 8-12	Fear/Anxiety Parent Rpt CAT	Renamed 'Fear/Anxiety'
NIH TB Fear-Over Anxious Parent Rpt FF Ages 3-7	Fear/Over Anxious Parent Rpt FF	No change
NIH TB Fear-Separation Anx. Parent Rpt FF Ages 3-7	Fear/Separation Anxiety Parent Rpt FF	No change
NIH TB Fear-Somatic Arousal FF Age 18+	Fear/Somatic Arousal FF	No change
NIH TB Friendship FF Ages 8-17	Friendship CAT Ages 8-17	Updated from FF to CAT
NIH TB Friendship FF Age 18+	Friendship CAT Ages 18+	Updated from FF to CAT
NIH TB General Life Satisfaction CAT Ages 13-17	General Life Satis. CAT Ages 13-17	No change
NIH TB General Life Satisfaction CAT Age 18+	General Life Satis. CAT Ages 18+	No change
NIH TB General Life Satisfaction FF Ages 8-12	General Life Satis. FF	No change

NIH TB General Life Satis. Parent Rpt FF Ages 3-12	General Life Satis. Parent Rpt FF	No change
NIH TB Instrumental Support FF Age 18+	Instrumental Support CAT	Updated from FF to CAT
NIH TB Loneliness FF Ages 8-17	Loneliness FF Ages 8-17	No change
NIH TB Loneliness FF Age 18+	Loneliness FF Ages 18+	No change
NIH TB Meaning and Purpose CAT Age 18+	Meaning and Purpose CAT	Updated to newer version; 12 V2 items were preserved and 25 additional items were added
NIH TB Peer Rejection Parent Rpt FF Ages 3-12	Peer Rejection Parent Rpt FF Ages 3-12	No change
NIH TB Perceived Hostility FF Age 18+	Perceived Hostility CAT	Updated from FF to CAT
NIH TB Perceived Hostility FF Ages 8-17	Perceived Hostility FF	No change
NIH TB Perceived Rejection FF Age 18+	Perceived Rejection CAT	Updated from FF to CAT
NIH TB Perceived Rejection FF Ages 8-17	Perceived Rejection FF	No change
NIH TB Perceived Stress FF Age 18+	Perceived Stress FF	No change
NIH TB Perceived Stress FF Ages 13-17	Perceived Stress CAT	Updated from FF to CAT
NIH TB Perceived Stress Parent Rpt CAT Ages 8-12	Perceived Stress Parent Rpt CAT	No change
NIH TB Pos. Peer Interact. Parent Rpt FF Ages 3-12	Pos. Peer Interact. Parent Rpt FF	No change
NIH TB Positive Affect FF Ages 8-12	Positive Affect CAT Ages 8-12	Updated from FF to CAT
NIH TB Positive Affect CAT Ages 13-17	Positive Affect CAT Ages 13-17	No change
NIH TB Positive Affect CAT Age 18+	Positive Affect CAT Ages 18+	No change
NIH TB Positive Affect Parent Rpt CAT Ages 3-7	Positive Affect Parent Rpt CAT Ages 3-7	No change
NIH TB Positive Affect Parent Rpt CAT Ages 8-12	Positive Affect Parent Rpt CAT Ages 8-12	No change
NIH TB Sadness FF Ages 8-17	Sadness/Depression CAT Ages 8-17	Updated from FF to CAT, renamed 'Sadness/Depression'
NIH TB Sadness CAT Age 18+	Sadness/Depression CAT Ages 18+	Renamed 'Sadness/Depression'
NIH TB Sadness Parent Rpt FF Ages 3-7	Sadness/Depression Parent Rpt CAT Ages 3-7	Updated from FF to CAT, renamed 'Sadness/Depression'
NIH TB Sadness Parent Rpt CAT Ages 8-12	Sadness/Depression Parent Rpt CAT Ages 8-12	Renamed 'Sadness/Depression'
NIH TB Self-Efficacy CAT Ages 8-12	Self-Efficacy CAT Ages 8-12	No change
NIH TB Self-Efficacy CAT Ages 13-17	Self-Efficacy CAT Ages 13-17	No change

NIH TB Self-Efficacy CAT Age 18+	Self-Efficacy CAT Ages 18+	Updated to newer version
NIH TB Self-Efficacy Parent Rpt CAT Ages 8-12	Self-Efficacy Parent Rpt CAT	No change
NIH TB Social Withdrawal Parent Rpt FF Ages 3-12	Social Withdrawal Parent Rpt FF	No change
NIH Toolbox Emotion instructions (Adult/Child)	Emotion Instructions (Adult/Child)	No change
NIH Toolbox Emotion Instructions (Parent Report)	Emotion Instructions (Parent Report)	No change
NIH TB Anger-Affect FF Age 18+	N/A	Removed
NIH TB Domain-Specific Life Satis. FF Ages 8-17	N/A	Removed
NIH TB Domain-Specific Life Satis. FF Age 18+	N/A	Removed
NIH TB Dom-Spec Life Satis Parent Rpt FF Ages 3-12	N/A	Removed
NIH TB Emotion Control FF Ages 8-17	N/A	Removed
NIH TB Emotion Control Parent Rpt FF Ages 8-12	N/A	Removed
NIH TB Fear-Affect FF Age 18+	N/A	Removed
NIH TB General Life Satisfaction FF Ages 13-17	N/A	Removed
NIH TB General Life Satisfaction FF Age 18+	N/A	Removed
NIH TB Maternal Relationship FF Ages 8-17	N/A	Removed
NIH TB Meaning and Purpose FF Age 18+	N/A	Removed
NIH TB Paternal Relationship FF Ages 8-17	N/A	Removed
NIH TB Pos. Parent Relat. Parent Rpt FF Ages 3-12	N/A	Removed
NIH TB Positive Affect FF Ages 13-17	N/A	Removed
NIH TB Positive Affect FF Age 18+	N/A	Removed
NIH TB Positive Affect Parent Rpt FF Ages 3-7	N/A	Removed
NIH TB Positive Affect Parent Rpt FF Ages 8-12	N/A	Removed
NIH TB Sadness FF Age 18+	N/A	Removed
NIH TB Sadness Parent Rpt FF Ages 8-12	N/A	Removed
NIH TB Sibling Rejection Parent Rpt FF Ages 3-12	N/A	Removed

Motor Domain

- In addition to the Summary of Key Differences listed above, the following changes have been made to the Motor tests:

Test Name in NIHTB V2	Test Name in NIHTB V3	Key Differences
NIH Toolbox 2-Minute Walk Endurance Test Age 3+	2-Minute Walk Endurance	No change
NIH Toolbox 4-Meter Walk Gait Speed Test Age 7+	4-Meter Walk Gait Speed	No change
NIH Toolbox 9-Hole Pegboard Dexterity Test Age 3+	9-Hole Pegboard Dexterity	No change
NIH Toolbox Grip Strength Test Age 3+	Grip Strength	No change
NIH Toolbox Standing Balance Test Ages 3-6	Standing Balance Ages 3-6	New accelerometer outputs available
NIH Toolbox Standing Balance Test Age 7+	Standing Balance Ages 7+	New accelerometer outputs available

Sensation Domain

- In 2024, new tests were added to the Sensation domain: Hearing Threshold and Near Visual Acuity.
- In addition to the Summary of Key Differences listed above, the following changes have been made to the Sensation tests:

Test Name in NIHTB V2	Test Name in NIHTB V3	Key Differences
N/A	Hearing Threshold	New test
N/A	Near Visual Acuity	New test
NIH Toolbox Odor Identification Test Age 10+	Odor Identification Ages 10+	No change
NIH Toolbox Odor Identification Test Ages 3-9	Odor Identification Ages 3-9	No change
NIH Toolbox Pain Intensity FF Age 18+	Pain Intensity FF	No change
NIH Toolbox Pain Interference CAT Age 18+	Pain Interference CAT	No change
NIH Toolbox Regional Taste Intensity Test Age 12+	Regional Taste Intensity	No change
NIH Toolbox Visual Acuity Test Age 8+	Visual Acuity Ages 8+	No change
NIH Toolbox Visual Acuity Test Ages 3-7	Visual Acuity Ages 3-7	No change
NIH Toolbox Words-In-Noise Test Age 6+	Words-In-Noise	No change

Batteries

The batteries from NIH Toolbox V2 have been pulled forward to NIH Toolbox V3. The two Cognition batteries, five Emotion batteries, and two Motor batteries have the same tests. The Sensation domain did not have a battery in V2 and therefore will not have a battery in V3. In 2024, a new Cognition battery was added: Early Childhood Cognition Battery—Crystallized-Fluid-Processing Speed (CFPS) (Ages 3-6).