



NIH Baby Toolbox® Administration Manual

Edited by
Abigail Sivan, Miriam Novack, Sarah Pila, Vitali Ustsinovich
Northwestern University

NIH Baby Toolbox® is trademarked by the U.S. Department of Health and Human Services. The NIH Baby Toolbox® content and any derivatives of this work are copyrighted by Toolbox Assessments, Inc. All rights reserved. May not be reproduced in whole or in part in any form or by any means without permission.

Manual Version: NBT-AM 1.0

© 2025 Toolbox Assessments

Acknowledgements

We would like to acknowledge the efforts of the many faculty and staff who have contributed countless hours to develop, maintain, and support the NIH Baby Toolbox®.

We would like to acknowledge and thank the funding sources that have helped to develop, maintain, and support the NIH Baby Toolbox®.

This project has been funded in whole or in part with federal funds from the National Institutes of Health Blueprint for Neuroscience Research and the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD), and the National Institutes of Health, Department of Health and Human Services, under *Contract No. 75N94019D00005*.

We would also like to acknowledge the copyeditor of this manual,
Gabriella Marie Juarez.

Table of Contents

Acknowledgements	2
Chapter 1: Introduction to the NIH Baby Toolbox® App	5
Chapter 2: Using the NIH Baby Toolbox App.....	6
Getting the NIH Baby Toolbox App	6
Hardware and Software Needed to Use the NIH Toolbox App.....	6
Downloading the NIH Baby Toolbox App.....	6
Signing In and Selecting a Subscription	7
Common Terminology.....	8
NIH Baby Toolbox App Structure	9
Dashboard	9
Assessment Tools.....	9
Participants	10
Results	13
Settings	15
Help & Support.....	15
NIH Baby Toolbox Support	16
Chapter 3: General Administration Guidelines.....	17
Administration.....	17
Test Interface Buttons.....	17
Pausing an Assessment	18
Interacting with Participants.....	18
Chapter 4: Level B Access Tests	19
Chapter 5: Cognition.....	20
Gaze Measures	20
Familiarization	26
Looking While Listening	27
Touch Screen Tutorial	28
Memory Task Learning, Memory Task and Visual Delayed Response Instructions	32
Picture Vocabulary.....	46
Counting.....	52
Subitizing.....	60
Who Has More.....	64
Verbal Arithmetic	70
Mullen Visual Reception	75
Mullen Language Scale – Receptive	98
Mullen Language Scale – Expressive Prompted	114
Mullen Language Scale – Expressive Observational	122
MacArthur Bates CDI-CAT Comprehension.....	125
MacArthur Bates CDI-CAT Production.....	128

Chapter 6: Motor	132
Get Up & Go	136
Reach to Eat.....	152
Sit and Stand (experimental)	165
Chapter 7: Social-Emotional	166
Introduction to Social Observation Measure	166
Social Observation Measure Younger (9-23 months)	169
Social Observation Measure Older (24-42 months)	191
Intro to Parent Report Measures	204
Caregiver Checklist Younger & Caregiver Checklist Older	206
Rothbart Infant Behavior Questionnaire - Revised (IBQ-R)	209
- Very Short Form.....	209
Rothbart Early Childhood Behavior Questionnaire (ECBQ).....	209
- Very Short Form.....	209
Rothbart Children’s Behavior Questionnaire (CBQ)	209
- Very Short Form.....	209
PROMIS Early Childhood Parent Report Anger/Irritability	213
PROMIS Early Childhood Parent Report Anxiety.....	216
PROMIS Early Childhood Parent Report Depressive Symptoms.....	219
PROMIS Early Childhood Parent Report Positive Affect	222
PROMIS EC Frustration Tolerance	225
PROMIS Early Childhood Parent Report Flexibility.....	228
PROMIS Early Childhood Parent Report Social-Relationships Child-Caregiver Interactions (CCI).....	231
PROMIS Early Childhood Parent Report Social-Relationships Peer-Relationships	234
Appendix 1 – Recommended Supplies and Materials	237
Appendix 2 - Mullen Expressive Language Observational Scale Log	240

Chapter 1: Introduction to the NIH Baby Toolbox® App

The NIH Baby Toolbox® app provides access to a standard set of valid and reliable measures for assessing cognitive, motor, and social-emotional functioning. The NIH Baby Toolbox was specifically designed to assess the functioning of infants and toddlers ages 1- 42 months.

In 2019, the National Institute of Child Health and Human Development awarded the NIH Baby Toolbox contract to Northwestern University, using NIH Blueprint funds. Dr. Richard Gershon was named Principal Investigator and a team of 48 researchers started work to develop a brief standardized assessment of neuropsychological, cognitive, motor, and social-emotional functioning in infants and toddlers ages 1-42 months. The Baby Toolbox uses the same functionality as the [NIHTB V3 app](#) that offers user-friendly features and functions, such as:

- Portable, easy-to-use technology
- Stand-alone application (internet access is not required during test administration or scoring)
- Minimal use of custom hardware
- Enhanced normative scores for individual tests and composites
- Ability to store results locally on the iPad or export results via iCloud, configurable web address, email, or directly to a computer
- Basic reporting on an individual participant level
- Availability of support (help@nihbabytoolbox.org or <https://nihbabytoolbox.org/support/>)

Selection of the developmental domains in NIH Baby Toolbox app was informed by input from a scoping review of the literature and from a survey of experts that included over 500 respondents on measures, domains/subdomains, cost, and length of administration. Most respondents were developmental psychologists, although there were also cognitive neuroscientists, clinical psychologists, neuropsychologists, pediatricians, psychometricians, and others. Measure development was guided by teams of domain scientists, and the final measures were normed in a nationally representative sample of over 2,500 infants.

In the end, the NIH Baby Toolbox is a neuropsychological assessment battery that provides normed scores for cognitive, motor, and social emotional functioning development for infants and toddlers ages 1 (16 days) to 42 months for use in both clinical and research settings. The measures include direct observational, child touch-based, and parent-report assessments that are administered and/or recorded on an iPad. All measures are available in both English and Spanish.

The NIH Baby Toolbox differs from other early assessment measures in its use of innovative assessment technologies, such as: Automated Scoring, Gaze Tracking, Computer Adaptive Tests (CATs), and video capture for behavioral measures. Manipulatives required outside of the iPad were selected for availability through general purchase to support flexibility and affordability.

This administration manual provides detailed written instructions for each of the 30+ measures that mirror the video training presentations. Also presented are instructions for using the NIH Baby Toolbox app; general guidelines for administering tests to young children; equipment lists; and links to several other useful references.

Chapter 2: Using the NIH Baby Toolbox App

The NIH Baby Toolbox is a user-friendly and effective resource that assesses infants and toddlers throughout infancy and early childhood. This NIH Baby Toolbox Administrator’s Manual and the NIH Baby Toolbox Training Videos available [online](#) and are designed to be used together when learning how to use the NIH Baby Toolbox app.

Getting the NIH Baby Toolbox App

Hardware and Software Needed to Use the NIH Toolbox App

To get the NIH Baby Toolbox app, you will need an iPad and an Apple ID. These are described in more detail below. The NIH Baby Toolbox app is available for public use through the Apple “App Store,” a digital distribution platform for mobile apps on Apple devices. At this time, only an iPad version of the NIH Baby Toolbox app has been developed; it is not available on Android devices or on the web. For more information, please contact Customer Support using the Contact Us option on our website: <https://nihbabytoolbox.org/support/>

iPad

It is recommended that the NIH Baby Toolbox is only used on the supported iPad models running the current version of iOS. The up-to-date list of supported devices can always be found on our website: <https://nihbabytoolbox.org/support/>. The NIH Baby Toolbox is updated every time that Apple releases a new iOS update, so it is important for your app to remain updated. To obtain the latest version of iOS, see “**Settings > General > Software Updates**” on your iPad. Please be aware that newer versions of iOS automatically remove infrequently used apps. To ensure the NIH Toolbox app does not get offloaded by accident during your iOS update, we recommend turning off the automatic function that offloads unused apps from your iPad before updating your iPad’s iOS system. To turn off the automatic Offload Unused App function, please go to: “**Settings > General > iPad Storage > Offload Unused Apps**”.

Apple ID

Users of the public version of the NIH Baby Toolbox app will need an Apple ID to use the “App Store” app, which comes preinstalled on your iPad. An Apple ID is your all-in-one account used to log into all Apple products and is associated with your billing information (i.e., credit card). You may use an existing Apple ID if you already have one. If you don’t already have an Apple ID, or if you want to create a new one for NIH Toolbox activity, please visit <https://www.apple.com/> for more information. Although the NIH Baby Toolbox app is free to install, you must purchase a subscription to store data, score the tests, and export data.

(Please note that the Apple ID that purchases the NIH Toolbox subscription should remain signed in on your iPad; logging out or changing the Apple ID on your device may cause issues with the NIH Toolbox app.)

Downloading the NIH Baby Toolbox App

The following instructions are for users of the public version of NIH Baby Toolbox. Users wishing to use the app through their organization’s business-to-business app store should contact Customer Support via Contact Us option on our website <https://nihbabytoolbox.org/support/>

1. Tap the App Store icon on your iPad.
2. Enter “**NIH Baby Toolbox**” in the App Store’s Search field and tap “**Search**”.
3. Once the NIH Baby Toolbox app is displayed, tap the “**GET**” button beside it.
 - If you are already signed in with your Apple ID, a pop-up window will ask you to provide your password and install the app. Tapping “**Install**” will initiate the download and installation process.
 - If you are not signed in, you will be asked to sign in to complete the purchase. Please note that this step is only to download the app; no purchase is made at this stage. After you are signed in with your Apple ID, a pop-up window will appear. Tapping “**Install**” will initiate the download and installation process.
4. When the download is complete, the NIH Baby Toolbox app will become available on your iPad. If you cannot see the app on your iPad after downloading, try swiping to the right or left to see all the apps installed on your iPad.
5. Open the NIH Baby Toolbox app by tapping the “**NIH Baby Toolbox**” icon.
6. When opening the app for the first time, you will be asked to agree to the NIH Baby Toolbox app Terms and Conditions (see www.nihbabytoolbox.org for more information) and set up an eight-digit passcode. You will be asked to enter this passcode every time you open the app in the future, as well as during key times when navigating the app. **Keep this passcode in a safe place. It cannot be recovered, and any data collected will be inaccessible if it is forgotten.**

Signing In and Selecting a Subscription

After setting up the eight-digit passcode in the NIH Baby Toolbox app, a screen will present the subscription options. The NIH Baby Toolbox app is free to download and explore but using the app in its entirety requires a paid subscription.

- **Limited Free Trial:** Prior to subscribing, you may explore the app via the Limited Free Trial, which allows access to the tests, batteries, participants, and test administration. This will give you the opportunity to get comfortable using the NIH baby Toolbox app and explore what it has to offer. However, while using the Limited Free Trial, no data will be saved, and you will not have access to the reports or data exports. To begin collecting data, you must first subscribe to the app. Access to some of the NIH Baby Toolbox tests is restricted to users who can demonstrate the appropriate knowledge, skills, training, and experience to responsibly use our tests. To learn more and request access, users should visit <https://resources.nihtoolbox.org/apply-for-access/>
- **Paid Subscriptions:** Each paid subscription grants 12 months of full access to the NIH Baby Toolbox app, though users of the tests that require access permission must first request free access to those tests at <https://resources.nihtoolbox.org/apply-for-access/>. Each 12-month subscription will automatically renew unless auto-renew is turned off at least 24 hours before the end of the current subscription period. No cancellation of the current (paid) subscription is allowed during the subscription period. After expiration, you will still have access to view and export existing data on the iPad, but you will no longer be able to create new participants or collect new data (unless you reactivate a subscription on that device).

NIH Baby Toolbox subscriptions are linked to specific iPads but can be deactivated on one device and activated on another, if needed. Please note that custom batteries, participants, assessments, collected data, and settings do not move from one device to another. Subscriptions are specific to

each app; if using translations, please be aware that each translation is a separate app and that a separate subscription is required for each app. For more information about subscriptions, please visit <https://nihbabytoolbox.org/get-the-toolbox/>.

Troubleshooting

If there are issues with the NIH Baby Toolbox app, please try the following steps:

1. Update the app if there is an available update. At times there are major updates to the app, which require you to manually update the app through the App Store. Keeping the app up to date helps to avoid many potential issues users may face.
2. Force stop and restart the app.
3. Update the iPad software if there is an available update.
4. Restart the iPad.

If the app still requires troubleshooting after completing the steps above, please contact NIH Baby Toolbox Customer Support via the Contact Us form at <https://nihbabytoolbox.org/support/>

It is crucial to note that all data is saved locally to the app/device it was collected on. If you are considering deleting and reinstalling the app, or if you want to install the app on a different device, your collected data will not be saved or transferred. Exporting the data is the only way to preserve and access the data outside of the app.

Common Terminology

- **Assessment:** A group of tests administered to a participant. An assessment contains tests and/or batteries.
- **Assessment Tools:** A term used to collectively refer to tests and/or batteries.
- **Battery:** A set of tests intended to be administered together in a specific order. You can also create custom batteries by adding tests in a certain order for use in future assessments. As a note, once a custom battery has been administered to a participant, it cannot be modified.
- **Domain:** A broad area of health and function. The NIH Baby Toolbox spans three domains: Cognition, Motor, and Social-Emotional functioning. Each domain includes multiple tests that can be selected individually or used as part of a preset battery.
- **Item:** A question or task within a test. Each test comprises items or tasks.
- **Test:** A set of items or tasks that is administered in an order that cannot be changed by the administrator. Each test is an individual assessment resource that can be administered as a stand-alone measure, as part of a preset battery, as part of a custom battery, or as part of a custom administration. Tests are also referred to as “instruments” and “measures,” and these words can be used interchangeably.
- **Gaze or Eye Tracking:** these terms are used interchangeably and refer to the use of the iPad Pro’s TrueDepth camera to track where on the screen participants are looking.

NIH Baby Toolbox App Structure

Dashboard

The Dashboard is the main landing screen after opening the app and entering the app passcode. The Dashboard displays Quick Links and Frequently Used Assessment Tools, which show the most frequently used tests and/or batteries. To toggle between these lists, tap “**Filter**” in the top right corner of the Frequently Used Assessment Tools section.

The sidebar on the left side of the screen provides quick navigation to key sections in the app. Details about each of these sections are provided below.

The eight-digit passcode is required for examiners to navigate certain parts of the app. It provides a level of protection from individuals who might not be authorized to explore certain sections (e.g., participants should not have the ability to view other participants’ demographic information).

Assessment Tools

Tests

The Tests section can be accessed by tapping “**Tests**” on the left sidebar. All tests that are available in the app are listed here, in order of the domain they are associated with: Cognition, Motor, and Social-Emotional. Each test card (*i.e., expandable row*) contains the name of the test, which domain the test is associated with, the age range for which the test is appropriate, and a brief test description.

Batteries

The Batteries section can be accessed by tapping “**Batteries**” on the left sidebar. A battery is a collection of tests intended to be administered in a specific order, in one administration. Preset batteries, which can be viewed by tapping Preset under Batteries at the top of the screen, are collections of tests predefined by the NIH Baby Toolbox team. Custom (*i.e., user-created*) batteries and archived batteries can also be viewed by tapping the appropriate tab at the top of the Batteries section.

Each battery card contains the name of the battery, the domain the battery is a part of (unless the battery has tests from multiple domains), and an age range for which the battery is appropriate. Although batteries can be administered to participants of any age, administering a non-age-appropriate test or battery is **NOT** recommended.

Tapping on a battery card expands it and displays the tests that are part of that battery. It may be necessary to swipe left or right on the battery card to view all the tests. Beside each test there is an icon that indicates which domain the test is a part of (*i.e., Cognition, Motor, Social-Emotional*) and an age range for which the test is appropriate.

Creating a Custom Battery

To create a custom battery:

1. Tap the “blue “**+ New Battery**” button at the bottom right corner of the screen.
2. Enter a unique name to identify the battery.
3. Add tests by tapping the “**+ Add Tests**” button. Tests are listed in alphabetical order by domain. Tap on the tests you would like to add to the battery. A blue circle with a check mark

to the left of the test indicates that the test has been added to the battery. At least one test must be added before the new battery can be saved.

4. When you are finished, tap **“Save”** at the top.
5. If you want to remove a test from the battery, tap the **‘red circle’** to the left of the test.
6. The order in which the tests appear on this screen indicates the order in which the tests will be presented during administration. If you want to reorder the tests, tap the three horizontal lines to the right of the test to drag and drop it where you want it to go.
7. When you are finished, tap **“Save”** at the top.
8. The new battery will be displayed under the Custom tab on the Batteries screen.

Editing Custom Batteries

Custom batteries can be edited only if the battery has never been used in an assessment. To edit a custom battery, tap on the **“battery card”** to expand it. Then tap the **“Edit”** button at the bottom of that battery card. Here, you can edit the name, included tests, and order in which the tests will be administered.

Assigning a Battery to a Participant

Batteries can be assigned to participants either from the Batteries section or the Participants section. To assign a battery from the Batteries section, tap the **“Battery card”** to expand it, then tap the **“Assign to Participant”** button at the bottom of the card.

To assign a battery from the Participants section, select a participant, tap the **“+ New Assessment”** button, tap the **“+ Add Tools”** button, then tap the **“Batteries tab”** at the top of the Select Assessment Tools window.

Archiving Batteries

If a custom battery has been created but is not desired in the list of custom batteries, the entry can be archived. This may be useful in managing data after examiner training or practice, or if an entry has been created in error. Preset batteries cannot be archived. Custom batteries can be archived or unarchived at any time.

To archive a custom battery, tap the **three vertical dots** on the battery card. Tap the **“Archive Battery”** button that appears in the dropdown menu and then tap **“Yes”** in the pop-up window that appears. The battery will be moved to the Archived tab in Batteries. To unarchive a battery, tap the **“Archived”** tab at the top of the Batteries screen, then tap the **three vertical dots** on the battery card, and tap the **“Unarchive Battery”** button that appears in the dropdown menu.

Participants

The Participants section can be accessed by tapping **“Participants”** on the left sidebar. All active participants will be displayed on the main Participants screen. Archived participants can be viewed by tapping the **“Archived”** tab at the top of the screen.

Creating a New Participant

To create a new participant, tap the **“+ New Participant”** button at the bottom right corner of the main Participants screen. This will display the New Participant Information screen, which allows you to fill in the participant’s demographic information.

Only Identifier and Date of Birth are required fields.

The demographic fields are as follows:

- **Identifier:** Any unique alphanumeric combination you wish to assign to the participant. This is a required field.
- **First Name:** The participant's first name.
- **Last Name:** The participant's last name.
- **Date of Birth:** The participant's date of birth. This automatically calculates the participant's age, which is used to determine which tests and start points are appropriate for that participant.
 - If you would like to de-identify the date of birth (*e.g., if you are concerned about protecting personal health information [PHI]*), you may elect to enter the correct month and year but substitute an alternate number for the day. For example, if the participant's date of birth is 8/18/2017, you might enter 8/1/2017 instead. Please note that entering an alternate day may impact the participant's calculated age.
 - If the Date of Birth was entered incorrectly and is corrected after that participant has already been tested, some scores may be recalculated based on the updated age.
- **Expected Due Date:** The date when the child's birth was expected to have occurred. While this field is not required, it is used to calculate the Adjusted Age (the age that takes into account the child's premature birth).
- **Adjusted Age:** A child's adjusted age, also known as corrected age, is the age they would be if they were born on their due date. It's calculated by subtracting the number of weeks a baby was born early from their actual age and only for children ages 24 months and younger.
- **Sex Assigned at Birth:** The participant's biological sex at birth. According to the American Psychological Association, "Sex is typically assigned at birth (or before during ultrasound) based on the appearance of external genitalia," [American Psychological Association, 2015, p. 862]. NIH Baby Toolbox scoring algorithms do not include sex assigned at birth; see NIH Baby Toolbox Technical Manual for more details on norms.
- **Ethnicity:** The participant's ethnicity. NIH Baby Toolbox scoring algorithms do not include ethnicity; see NIH Baby Toolbox Technical Manual for more details on norms.
- **Race:** The participant's race. NIH Baby Toolbox scoring algorithms do not include race; see NIH Baby Toolbox Technical Manual for more details on norms.
- **Mother's Education, Father's Education, Guardian's Education:** The highest completed education level of the participant's mother, father, and/or guardian. NIH Baby Toolbox scoring algorithms do not include relatives' education level.

Manually entering demographic information often results in errors. In addition to manually creating new participants, users may choose to scan QR codes with the participants' demographic data instead.

- To scan a QR code, tap the "**Scan symbol**" in the upper right corner of the New Participant Information screen. You may be asked to grant permission for the NIH Baby Toolbox app to use your iPad camera the first time you try to scan a QR code.
- If your QR code was formatted correctly, all the demographic fields will be populated automatically. You will be notified of any possible errors in formatting and given an opportunity to fix them in the app.
- Any fields not included in the QR code will remain blank. For instance, if Education is left blank in the QR code information, it will also remain blank in the app once the QR code has been scanned.

- Please refer to <https://nihbabytoolbox.org/support/> for information on how to generate correctly formatted QR codes.

Editing Existing Participants

To edit an existing participant, tap on the participant, then tap the “**Edit**” button in the top right corner of the Demographics tab. Please note that changes to **Date of Birth**, **Sex Assigned at Birth**, **Ethnicity**, and **Race** will be reflected in exports and reports for all assessments (*i.e.*, *completed assessments, started but not yet completed assessments, and assessments that have not yet been started*). Changes to the **Date of Birth** may cause age-based scores to be recalculated. Changes to **Due Date** may result in recalculation of the **Adjusted Age**. Changes to the other demographic fields will only be reflected in exports and reports of assessments that have not yet been started. When you are finished, tap “**Save**”.

Assigning Batteries or Tests to a Participant

To assign batteries or tests to a participant, select the participant, then tap the “**+ New Assessment**” button at the bottom of the screen.

1. Either keep the auto-populated assessment name (e.g., “**Assessment 1**”) or enter the name of the new assessment.
2. Tap the “**+ Add Tools**” button.
3. Tap the ‘**circle**’ to the left of the test(s) you want to add to the assessment. Each test card indicates which domain that test is a part of and the appropriate age range for that test. Some tests have a cube icon, which indicates that there is additional information or additional requirements (e.g., *it is a proxy report, it requires a Bluetooth keyboard for administration*).
4. To add one or more batteries, tap the “**Batteries**” button at the top of the screen to display the batteries, then tap the ‘**circle**’ to the left of the battery or batteries you want to add to the assessment.
5. Once you have selected all the tests and/or batteries you would like in the assessment, tap “**Save**” at the top right corner.
6. The tests and/or batteries you have selected will be displayed. If you would like to reorder the tests and/or batteries, tap on the **three horizontal lines** to the right of the test or battery, then drag it up or down until they are in the order you would like.
7. When you are ready, tap “**Save**”.

Editing an Assessment

To edit an assessment, tap on a Participant, then tap on the “**Assessments**” tab. Tapping on the assessment card you want to edit will cause the card to expand, showing what tests and/or batteries are a part of that assessment. Tap the “**Edit**” button to rename the assessment, add or remove tests and/or batteries, or reorder the tests and/or batteries.

Archiving Participants or Assessments

If a participant or assessment has been created but is not desired in the list of participants or assessments, the entry can be archived. This may be useful in managing data after examiner training or practice, or if an entry has been created in error. Archived participants and their corresponding data (if any) are hidden from view but are not actually removed from the iPad.

Participants can be archived or unarchived at any time. If a participant is archived, the assessments belonging to that participant are also archived. If a participant is unarchived, the assessments belonging to that participant are also unarchived. If a participant or assessment is archived, it does **NOT** appear in the data exports when they are generated from within the app.

To archive a participant, tap the “**Edit**” button at the top right corner of the participant’s Demographics tab. Scroll down, tap the “**Archive Participant**” button at the bottom of the screen, and then tap “**Yes**” in the pop-up window that appears. To view archived participants, tap the “**Archived**” tab at the top of the main Participants screen. To unarchive a participant, tap **the three vertical dots** on the participant’s card, then tap the “**Unarchive Participant**” button that appears in the dropdown menu.

To archive an assessment, tap the **three vertical dots** on the assessment card. Tap the “**Archive Assessment**” button that appears in the dropdown menu and then tap “**Yes**” in the pop-up window that appears. To view archived assessments, use the “**Show archived assessments**” toggle at the top right of the participant’s screen under the “**Assessments**” tab. To unarchive an assessment, tap the **three vertical dots** on the assessment card, then tap the “**Unarchive Assessment**” button that appears in the dropdown menu.

Results

The Results section can be accessed by tapping “**Results**” on the left sidebar. Each assessment will have a result card. The Status column indicates two key points of information: (1) Whether the assessment has been completed, is in progress (*i.e., has been partially completed*), or has not been started; and (2) Whether the assessment has or has not been exported previously. All active results will be displayed on the “**Active**” tab, and the archived results can be viewed by tapping the “**Archived**” tab.

We strongly encourage you to regularly export and save your data based on your institution’s best practices. Unless it is exported, data remains on the iPad it was collected on, and in the event something happens to that iPad (*e.g., if it breaks, if it is lost*), your collected data cannot be recovered. If administering eye-tracking based tests and/or Motor tests, large amounts of data are saved on the iPad, and users may run out of memory relatively quickly. Exporting data regularly (after each assessment or daily, if collecting eye-tracking or Motor data) will help prevent these issues.

Viewing Score Reports

When an assessment has been completed, a PDF icon will appear in the assessment card in the “**Results**” section. Tapping on that PDF icon opens the Score Report. You can view the Score Report on the screen or tap the export icon at the top right corner of the pop-up window to email or print it.

Score Reports display information related to that assessment, including participant information, scores for administered tests, and any examiner comments that you may have entered.

Export File Formats

Data for each assessment is spread across three kinds of exports:

- **Registration:** Contains participant demographic information as well as details about the iPad used (*e.g., app version, iPad version*).
- **Scores:** Contains test-level scores and test-level information (*e.g., the assessment was paused during the “Reach to Eat” test*).
- **Item:** Contains item-level information such as scores, responses, and response time.

Participant data can be linked across export files by the **PID** (*i.e., participant identifier*) and **Assessment Name** fields.

There are two export structures: Wide/Default and Narrow. That is, there is a Wide/Default Registration export file and a Narrow Registration export file for the Registration and Item exports listed above, plus a Narrow Scores export. In total, there are five export files. Although the content of the Wide/Default versus Narrow exports overlaps, the Narrow exports contain some additional fields and the Scores exports are only available in the Narrow structure. Narrow exports are modeled on key-value tables and pivot the data so there are many more rows than columns. The main purpose of the Narrow exports is to aid analysts in the creation of filtered and/or pivoted data sets. We strongly recommend using Narrow exports if values are to be imported into another system or database. While we attempt to minimize changes to all export formats, the format of the Wide/Default exports is least likely to change over time.

Additionally, some types of tests (Eye-tracking and Motor tests) also include other exports: JSON, images (**.jpg**), videos (**.mov**) that can also be exported. Users can choose if they want to retain (**save**) .jpg and .mov files in the app settings.

Exporting Individual Assessments

To export an individual assessment, tap the **“Export”** icon to the far right of the assessment card. This will populate five options, which are listed below. Please note that access must first be granted to utilize these export functions. To do this, tap **“Settings”**, then tap **“Data Security”**, then toggle on the export options your organization supports.

- **iPad File Sharing**
 - After generating files to export, connect the iPad to a Mac or PC via cable.
 - On a Mac, open **“Finder”** and select your iPad from the sidebar, then select **“Files”** from the top navigation bar to view and access the files.
 - On a PC, open **“iTunes”** and click the **“iPad”** button near the top left of the iTunes window. Then select the **“NIH Baby Toolbox”** app in the list to view and access the files.
- **Send via Email**
 - To use this option, the Mail app on the iPad must be set up. For instructions on setting up the Mail app, please contact Apple Support.
 - The Email option will use the Mail app to attach the file(s) to a new email message, which you can send to a destination email.
 - When emailing the data files, exercise caution and only email the data to secure email accounts (*e.g., the recipient’s institutional email*).
 - As an extra security measure, you can choose to encrypt the file(s) sent via email with a password you must share with the recipient.
 - As a note, it is sometimes helpful to exit the app, open the app you are using to send emails, and navigate to your Sent folder to ensure the files have been sent.
- **Upload to iCloud**
 - To use this option, iCloud must be set up on the iPad. For instructions on setting up iCloud, please contact Apple Support.
 - If iCloud is enabled on the iPad **AND** in the NIH Baby Toolbox app, all the files generated by this app will be available in the iCloud Drive linked to the Apple ID used to install the app. These files can be accessed by logging into iCloud from any browser using the Apple ID associated with the app that generated the files.

- **Upload to Web Server**
 - This option is intended for use with an existing web location for data centralization. Many research projects have a data coordination center with the capability to set up a data server. For more information, please contact your institution’s information technology (IT) personnel.
 - After enabling this option in the app’s Data Security section and configuring the Data Transfer URL, User ID, and Password, test the connection to ensure smooth data transfer. Please refer to your institution’s IT personnel if you have any difficulties.
 - We strongly recommend that the Narrow data format be used for all server uploads.
- **File Viewer**
 - This option displays the selected export file on the screen and can be used to immediately view the data. This option does not send the data anywhere.

Note: Only iCloud, File Sharing and Web Server options can be used for exporting the media files generated by some of the NIH Baby Toolbox assessments (.jpg and .mov files).

Exporting Multiple Assessments

To export multiple assessments, tap the **“Select”** button at the top of the Results screen. This will cause circles to appear to the left of each assessment. Select the assessments you would like to export by tapping each circle; a **‘white circle’** means it is not selected, a **‘blue circle’** means it is selected. You can also tap **“Select All”** at the bottom left of the Results screen to select all assessments in one tap. The text at the bottom right corner will indicate how many assessments are selected. When you are ready, tap that **text** or the **“Export icon”** to populate the export options listed above.

Note: Only iCloud and Web Server options can be used for exporting the media files generated by some of the NIH Baby Toolbox assessments (.jpg and .mov files).

Settings

The Settings section can be accessed by tapping **“Settings”** on the left sidebar. Here you can do the following:

- **General Section:** Sign up for newsletters and update notifications, apply for access to the tests that require access permission
- **Account Section:** View your subscription status, enter or view your institution name
- **Security Section:** Configure data security (for exporting data)
- **Media Section:** choose if media (.jpg image files and .mov video files) generated by Eye-Tracking and Motor tests respectively should be saved on the iPad
- **Regional Formatting Section:** Adjust the time and date formatting

You can also change your passcode by tapping **“Change Passcode”** at the top right of the Settings screen.

Help & Support

The Help & Support section can be accessed by tapping **“Help & Support”** on the left sidebar. Here, you can view Getting Started, What’s New In This Version, Audit Logs, Frequently Asked Questions (FAQ), Knowledge Base, Contact Support, Terms and Conditions, Privacy Policy, and Diagnostic Information.

Audit Logs

There are three Audit Logs that can be used to identify all records that have been changed and where those changes occurred.

- **Participant Audit Log**
 - Contains audit entries identifying when a participant snapshot is first created and when it is modified. It creates a record of the demographic field values before and after the edits (*i.e., old and new demographic data*).
 - Participant Audit Logs are sorted by PIN, Date Created, and Date Modified, with the most recent record on top of the previous record.
- **Rescore Audit Log**
 - Includes changes related to any rescoring of data, which may happen if adjustments are made to demographic information (*e.g., participant age is updated*).
 - Rescore Audit Logs are sorted by PIN, then by Test Name, with the most recent record on top of the previous record. Composite scores, however, are only included in rescored (new) records.
 - This is not designed to be used in analysis, but instead as a record of the changes in scores that were made.
- **Battery Audit Log**
 - Displays the custom batteries that have been updated due to replacement of retired test(s) with the new versions or due to the presence of retired test(s) in a custom battery.

NIH Baby Toolbox Support

To access a copy of this manual, Privacy Policy, or Terms and Conditions, or to view more resources about the NIH Baby Toolbox, please visit <https://nihbabytoolbox.org/>. Use the Contact Us form at <https://nihbabytoolbox.org/support/> with questions in English or to report technical problems.

The NIH Baby Toolbox is more than a set of tests: we are a community of users, and the NIH Baby Toolbox continues to evolve. Please help us make this product the best it can be. If you have suggestions for changes or corrections, please share them with us in English by using the Contact Us form at <https://nihbabytoolbox.org/support/>

Chapter 3: General Administration Guidelines

To be successful in testing infants and toddlers, it is essential to

- Establish and maintain rapport with both the child and the caretaker,
- Create a testing environment that is comfortable and supportive
- Enjoy interacting with young children.

Toward that aim, this chapter provides detailed guidelines for administering the **NIH Baby Toolbox** to participants of all ages, reviews general administration procedures, and describes the best practices for interacting with young children.

Administration

Prior to administering an assessment, disable all pop-up messages (*e.g., calendar alerts, email notifications*) on the iPad to ensure smooth, uninterrupted data collection.

NIH Baby Toolbox normative data was collected with examiners and participants interacting directly with the screen. Apple allows Mac users to use their mouse on a connected iPad. As this is not how the normative data sample was collected, we do not recommend the use of a mouse when administering assessments on the NIH Baby Toolbox app.

To start an assessment after it has been created, tap the “**right-facing arrow/chevron**” on the assessment card to expand it and display the list of tests and/or batteries that have been assigned to that assessment. When you and the participant are ready to begin, tap “**Start Assessment**”. Each test begins with a title screen that contains the test’s abbreviated name to help orient the examiner without overtly stating to the participant which test they will be working on.

Test Interface Buttons

- **Slide to continue:** There is a “**Slide to continue**” button on the title screen of each test, as well as before each major transition (*e.g., immediately before live test items*). Touch the **circle** and drag it across the bar all the way to the right to continue to the next screen. Note that only you should slide this button; the participant should never interact with this button.
- **Play again button:** At the top of some screens, there is a “**Play again**” button, which you can tap to play the audio again. This is helpful in instances where the participant may need to hear that screen’s instructions again (*e.g., if the participant did not understand the instructions the first time*). The “**Play again**” button is inactive while the audio reads the instructions and becomes active (*i.e., tappable*) when the audio stops.
- **Next button:** At the top of many screens, there is a “**Next**” button, which allows you to move to the next screen.
- **Back button:** At the top of some screens, there is a “**Back**” button, which allows you to go back to a previous screen. This is helpful in instances where the participant may need extra practice, or if there is an interruption (*e.g., car alarm*) that distracts the participant. Based on test logic and flow, the “**Back**” button either takes you and the participant back to the previous screen or goes back to the start of the test. With a few exceptions, the “**Back**” button is not

present after a certain point that would invalidate the test (*e.g., it is not present during live items on a timed test*).

Pausing an Assessment

An assessment can be paused at any time after it is started. If an assessment is paused, stopped, skipped, or delayed, it will be noted in the scores export along with the reason you provided. Follow these steps to **pause, add notes, stop, skip, or delay a test**:

1. Put three fingers vertically on the right side of the screen, then swipe your fingers across the screen to the left. This is called the “**Administrator gesture**” or “**Admin gesture.**”
2. Enter the passcode.
3. Select from the five options presented on the screen:
 - a. **Add/Edit Test Notes:** This allows you to add or edit notes for any test within the current assessment.
 - b. **Stop Assessment:** Stopping the assessment ends the current testing session and brings you back to the participant’s screen.
 - c. **Skip Test:** Skipping a test means the current test will be skipped and the next test in the assessment will be administered.
 - d. **Delay Test:** Delaying a test allows you to move the test to a later spot in the assessment.
 - e. **Resume Test:** Resuming the test means the pop-up window will disappear and the test will continue.

For more information about **pausing, stopping, delaying, and resuming a particular test**, please refer to that test’s chapter in this manual.

Interacting with Participants

For more details, see the training video “**Interacting with Participants**”. Before administering the NIH Baby Toolbox, it is important to understand how to interact with both young children and their caregivers. While not exhaustive, these best practices were performed during our norming administration.

Administrators should prioritize creating a safe, comfortable, and engaging environment. It's important to use simple language, maintain a gentle tone, and get down to the child's eye level to foster trust and connection. Play-based activities can be particularly effective, especially when “warming up” before administering any test, as they align with the child's natural way of exploring their world. The administrator should be patient, observant, and responsive to the child's cues, ensuring that the interaction is positive and stress-free. Building rapport with the child can lead to more accurate and meaningful observations.

When interacting with the children’s caregivers, administrators should approach them with empathy and respect. Administrators should remind caregivers nicely but firmly that the NIH Baby Toolbox is interested in the child's behavior, so they should not interfere or help. It's also helpful to explain that the measures are administered to children across many ages and there is often a variety of responses. Gently remind caregivers not to interact unless asked but also let them know that their help may be needed if the child is uncooperative or misbehaving.

Chapter 4: Level B Access Tests

Most NIH Baby Toolbox tests (all of Cognition, Motor and some Social/Emotional tests) are not available for immediate use in the app. Those tests will have a padlock symbol next to them on the Tests screen in the app when it is first downloaded from the App Store.

To preserve test integrity, access to these tests is limited to users who have appropriate credentials, such as training in test administration and/or interpreting test results. New users are asked to submit credentials demonstrating they have the appropriate knowledge, skills, training, and experience to responsibly use NIH Baby Toolbox tests or are working under the supervision of someone qualified to use those tests. For a full list of credentials, please visit <https://resources.nihtoolbox.org/apply-for-access/> Users who already have Access credentials from NIH Toolbox may use those credentials in the NIH Baby Toolbox app.

To apply for access to these tests, either navigate to the Settings screen and tap the *Access to Level C and/or Level B Tests* section, tap on the lock symbol beside locked tests on the test selection screen, or go to <https://resources.nihtoolbox.org/apply-for-access/> and tap/click either C-Level access request form or B-Level access request form, depending on your level of qualifications. Level B approval comes with access to all NIH Baby Toolbox tests and Level C approval unlocks both NIH Baby Toolbox and NIH Toolbox tests.

Application for Level B or Level C access is free, but it is required for all users in order to administer the tests with access control, whether you have a paid subscription or are exploring the app via the free trial. Approval is also needed to access all of NIH Baby Toolbox training materials and manuals, since they contain protected materials.

Once the request is submitted and approved by NIH Baby Toolbox Customer Support, you must enter the credentials into the NIH Baby Toolbox app on each device your subscription is installed on. To do this, navigate to the Settings screen, tap the *Access to Level C and/or Level B Tests* section, and then *Enter Unlock Code*. The name, email, institution, and code must be entered exactly as they were provided to you. Tests can be administered immediately after the access code has been entered.

For more information about access to NIH Baby Toolbox tests and restricted materials, please visit www.nihbabytoolbox.org

Chapter 5: Cognition

Gaze Measures

For more details and video examples, see the training video “**Introduction to Gaze Measures**”.

Overview

There are two measures that use the Gaze procedure: **Looking While Listening and Familiarization**. Gaze measures are administered to children under 24 months of age and use software in the iPad that identifies the places on the screen where the child is looking. Gaze measures allow children to express their understanding of the environment without needing to produce an explicit response. During Gaze Measures, children watch videos or images on the iPad. The administrator sets up the task and then stands back as the child watches.

Administration Flow

Both measures involve the same procedure and have three phases: **Head placement, Calibration, and Test items**. Only the test items differ across the measures.

- During the **Head placement**, the administrator sets up the iPad in the correct position.
- During the **Calibration phase**, the iPad calibrates a specific child’s gaze behavior.
- During the **Test Items phase**, the child is presented with stimuli as they watch the screen. The iPad does not provide feedback during the test items phase.

Materials and Positioning

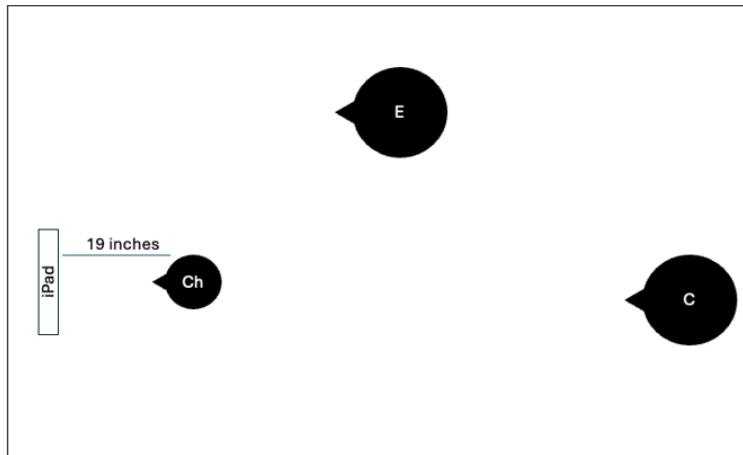
Make sure that the volume on the iPad is loud enough for the child to hear the presentation of audio accompanying the visual stimuli.

The child can be strapped into a highchair (**Option 1**) or sitting in the caregiver’s lap (**Option 2**). In both cases, the child faces the iPad, that is held on a stand sitting on the floor with a height that can be adjusted.

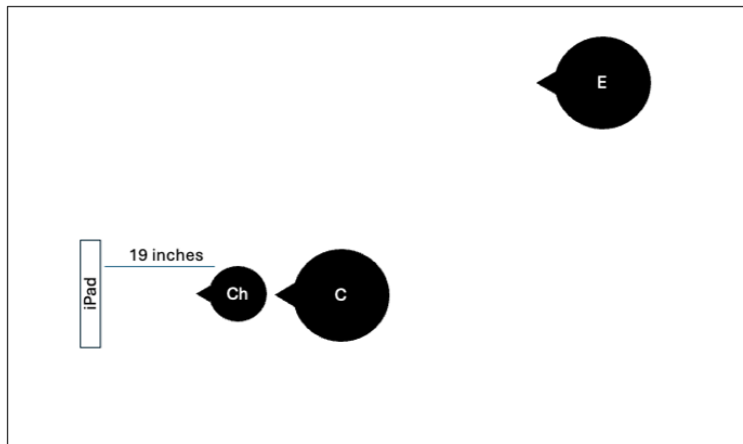
The examiner should be standing off to the right side and behind the child. The caregiver should be told not to interact with the child during the task. Ask the caregiver to look down and avoid eye-contact if the child looks at them during the task.

If the child is too little to sit by themselves, they should sit on their caregiver’s lap. In this case, the caregiver needs to block their face throughout the task. They can hold a paper (manilla folder) or another solid object in front of their face. In all cases, the caregiver should be told at the start not to talk to or interact with their child once the program on the iPad begins.

Option 1: Child in highchair



Option 2: Child in caregiver's lap



Setting up the room

Gaze capture only works as long as the child is looking at the iPad. This is best accomplished when the room is free of distractions (mirrors/windows should be covered). Make sure the room is well lit and that there are no pictures on the walls.

Avoid placing the iPad stand on a table as the child can kick or bang the table and disturb the iPad or distract themselves.

How Gaze Works

The Gaze capture technology uses the child's whole face (including the mouth). The child cannot be using a pacifier, eating, or wearing a mask during the assessment.

For some older iPad Pro models, the front-facing camera is located on the left side of the front of the iPad. If you are using this model, make sure you do not block the camera while setting up or administering the task. This is why you should always stand on the child's right-hand side. Other iPad models have the front-facing camera in the middle of the top of the iPad. Make sure you identify the front-facing camera on your iPad and make sure not to block it with your hand/body/stand.

Here the yellow circle indicates where the camera on the iPad is located, either on left-hand side of the front of the iPad or in the middle top of the iPad



Here a child sits in a highchair looking at the iPad; the examiner stands on the right side of the child.



Step 1: Head Placement

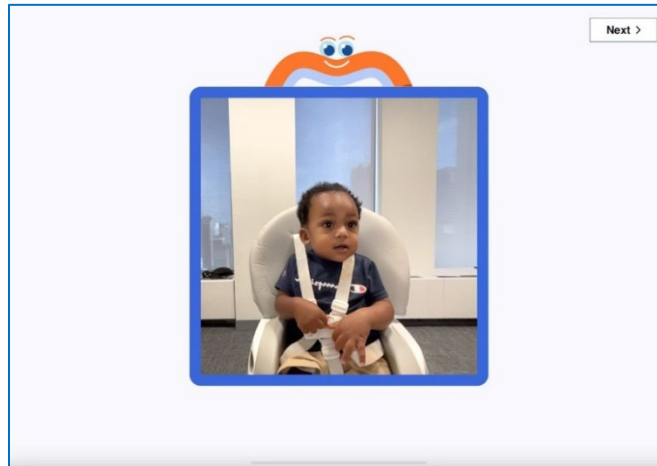
During head placement, you will ensure that the child is positioned correctly for calibrating their gaze. During head placement, you will see an image of the child with a red or blue rim. Center and adjust the child/iPad so that the child's face is within the photo lens shown on the iPad screen.

When the child is positioned appropriately, there will be a **blue** rim around the image. Here are some guidelines that will help with this process:

- The iPad should not be tilted; it should be close to but not within reach of the child.
- If the iPad camera is on the left, the iPad camera should be at the height of the child's eyes. If the iPad camera is in the center, the child's head should be at the same height as the center top of the iPad.
- Center and adjust the child/iPad such that the child's face is within the photo lens shown on the iPad screen.
- Adjust the iPad stand and/or the child's chair to achieve the correct height.

- Animations will maintain the child's attention while you adjust the height, tilt and distance of the iPad.
- When the child is positioned appropriately, there will be a **blue** rim around the image.
- Border needs to stay **blue**, not just flash for a moment.

Here is a picture of a participant with a blue rim around the image, which indicates that the child is in the correct position for head placement.



You should center and adjust the child/iPad such that the child's face is within the photo lens shown on the iPad screen. As noted earlier, animations will maintain the child's attention while you adjust the **height**, **distance**, and **tilt** of the iPad.

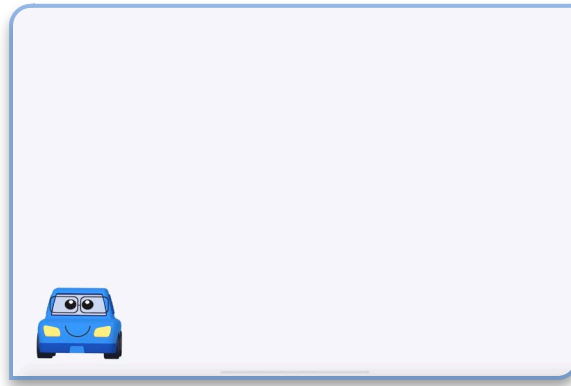
- **Height:** iPad should be at child's eye-level. Avoid having it too high or too low, although slightly too high is better than slightly too low. Consider adjusting the child's seat, the table height, or the iPad stand to get the correct height.
- **Distance:** iPad should be approximately 1/2 meter (19 inches) from child's face. It needs to be as close as possible, without being within reach (you do not want the child to be able to touch it)

Tilt: Make sure that the iPad is vertical, not tilted forward or backward.

Step 2: Calibration

- Once Calibration begins, step back behind the child and remain quiet
- Animations will appear in all four corners of the screen. Images respond contingently to infant looking. Meaning, they advance faster if the child looks at each target, and slower if the child does not look at each target.
- There will be a minimum of 4 and a maximum of 12 calibration trials.
- The iPad will display animations and sounds to attract the child's attention.
- This will be repeated if the iPad has trouble distinguishing the child's gaze. This is all automated by the iPad.

An example of one calibration item is shown below:



- **If the app loses the child’s gaze during calibration, it will return to head placement**
 1. If this happened because the child briefly turned away, and the iPad can easily re-find the child’s gaze, it will automatically proceed to calibration again.
 2. If the app cannot detect the child’s gaze, you will have to continue adjusting the height, tilt, or distance of the iPad or try adjusting the positioning of the child before manually tapping “**NEXT**” to continue. Make sure the rim stays blue, before tapping “**NEXT**” to return to calibration.

Step 3: Beginning the Test

If the calibration is successful, the iPad will automatically move to the test items until all the items are presented. Specifically, the iPad displays stimulus pictures and plays audio prompts.

During the test items, remember that:

- The iPad does not provide feedback.
- If the child looks at you, look away to avoid eye-contact with child to encourage them to look back at the screen
- The caretaker should avoid talking or interacting with the child.
- Ask the caretaker to look away to avoid eye contact if the child looks at them.
- Parent and examiner should be out of view of the child.

How to Redirect

If the child becomes very distracted, you can try to direct their attention back to the screen. To direct attention back to the screen, tap on the back of the iPad. (**Avoid talking to the baby (e.g., “look at the screen”)** as this will make them more likely to look at *you* rather than the screen).

- Never point to a specific object on the screen to re-direct.
- While re-directing, avoid eye-contact with the baby and move back to your position behind the child as soon as they are focused on the screen again.
- Times when you should or shouldn’t direct attention back to the screen vary by measure and will be described individually.

What to do if the child becomes upset

- If the child is whimpering, squirming, generally “**bored**”, it’s okay to continue the task
- If the child is crying (**especially with closed eyes**) it may be necessary to stop the measure
- Give the child time to calm down. There are built-in features (**attention-getters**) that will bring the child’s attention back to the screen.
- If the distress continues/escalates, stop the measure
- Use your judgement to determine whether it’d be best to try another gaze measure or skip for later

Pausing Gaze Measures

- If you need to pause a test for any reason, use the three-finger slide from right to left ([administrative gesture](#)).
- You can pause during the title screen, instructions, head placement or calibration, and return later to the measure. If you need to take a break, that would be the best time to do so.
- If you pause during the instructions, the App will return to the instruction screen.
- If you pause during the calibration items, when you resume, the App will return to the last calibration item to which the child did not respond.
- If you need to take a break, take it before the test items.

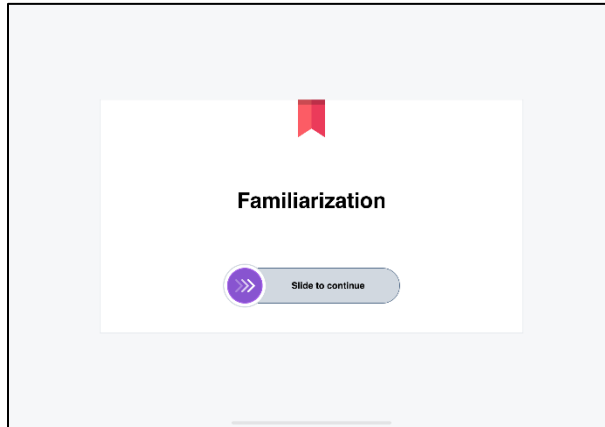
(If you pause the test during the test items, the test will end and cannot be resumed later.)

Remember, the Gaze itself is not a measure; it is a process by which to measure behavior. The process above begins by choosing one of the gaze measures: “**Familiarization**” or “**Looking While Listening**” in the App.

How to Practice at Home

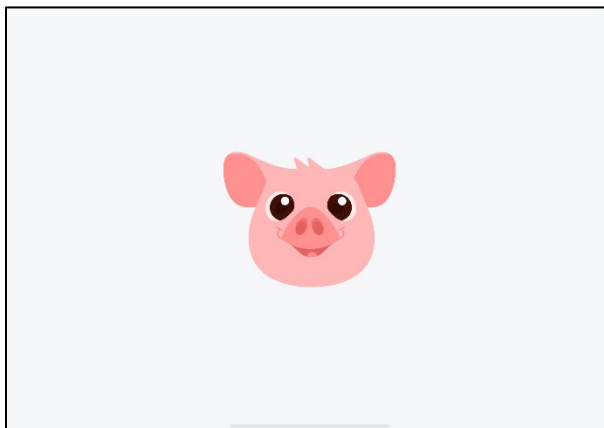
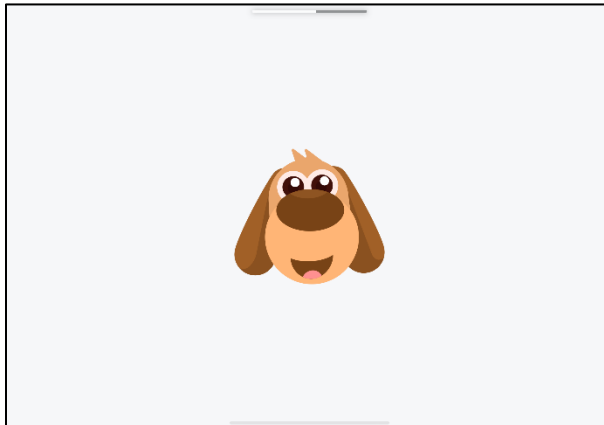
- The Gaze procedure will become easier with practice. Try practicing with as many people (**including adults and older children**) as possible, to get the hang of the technology.
- Make sure you are paying attention to the distance, height, and tilt of the iPad. Don’t rely solely on the blue rim.
- Practice different techniques when children become distracted. Practice looking down (**avoiding eye-gaze**). Practice redirecting by tapping the back of the iPad and notice how your movements and behaviors may be more or less distracting to the child.

Familiarization



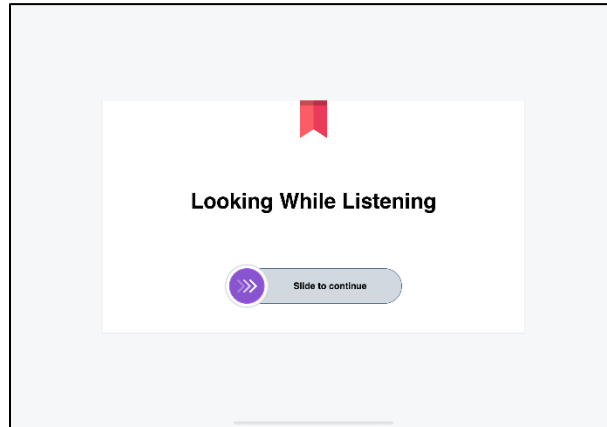
“Familiarization” assesses habituation or how quickly children get bored with an image. Looking away or changing gaze focus is a sign that they are learning. For this reason, never redirect a child if they look away. If they look at you or the caregiver, both you and the caregiver should avoid eye contact and look down.

Trial items from this measure are shown below:



The app tracks how quickly a child gets bored with an image they have seen for a while, and how quickly they become bored with a new image. The picture is accompanied by music, but no other stimuli.

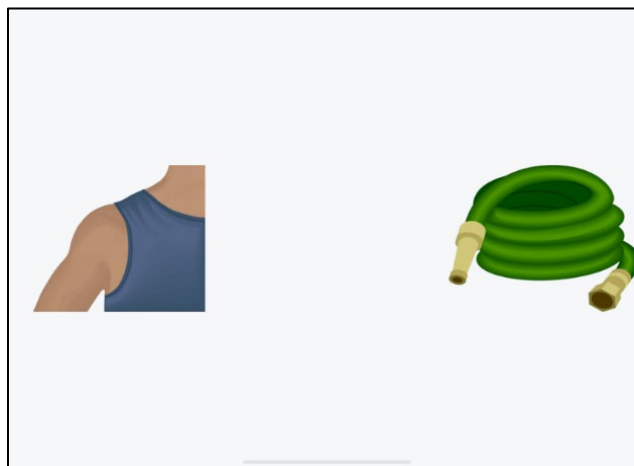
Looking While Listening



“**Looking While Listening (LWL)**” is a measure of receptive vocabulary administered to children under 24 months of age. The task begins like the other gaze measures, with head placement and calibration before proceeding to test items. During test items, the iPad presents two familiar images of objects accompanied by an audio recording that asks the child to look at the object associated with a word. The exact images shown will vary based on the child’s age.

An animation is played after every four trials to help maintain attention. For most children, the measure takes approximately 5 minutes.

In the sample item below, an audio prompt says either: “**Do you see the shoulder? Look at the shoulder?**” or “**Where is the hose? See the hose.**”



Touch Screen Tutorial

For more details and video examples, see the training video “**Touch Screen Tutorial**”

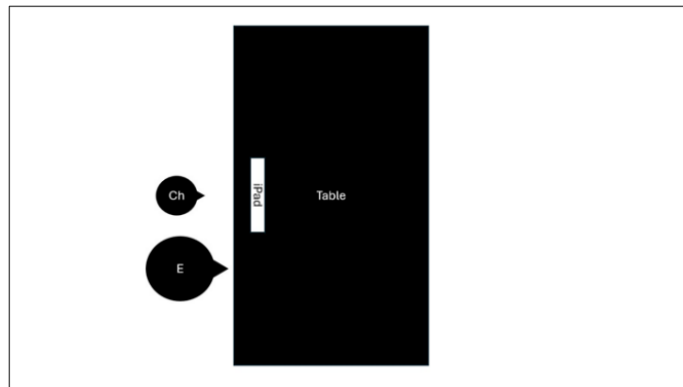
Overview

The Touch Screen Tutorial is a brief introduction for children, old enough to be administered touch measures (21 months in some cases), and to practice touching the iPad. It is designed to give them reassurance that it is okay for them to touch the iPad and for them to see how the touchscreen responds. To accomplish this goal, the examiner may need to help demonstrate by moving the child’s finger in their own hands (hand-over-hand) or use other methods to encourage the child to touch the screen in response to the audio prompts. There are four live items; the first two have one image and the second two have two images.

Administration

Materials and Set-up

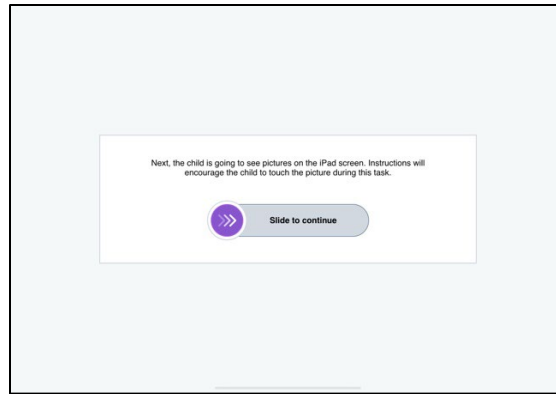
The Examiner should sit at the table next to the child. The iPad should be on the stand, facing both the child and the examiner; it should be close enough for the child to comfortably reach it. The child should be sitting in a highchair next to the examiner while the caregiver is off to the side, so as not to interfere.



Starting the Test

The task is introduced with a title screen: “**Touch Screen Tutorial.**”

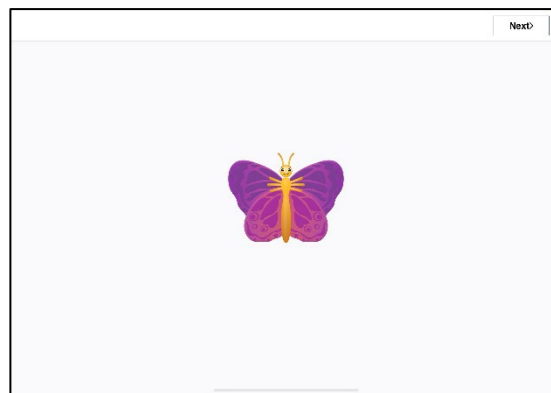
Below the test name, there is a purple button. Slide the purple button to the right to begin the test. Once the examiner slides the purple button to the right, an instructional screen appears and presents a short introduction, as seen below:



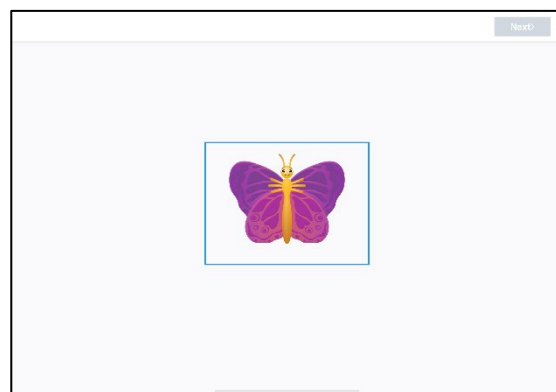
This instructional screen reads:

“Next, the child is going to see various pictures on the iPad screen. Instructions will encourage the child to touch the picture during this task.”

Once the examiner slides the purple button to the right, an audio prompt says: **“Touch the butterfly.”** At the same time, the following screen with a picture of a butterfly appears.

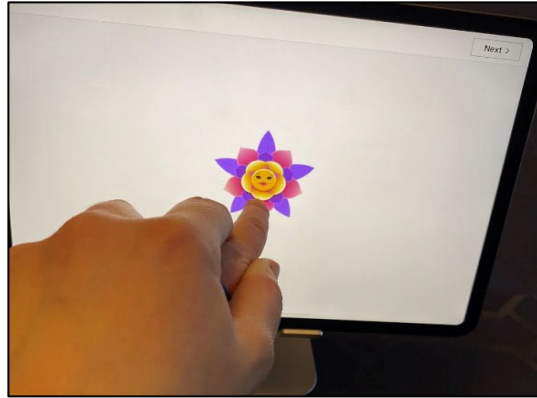


If the child touches the butterfly, a short animation with sound appears as a reward. If the child does not touch the image within 5 seconds, the audio prompt is repeated, and a flashing blue square will appear around the image to encourage touch.



If the child still does not touch the image, the examiner should show them how to touch without selecting the image itself, and eventually the examiner can show the child how to select the correct image using the **Hand Over Hand** Technique until the child is successful.

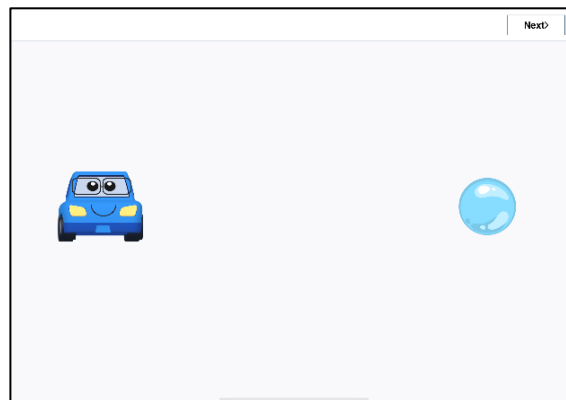
The picture below shows the **“Hand Over Hand”** technique.



The measure then moves on to another item. This time there is a picture of a flower accompanied by audio that says: **“Touch the flower”**. If the child touches the picture, a short animation with a sound appears as a reward.

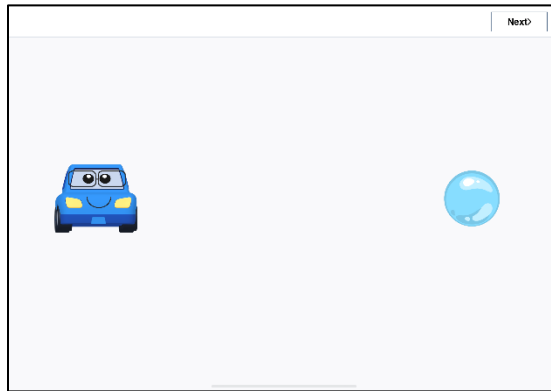
If the child does not touch the picture in 5 seconds, the audio again says: **“Touch the flower”** and a flashing blue square appears around the image to encourage a touch. If the child still does not touch the image, the examiner should show them how to touch without selecting the image itself. Then the examiner may try the **“Hand Over Hand”** technique until the child is successful in touching the screen themselves

After this, the next item appears with two pictures. The screen that follows appears as the audio says: **“Now touch the car”**.



If the child taps the correct image, an animation with sound plays and the next item appears. If the child taps the incorrect image, the audio says: **“Let’s try again. Touch the car”**. After the child responds correctly, or chooses two incorrect answers, the examiner taps the **“NEXT”** button, and the app moves on to the next item.

The next screen appears, and the audio says: **“Now touch the bubble”**.



If the child taps the correct image, an animation with sound plays and the test ends.

If the child taps the incorrect image, the audio says: **“Let’s try again. Touch the car”**. After the child responds, or chooses two incorrect responses, the examiner taps the **“NEXT”** button, and the presentation ends.

Pausing and Resuming, Stopping or Skipping the Test

- If you need to pause the test for any reason, use the three-finger slide from right to left ([Administrative gesture](#)).
- If you pause or stop at any time, when you resume, the app will return to the active screen.

Memory Task Learning, Memory Task and Visual Delayed Response Instructions

For more details and video examples, see the training video “**Memory Task Learning, Memory Task Test, Visual Delayed Response**”

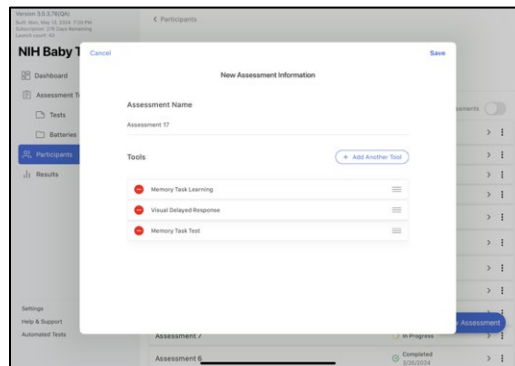
Overview

“**Executive Functioning (EF) Learning and Memory**” is a measure of the mental processes involved in processing information gained from interactions with the environment. There are three separate tests involved in this measure; in addition to the “**Memory Task Learning**” and “**Memory Task**”, there is a third test “**Visual Delayed Response**” (touch) that is administered between the other two.

Users may also choose to administer the “**Visual Delayed Response**” test by itself.

This combination of measures will be administered to all examinees aged 22 months and older. There is only one form of each of these tests; administration of each test takes about 5-6 minutes. Between the learning and test measures, there will be an interval of 6-8 minutes, in which the “**Visual Delayed Response**” measure is administered.

It is important when setting up the test battery that all three measures be arranged, so that the “**Learning task**” comes before the “**Visual Delayed Response**” measure, and then both are followed by the “**Memory task**”. The arrangement is illustrated in the screenshot below. The examiner can move the tests by touching and moving the horizontal lines to the right side of the test name.



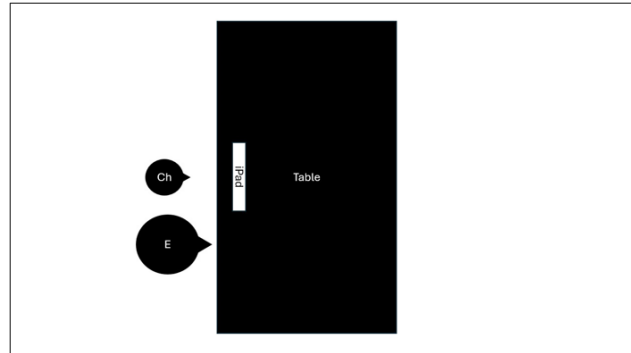
Administration

Make sure that the iPad volume is loud enough for the child to hear the instructions and feedback. Make sure that the child is seated comfortably and can reach the iPad screen before starting the test. If not done earlier, make sure that the child has completed the Touchscreen Tutorial before beginning this series of measures.

Materials and Set-up

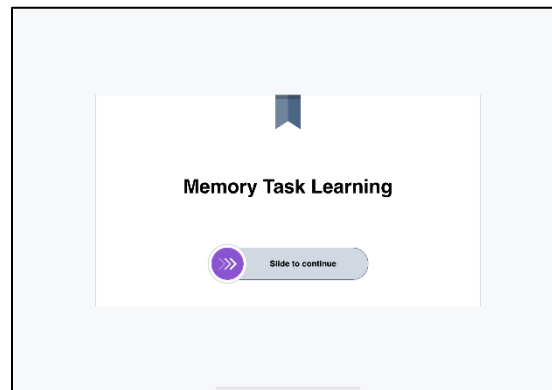
The examiners should sit at the table next to the child. The iPad should be on the stand facing both the child and the examiner, close enough that the child can comfortably reach it. The child should be sitting in a highchair next to the examiner. The caregiver is off to the side so as not to interfere.

Below is a diagram of the set-up



PART 1: Memory Task Learning

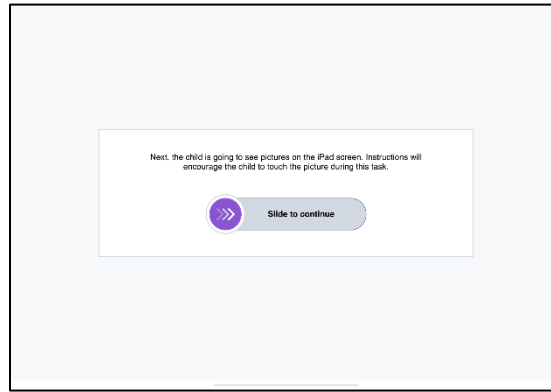
This measure starts with a title screen: **“Memory Task Learning”**.



Below the test name, there is a purple button. The examiner will slide the purple button to the right to begin the test. Once the examiner slides the purple button to the right, an instructional screen appears and presents a short introduction for the examiner that says:

“Next, the child is going to see pictures on the iPad screen. Instructions will encourage the child to touch the picture during this task.”

The examiner should also verbalize the instructions. This instructional screen is shown below:

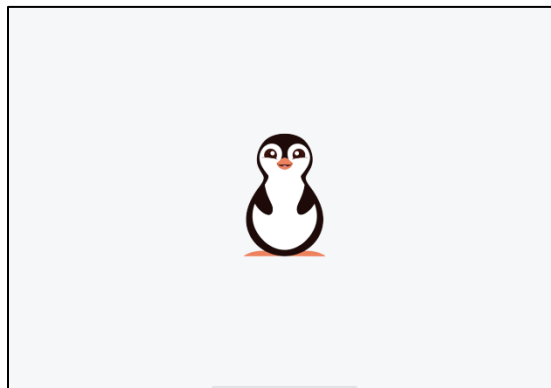


Once the examiner slides the purple button to the right, three practice items appear and are followed by 11 encoding items.

1. During this task, if the child tries to touch before the instructions are over, the touch will not work. ‘
2. If they try to touch early, say: **“Wait, listen to the directions, then touch.”**
3. If they touch the screen early, they will need to touch it again so that the app can record the response correctly.
4. When the audio stops, say: **“Try to touch again.”**

Practice 1: The first practice item appears and the audio says:

1. **“This animal is hungry, touch the animal to feed it.”**

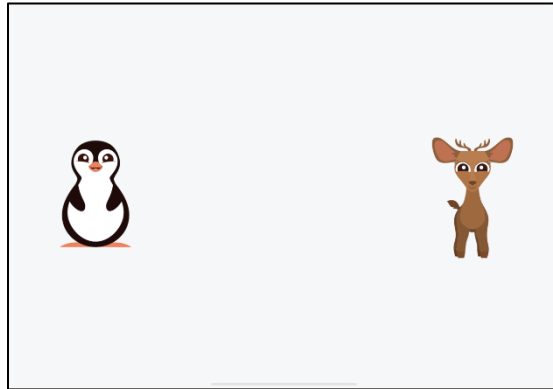


2. If the child touches the animal, they receive the audio feedback: **“Yum, that’s right! You fed the hungry animal.”**

3. If the child doesn't touch the animal within 5 seconds they receive the audio feedback "**Touch the animal**" (image flashes).
4. If the child still doesn't touch the animal, then you should touch the animal and say "**Touch the hungry animal**"

Practice 2: The second practice item appears with two animals; the audio says:

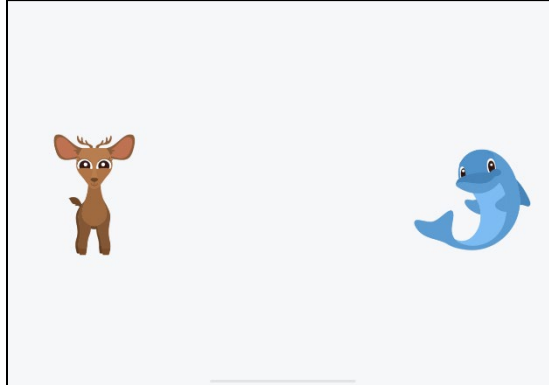
1. "**Now you see two animals. One of them we already fed**" (a box appears around the familiar animal – Penguin). "**Let's touch the NEW animal**" (a box appears around the new animal - Deer)



2. If the child touches the correct animal, they receive the audio feedback: "**Yum, that's right!**"
3. If the child doesn't touch either of the animals, they receive audio feedback: "**Now you see two animals. One of them we already fed**" (a box appears around the familiar animal – Penguin). "**Let's touch the NEW animal**" (a box appears around the new animal - Deer).
4. If the child touches the wrong animal, they receive the wrong answer sound and audio feedback: "**We fed that one already, remember! Touch the new animal.**"
5. If the child touches the wrong animal a second time, they receive audio feedback: "**Let's try that again.**"
6. The practice item repeats until it is correct.

Practice 3: The third practice item appears with two animals; the deer and a dolphin. The audio says:

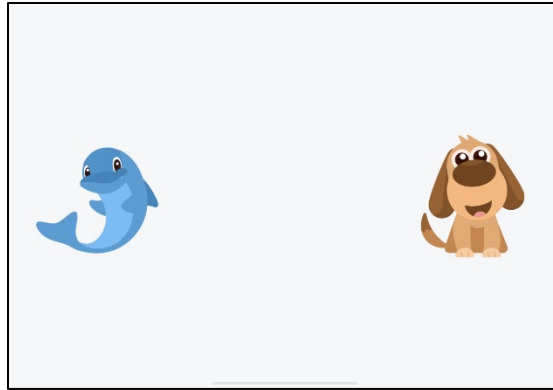
1. **“Now you see two animals. One of them we already fed”** (a box appears around the familiar animal – Deer). **“Let's touch the NEW animal”** (a box appears around the new animal - Dolphin)



2. If the child touches the correct animal, they receive the audio feedback: **“Yum, that’s right!”**
3. If the child doesn’t touch either of the animals, they receive audio feedback: **“Now you see two animals. One of them we already fed”** (a box appears around the familiar animal – Deer). **“Let's touch the NEW animal”** (a box appears around the new animal - Dolphin).
4. If the child touches the wrong animal, they receive the wrong answer sound and audio feedback: **“We fed that one already, remember! Touch the new animal.”**
5. If the child touches the wrong animal a second time, they receive audio feedback: **“Let’s try that again.”**
6. The practice item repeats until it is correct.

Encoding Items

1. After the practice items, the audio says: **“Let’s do some more!”** Then there are 11 encoding items, the presentation for each item is the same.
2. Audio accompanies the images of two cartoon animals and says: **“Touch the new animal.”**
3. If the child touches the correct animal, they receive the audio feedback: **“Yum, that’s right!”**
If the child touches the wrong animal, they receive the wrong answer sound and audio feedback: **“We fed that one already, remember! Touch the new animal.”**

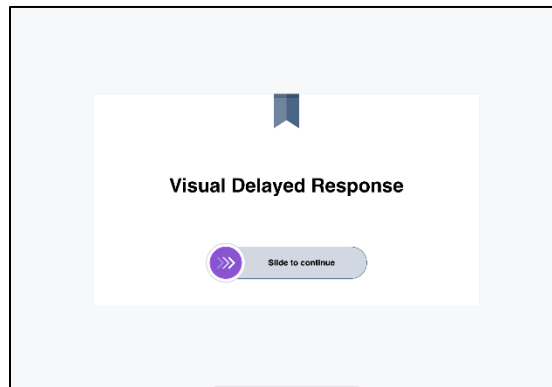


After **“Memory Task Learning”** is completed, you must wait a minimum of 6 minutes (maximum 8 minutes) before administering the **“Memory Task Test.”** We suggest administering another task (typically **“Visual Delayed Response”**) during this time.

PART 2: Visual Delayed Response

The measure begins with a screen with the test name: **“Visual Delayed Response”**.

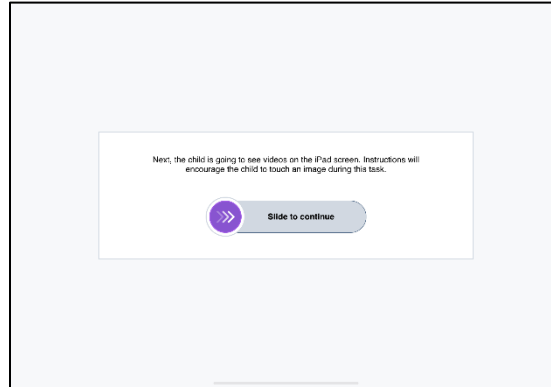
Below the name is a slide with a purple button. Slide the button to the right to continue.



Once the examiner slides the purple button to the right, an instructional screen appears and presents a short introduction for the examiner that says:

“Next, the child is going to see videos on the iPad screen. Instructions will encourage the child to touch an image during this task.”

This screen is shown below:



After the examiner slides this purple button to the right, the first of the three practice/training items appears.

During this task, if the child tries to touch before the instructions are over, the touch will not work.

If they try to touch early, say: **“Wait, listen to the directions, then touch.”**

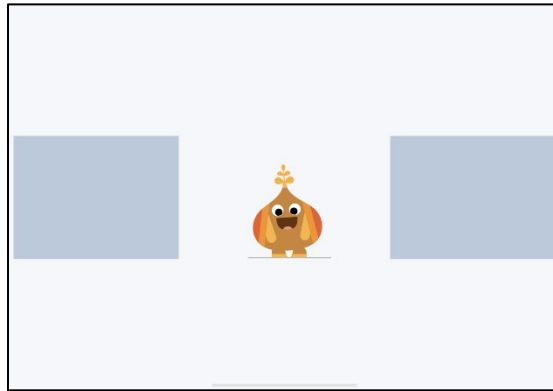
If they touch the screen early, they will need to touch it again for the app to record correctly. When the audio stops, say: **“Try to touch again.”**

All **three** practice items have the same format; these are outlined below:

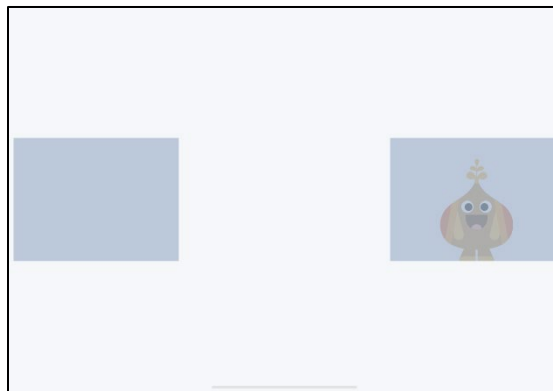
1. An animated character appears between two blocks and the audio says: **“Look at that!”**
2. Then the character disappears behind one of two (left and right) transparent boxes, a curtain closes on the screen, music plays, and after 6 seconds the curtain opens again.
3. The audio says: **“Where is it hiding? Touch where it is hiding.”**
4. If the child touches the correct box, the character - accompanied by happy music - emerges from the top of the box. If the child taps the incorrect box, the audio says: **“Try again”**. The music playing indicates disappointment.

The screens below illustrate the steps of the practice item animations.

Appearance of Animated Character



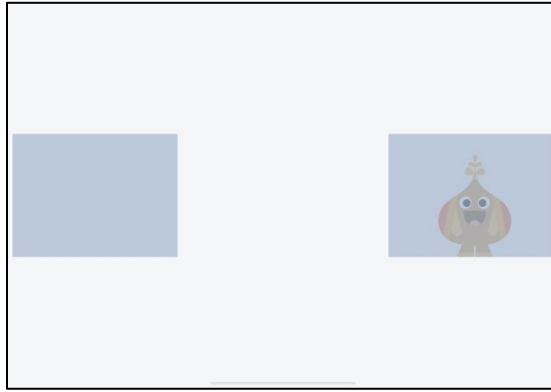
Character behind Transparent B



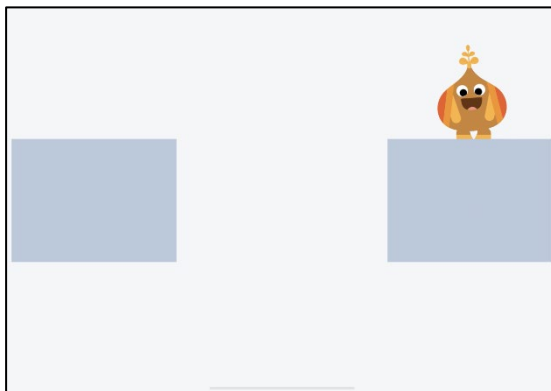
Introduction of the Curtain



After the Delay



After Selection of Correct Box

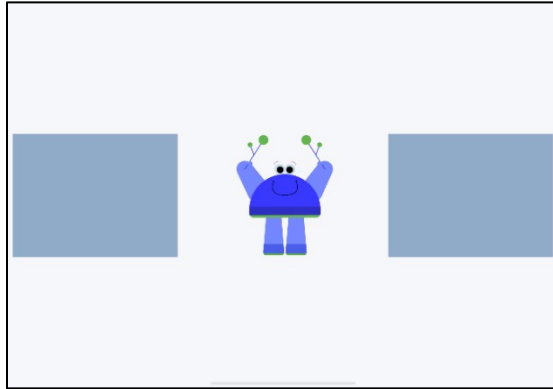


After the **three** practice items, there are **eight** live test items, all eight have the same sequence:

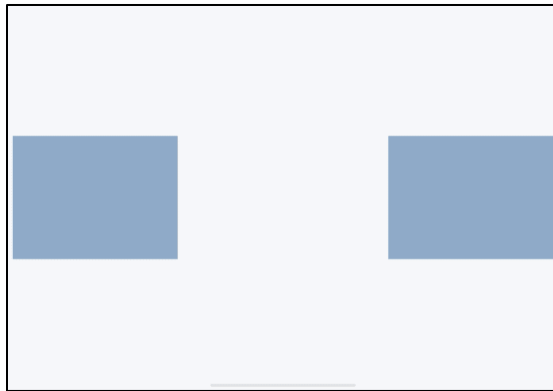
1. An animated character appears between two blocks and the audio says: “**Look at that!**”
2. Then the character disappears behind one of the two (left and right) solid boxes, a curtain closes on the screen, music plays, and after a period of time (**exact time varies by age**) the curtain opens again.
3. The audio says: “**Where is it hiding? Touch where it is hiding.**”
4. If the child taps the correct box, the character - accompanied by presentation music - emerges from the top of the box. If the child taps the incorrect box, the music playing indicates disappointment.

The next item is presented after the music ends.

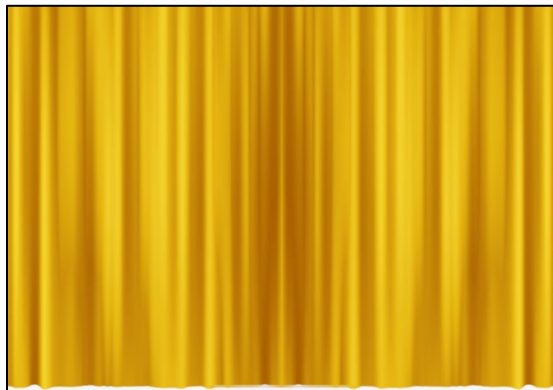
Appearance of Animated Character



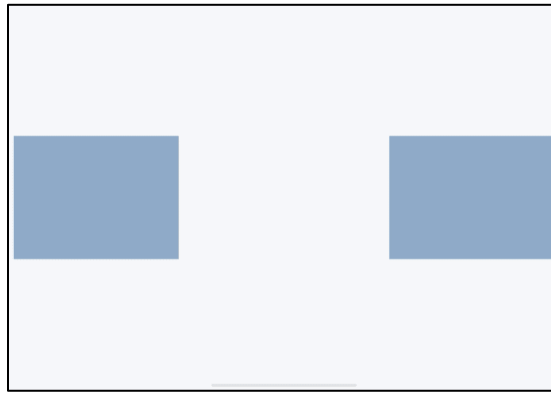
Character behind Solid Box



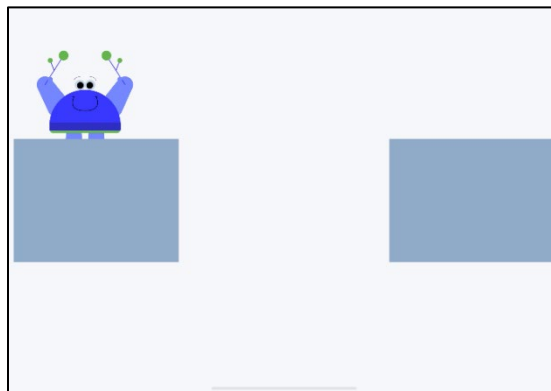
Introduction of Curtain



Character behind Solid Box



After Selection of Correct Box

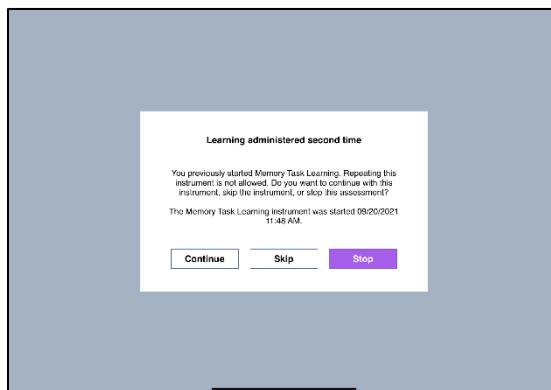


The measure ends after all eight items are presented.

The warning screen, such as the one shown below, appears if not enough time has elapsed between **“Part 1: Learning”** and **“Part 3: Memory of this task.”**

If that happens, take a note of the time needed before continuing and entertain the child briefly during this time with something else before tapping **“Continue”**. Selecting any other option may result in loss of scores or non-standard scores.

Warning Screen

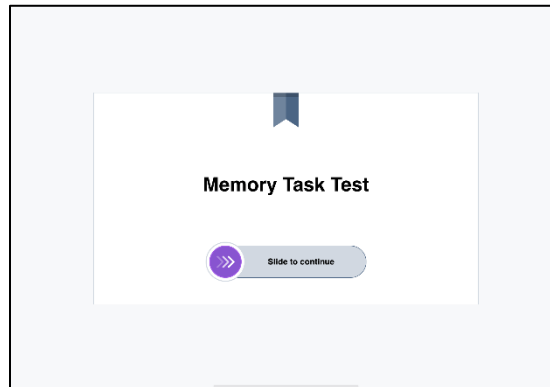


PART 3: Memory Task Test:

The third part of this task begins with a screen with the test name: “**Memory Task Test**”. Below the name is a slide with a purple button.

Slide the button to the right to continue with administration of the test.

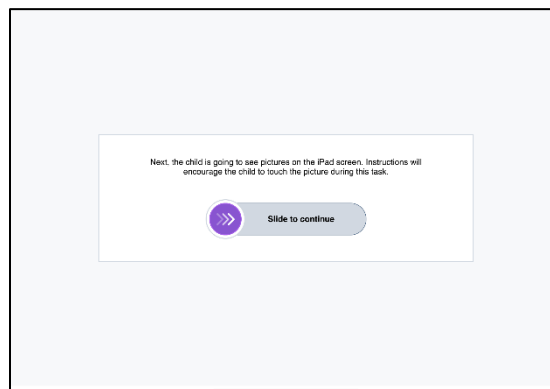
This title screen is shown below:



Once the examiner slides the purple button to the right, a screen appears and presents a short introduction for the examiner that says:

“Next, the child is going to see pictures on the iPad screen. Instructions will encourage the child to touch the pictures during this task.”

This instructional screen is shown below:



This measure consists of twenty items, the sequence of which is the same.

1. During this task, if the child tries to touch before the instructions are over, the touch will not work.
2. If they try to touch early, say: **“Wait, listen to the directions, then touch.”**
3. If they touch the screen early, they will need to touch it again for the app to record correctly.
4. When the audio stops, say: **“Try to touch again.”**

The sequence of items is preceded by a blank screen with an audio that says:

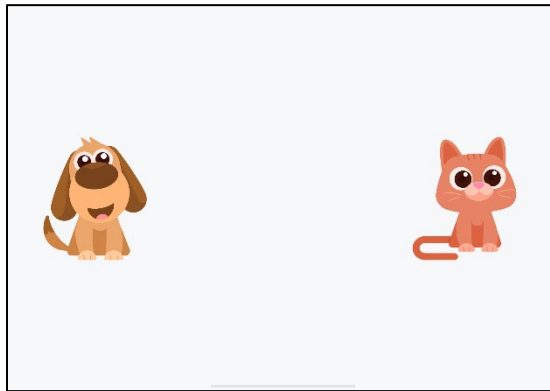
“Now, you will see two animals. One of them is hungry and one of them has already been fed. Let’s feed the animal that has not been fed. It’s still hungry. Touch the hungry animal to feed it.”

The three steps are:

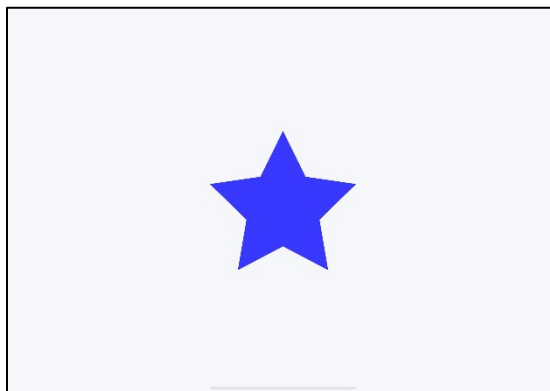
1. Audio accompanies the images of two cartoon animals and says: **“Touch the new animal”**.
2. The audio feedback is the same for both correct and incorrect choices: **“Let’s try another”**.
3. After each item, a stimulus — a bursting star with accompanying tones — is shown on the screen before presenting the next item.

The screenshots below are examples of steps 1 and 3:

Two animals: Touch the new animal



Sample: Star



The test will continue until all twenty test items are administered.

Pausing the tests, all three parts: Memory Learning, Visual Delayed Response, and Memory Task

If you need to pause or stop one of these tests for any reason, use the three-finger slide from right to left ([administrative gesture](#)).

If you pause or stop during an instruction screen, when you resume, the app will return to the last active screen.

If you pause or stop during the demonstration or practice items, when you resume, the app will start from the beginning of the current item presentation sequence.

If you pause or stop during the test items, the app will start from the beginning of the current item presentation sequence. OR start at the beginning of any unanswered items in the item presentation sequence when resuming after a stop.

Picture Vocabulary

For more details and video examples, see the training video “**Picture Vocabulary**”

Overview

“Picture Vocabulary” is a measure of receptive vocabulary administered in a computer-adaptive (CAT) format. The instructions and format of the PV are the same for all ages (25 months +). The iPad presents the child with four pictures accompanied by an audio recording that says a word. The iPad instructs the child to tap (touch) the picture that most closely shows the meaning of the word. For most children, the measure takes approximately 5 minutes.

The measure has three phases: **Instruction**, **Practice**, and **Test items**.

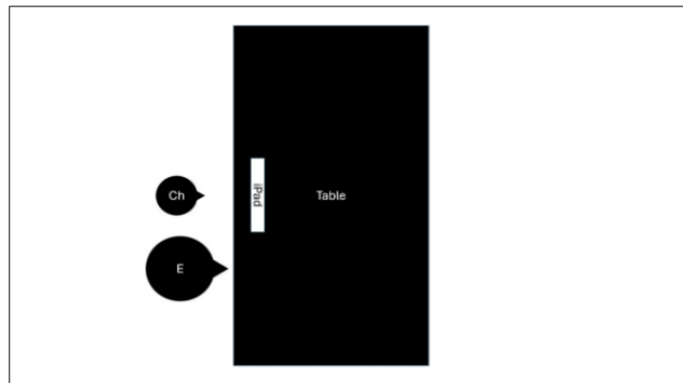
1. During the **Instruction phase**, the iPad presents an audio file with the test instructions.
2. During the **Practice phase**, the child responds to two practice items, with corrective feedback from the iPad.
3. During the **Test Items phase**, the child responds for approximately 5 minutes or 25 items. The iPad does not provide feedback during the test items phase.

NOTE: Make sure that the volume is loud enough so that the child can hear the pre-recorded feedback and the presentation of the words.

Administration

Set-up and Materials

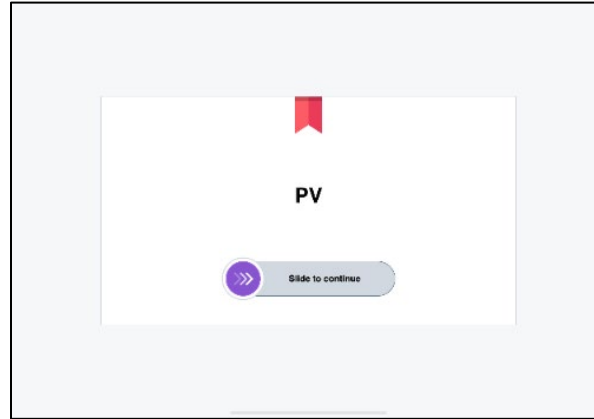
iPad with the Baby Toolbox App; comfortable seating for the child and examiner. Below is a diagram of one such arrangement especially for the youngest children.



Starting the Measure

As with other Toolbox measures, the test begins with a title screen (below) with the abbreviated test name: PV (Picture Vocabulary). Below, the name is a slide with a purple button. Slide the button to the right to continue with administration of the test.

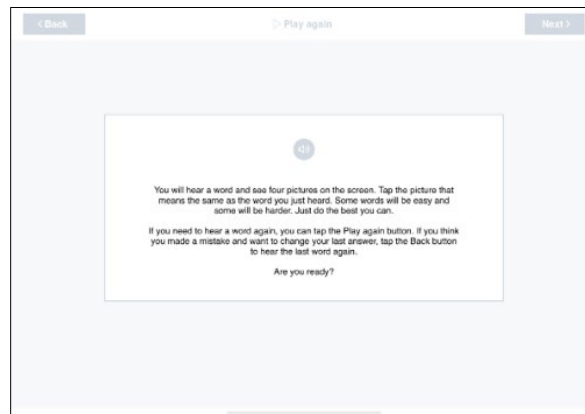
The title screen is shown below:



Instructions

Once the examiner slides the purple button to the right, an instruction screen appears. An audio file presents a short introduction with simple instructions. The audio file says the following:

“You will hear a word and see four pictures on the screen. Tap the picture that means the same as the word you just heard. Some words will be easy and some will be harder. Just do the best you can. If you need to hear a word again, you can tap the Play Again button. If you think you made a mistake and want to change your last answer, tap the Back button to hear the last word again. Are you ready?”



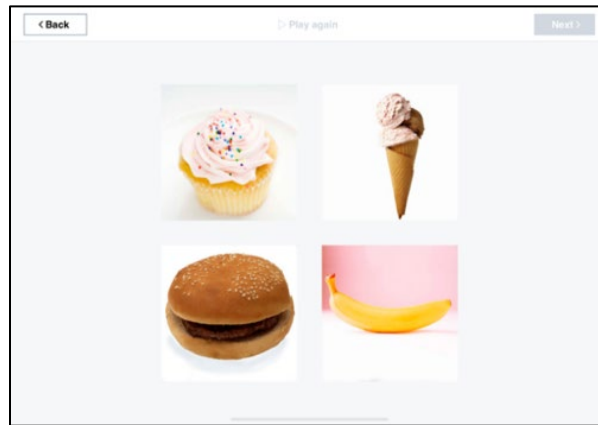
After these instructions, and when the child indicates readiness to continue, the examiner should touch the **“NEXT”** button to continue.

Practice Items

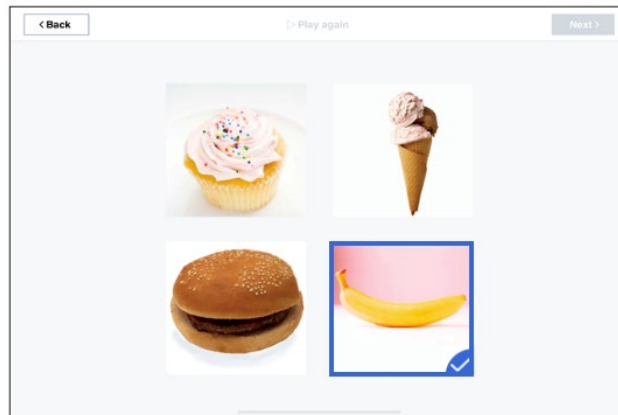
There are two practice items. The iPad displays stimulus pictures, plays the audio prompts, and provides feedback for both items. If the child answers incorrectly, he or she will have multiple attempts until he/she answers correctly.

Practice Item 1

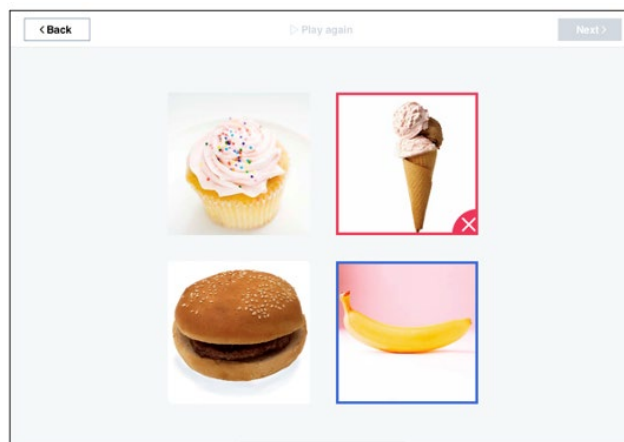
The iPad displays four pictures. An audio prompt says: **“Let’s try one for practice: Banana. Touch the picture of Banana.”**



The child should tap the Banana picture. If the child responds correctly by tapping the Banana picture, the iPad provides feedback, saying: **“That’s right!”** and a checkmark appears next to the picture as shown below. The iPad automatically advances to **Practice Item 2**.



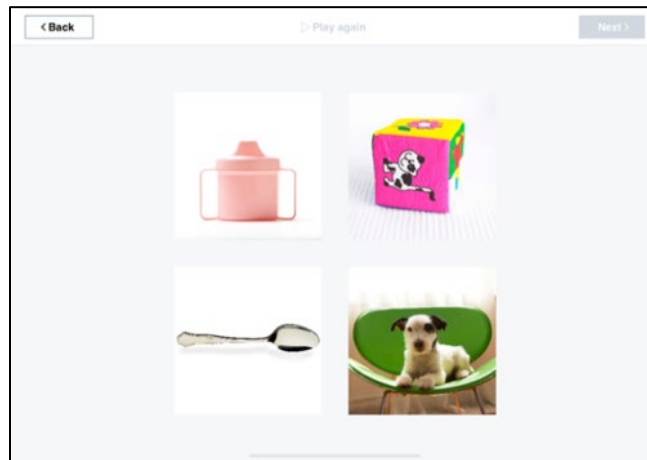
If the child responds incorrectly by tapping one of the three images that is not a banana, the Banana picture lights up and the iPad provides corrective feedback: **“This is banana. Let’s try again.”** The iPad repeats **Practice Item 1** until the child selects the correct item, Banana. If the child does not succeed in three tries, the examiner should touch the picture of the banana saying, **“This is a banana.”**



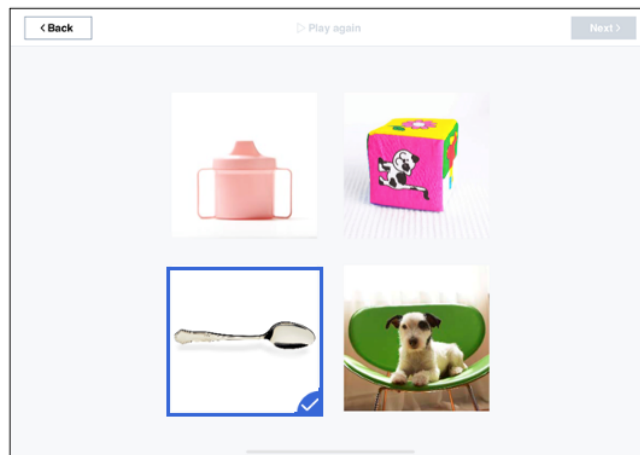
Then the app will move to **Practice Item 2**.

Practice Item 2

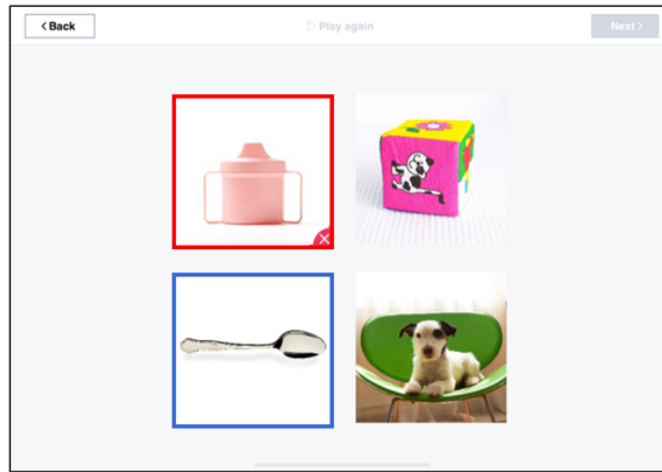
The iPad will display four pictures. An audio prompt will say: **“Let’s try another one: Spoon. Touch the picture of Spoon.”**



The child should tap the Spoon picture. If the child responds correctly by tapping the Spoon picture, the iPad will provide feedback: **“That’s right!”** A checkmark appears next to the correct response as is seen next to the picture of the spoon below. Then the iPad automatically advances to the test items transition screen.



If the child responds incorrectly by tapping one of the three images that is not a spoon, the Spoon picture lights up and the iPad will provide corrective feedback: **“This is a spoon. Let’s try again.”** The iPad repeats Practice Item 2 until the child selects the correct item, Spoon. If the child does not succeed after three tries, the examiner should touch the picture of the spoon saying, **“This is a spoon”** and the app moves to the test items transition screen.

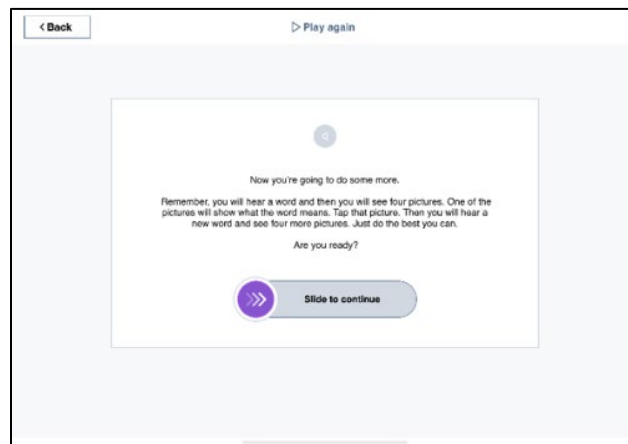


Test Items

Following the two practice items, the iPad will display a transition screen to the test items and present the instructions with audio saying:

“Now you’re going to do some more. Remember, you will hear a word and then you will see four pictures. One of the pictures will show what the word means. Tap that picture. Then you will hear a new word and see four more pictures. Just do the best you can. Are you ready?”

After confirming that the child is ready to begin the test items, slide the purple button to the right to start the test items.



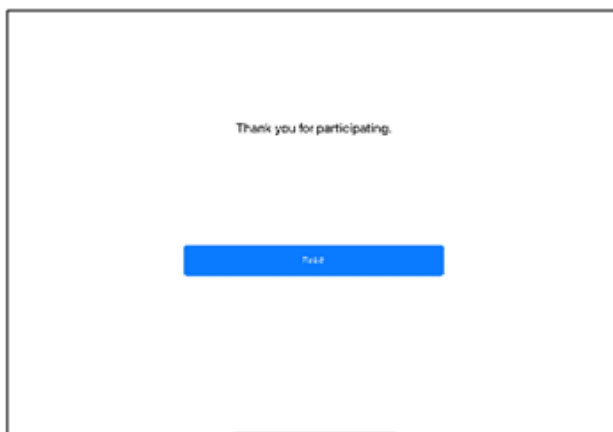
The iPad then presents test items, one at a time, for about five minutes until all the items are presented.

NOTE: Some children may have difficulty touching the screen. The participant may point, and the examiner can touch the screen. In this case, the examiner should say something such as:

“You can point to your choice and then I will touch the screen for you.”

If the child says that he or she does not understand that word after several repetitions, the examiner may say the word **once more** and then encourage the child to choose a picture.

When the test items are completed, the final screen appears; it is shown below:



More recommendations

If the child has difficulty touching the screen, they might point to the choice and the examiner can touch the screen on their behalf.

If the child is too eager to touch the screen before the audio ends, the examiner can pull the screen back out of reach until the audio has played and then bring the iPad forward within reach for the child to respond.

Pausing or stopping/delaying the test

If the examiner needs to pause or stop/delay the test for any reason, use the [admin gesture](#) (three-finger slide) from right to left. You can do so at any time. If you do so during the instructional and practice items, you will return to the last active screen (the same place where you left off). If you pause or stop/delay during the live items, you will return to the next unadministered item.

Counting

For more details and video examples, see the training video “Intro to Math Measures”.

Overview

There are two tasks in this measure. They are designed for children ages 25 months and older. The first task assesses a child’s counting ability or ability to verbalize their knowledge of numbers in order. The examiner asks the child to start counting from 1 to see how high they can count. The second task assesses a child’s ability to look at an array of objects on the screen and count them. In each task, after the child responds, the examiner records how the child responds on the iPad.

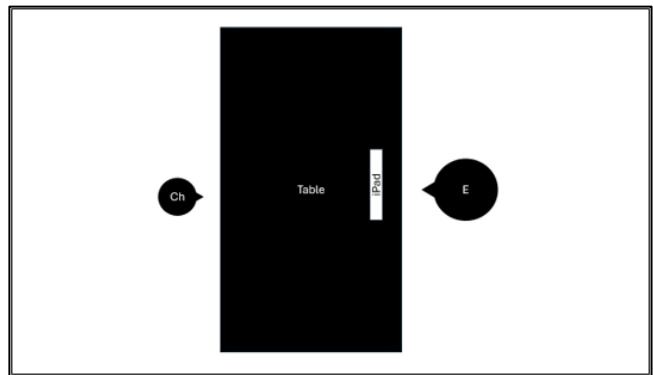
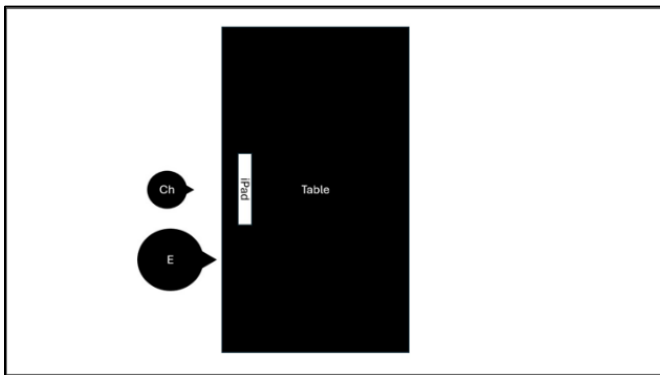
Administration

Materials

iPad with Baby Toolbox App, with comfortable seating for child, examiner, and the caregiver.

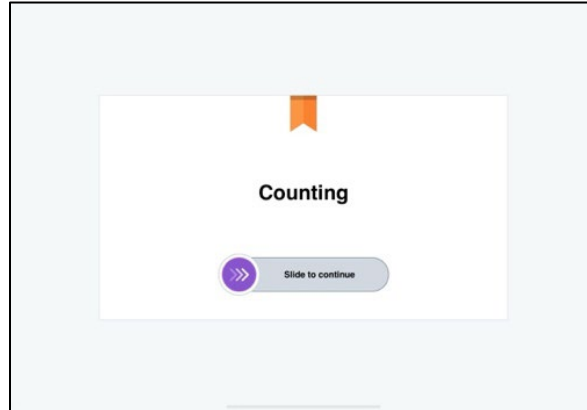
Positioning

For part one of this test, the examiner can sit at the table next to the child or across from the child. The iPad should be on the stand facing either the child and the examiner, or just the examiner. In either case, the child should not be able to reach the iPad. When the child is sitting in a highchair next to the examiner, the caregiver should be off to the side as not to interfere.



Instructions:

The measure begins with a title screen that shows a purple circle and slide under the name: **Counting**.

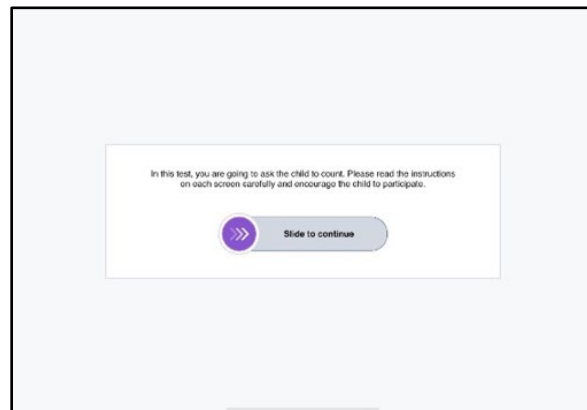


The examiner slides the purple circle to the right to begin the measure.

Task 1: Verbal Counting

The next screen explains the first task for the examiner.

In this test, you are going to ask the child to count. Please read the instructions on each page carefully and encourage the child to participate.



The examiner slides the purple circle to the right to begin. Then the examiner reads the next screen to the child. The examiner asks: **“How high can you count? Please start at one and show me.”**

Once the child stops counting, the examiner should prompt the child to keep counting by saying, **“What comes next?”** or **“Can you count higher?”**

If a child counts in another language and you happen to know that language, you may record that response. We recommend that you make a note that you did this. Similarly, if the child counts in another language and you do not know that language, you may ask the parent or caregiver to help you interpret. Again, we recommend that you make a note that you did this.

When the child has completed counting, the examiner types the last consecutive numeral they gave in the answer box. The **“NEXT”** button in the upper right corner of the screen then becomes active.

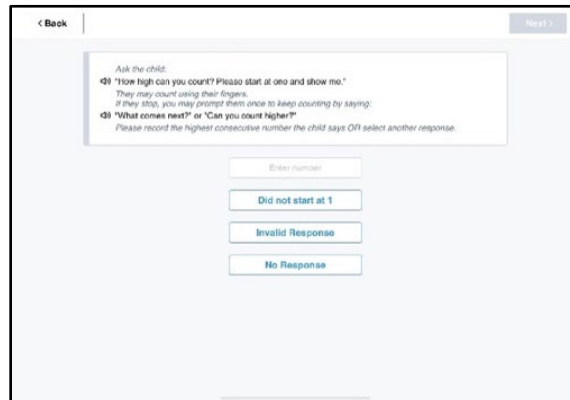
If the child starts at a number other than one, but otherwise counts consecutively correctly, you may ask them to try one more time by saying **“Start at 1”**. If they start at another number again, tap the response: **“Did not start at 1”**.

As shown above, the possible responses are shown on the screen. There are four possibilities: **“A numeric response”**; **“Did not start at 1”**; **“Invalid Response”**; and **“No Response”**.

If the child does not respond within 30 seconds, you may prompt them once more. If they do not respond after another 30 seconds, **“No Response”** should be selected.

If the child gives an invalid number (not between 0-99) or something other than a number (for example, **“star”** or **“candy”**), then tap the **“Invalid Response”** choice.

Below is the screen for Task 1 question and answer choices:

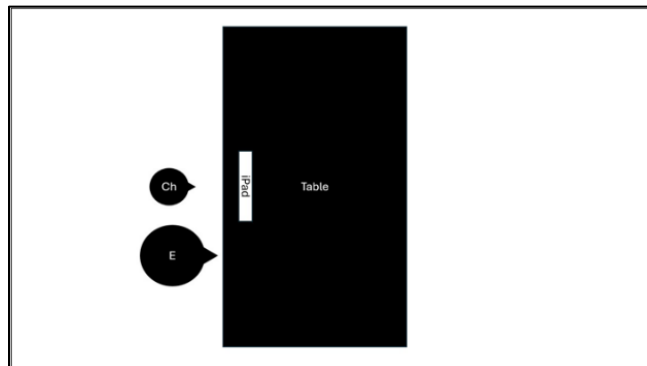


After the examiner enters the child's response and taps "NEXT", the test moves on to Task 2.

Task 2: Object Counting

Positioning

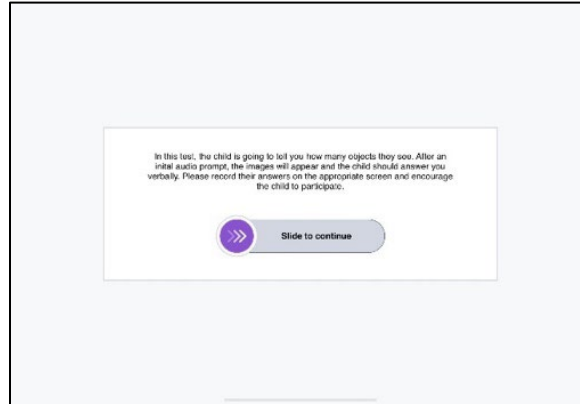
For part two of this test, the examiner should be seated at a table next to the child. The iPad should be on the stand facing both the child and the examiner, and the child should not be able to reach the iPad. The child should be sitting in a highchair next to the examiner, while the caregiver is off to the side so as not to interfere.



"Object Counting" assesses a child's ability to look at an array of objects on the screen and count them. Specifically, the assessment involves the child looking at a series of object arrays and telling the examiner how many objects they saw. The arrays are presented on the iPad screen, and the examiner records the child's numeric response in an open text field on the screen following the presentation.

There are no practice items, and the arrays are always presented in the same order. There are 6 stimulus arrays: 1 camera; 3 apples; 2 trees; 4 hats; 5 gift boxes; and 8 donuts.

The next screen explains to the examiner the specific expectations for the child in this task.



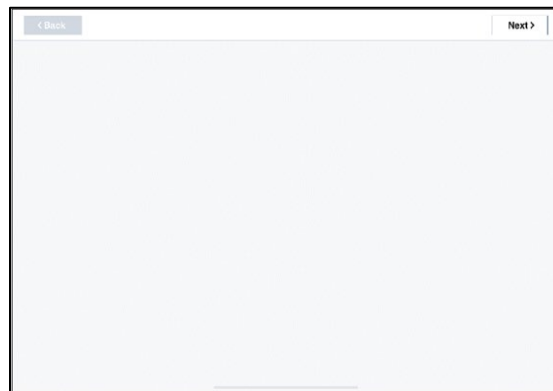
This instructional screen reads:

“In this test, the child is going to tell you how many objects they see. After an initial audio prompt, the images will appear, and the child should answer you verbally. Please record their answers on the appropriate screen and encourage the child to participate.”

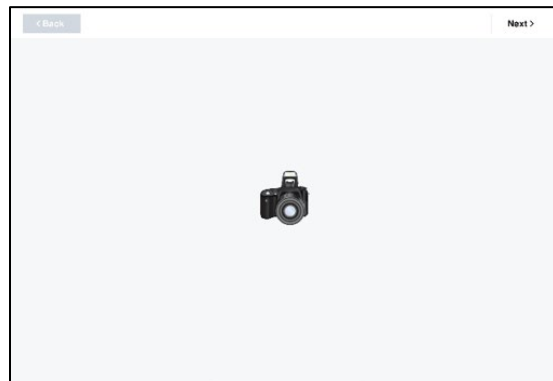
If the child does not respond in 5 seconds, you can repeat the question.

The examiner slides the purple button to the right to begin the test.

The first screen is blank and has an audio prompt that says, **“Look at the screen.”**



A picture appears on the next screen and the audio then asks, **“How many are there?”** After the audio ends, the **“NEXT”** button becomes active.



After tapping the “**NEXT**” button, the examiner records the child’s response on a screen that offers three response options: ‘**The Child’s Numeric Response**’ in an open text field, “**No Response**”, or an “**Invalid Response**”.

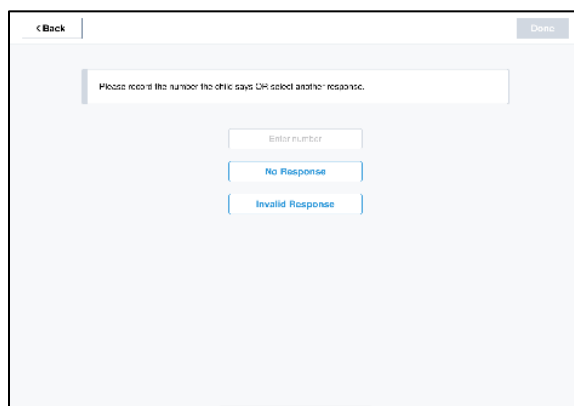
If the child responds verbally and uses a gesture [for example, saying the word “**three**,” but holds up two fingers], the verbal response should be recorded.

If no verbal response is given, but the child uses a gesture [for example, holding up three fingers], that number should be recorded.

If the child does not respond within 30 seconds, “**No Response**” should be selected.

If the child gives an invalid number (not between 0-99) or something other than a number (for example, “**star**” or “**candy**”), then tap the “**Invalid Response**” choice.

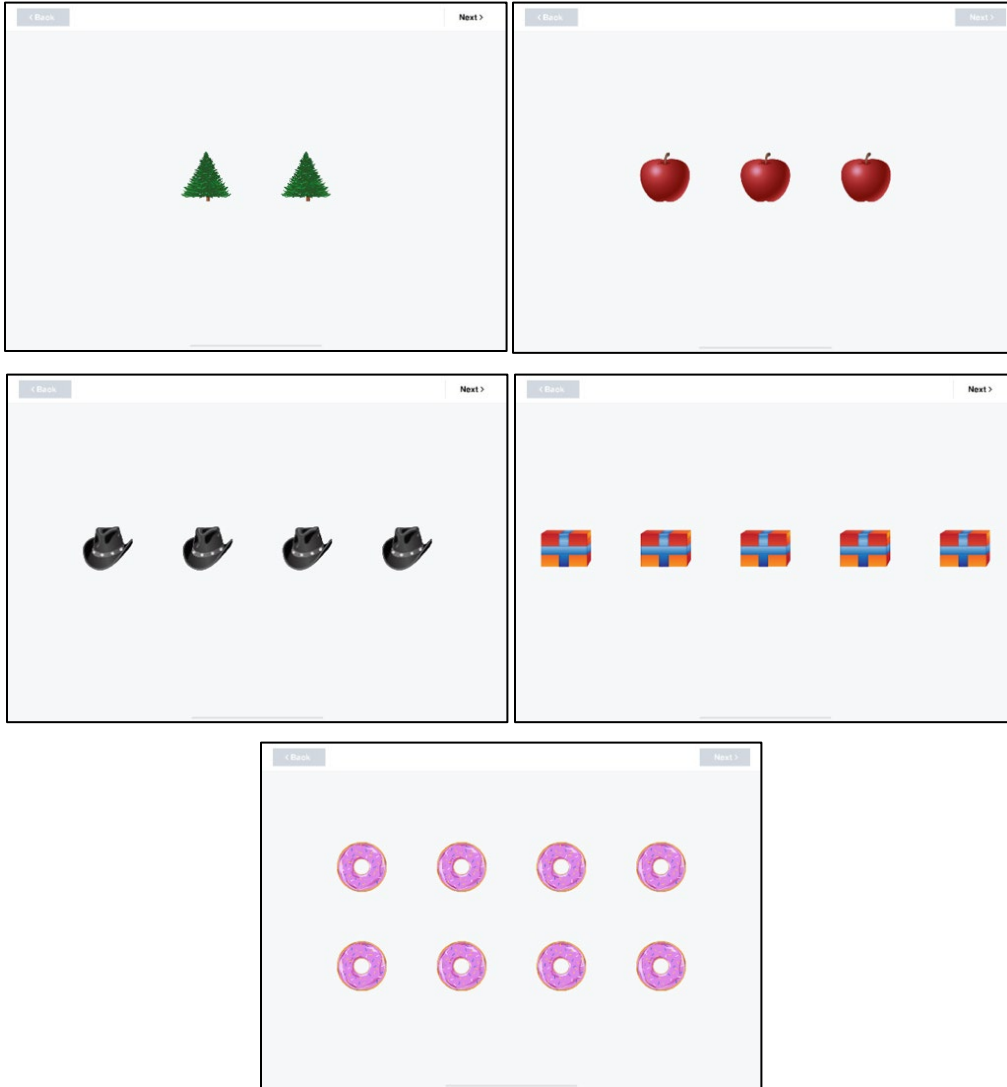
The examiner taps “**NEXT**” when finished recording the response.



After the examiner has tapped “**NEXT**”, the second live item appears and the audio asks “**How many are there?**”

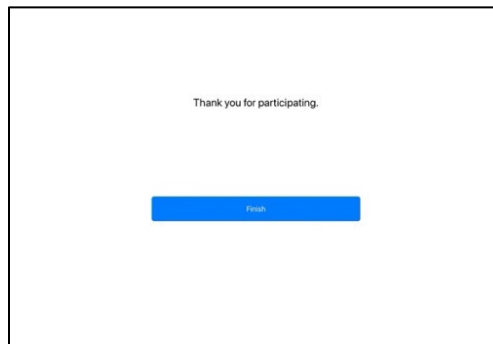
After this audio ends, the “**NEXT**” button becomes active. Then the examiner taps “**NEXT**” to activate the response screen and records the child’s response. This sequence continues until the test ends. After the last item, the examiner taps “**NEXT**”.

The remaining items are shown here:



NOTE: The test will end if the response option to the first or the third item is an incorrect numerical input, “No Response,” or “Invalid Response.”

Otherwise, all six items will be administered; then, a final screen will appear thanking the child for their participation.



Pausing and Resuming, Stopping or Skipping the Test

If you need to pause the test for any reason, use the three-finger slide from right to left ([administrative gesture](#)).

If you pause or stop/delay during an instruction screen, when you resume, the app will return to the last active screen. If you pause or stop/delay during the test items, when you resume, the app will start at the beginning of any unanswered items in the item presentation sequence.

If you want to skip the test, you need to provide a reason for doing so.

Subitizing

For more details and video examples, see the training video “Intro to Math Measures”

Overview

Like the other measures in this section, this measure is designed for children ages 25 months and older. Subitizing is a performance-based measure in which groups of varying numbers of dots are displayed on the iPad screen and the children are asked to say how many they see.

In all items, a dot image display is shown for 1 second. The child verbally tells the examiner their response; the examiner records their response in an open-text field that is on the screen after the dot display.

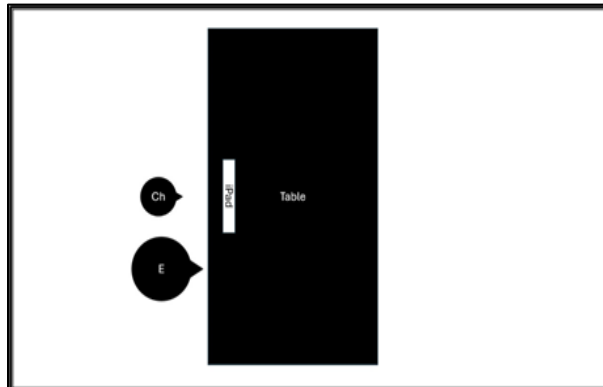
Administration

Materials

iPad with Baby Toolbox App; iPad stand; comfortable seating for child, examiner, and caregiver

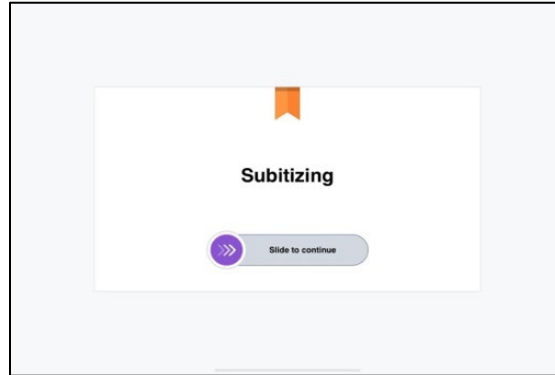
Positioning

The examiner sits at the table next to the child. The iPad should be on the stand facing both the child and the examiner just out of reach of the child. The child should be sitting in a highchair next to the examiner, while the caregiver is off to the side, so as not to interfere.



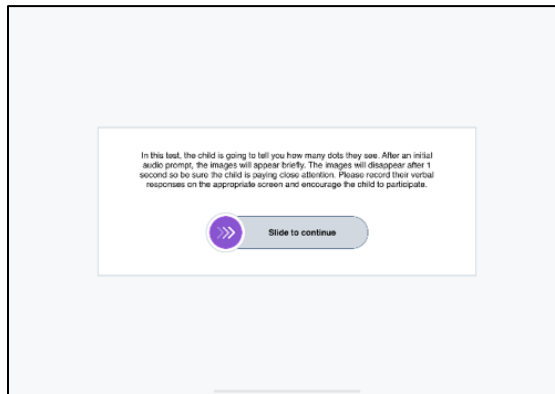
Instructions

The measure begins with a title screen with a purple circle and slide under the name: “**Subitizing**.”



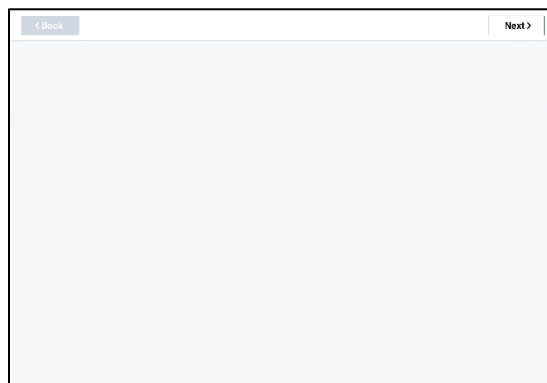
Slide the purple circle to the right to begin the measure. The next screen explains the task for the examiner:

“In this test, the child is going to tell you how many dots they see. After an initial audio prompt, the images will appear briefly. The images will disappear after 1 second so be sure the child is paying close attention. Please record their verbal responses on the appropriate screen and encourage the child to participate.”

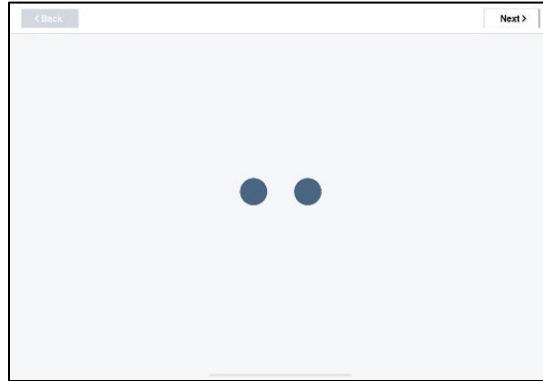


The examiner should slide the purple ball to the right to bring up the next screen: a blank screen with audio that says, “**Look at the screen.**”

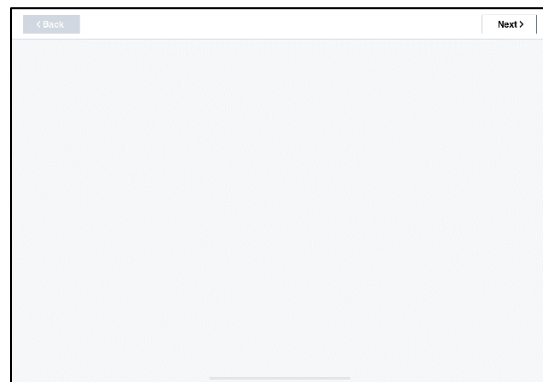
When the child is ready and attentive, the examiner taps “**NEXT**” as shown in the screen below.



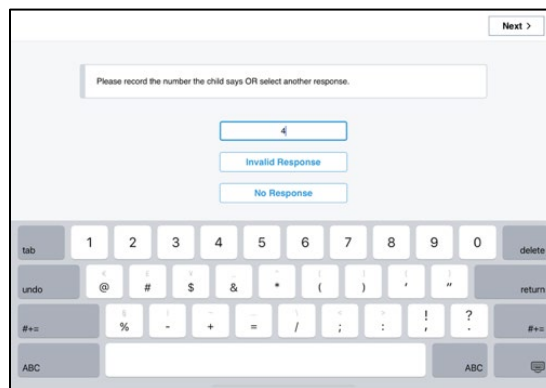
After the examiner taps “**NEXT**,” the first of four test items will appear for one second.



After the screen goes blank (see screen below), the app audio asks: “**How many did you see?**”



Once the child answers, the examiner taps “**NEXT**” in the upper right-hand corner of the blank screen to bring up the response screen.



The examiner records the child’s response on a screen that offers three response options: ‘**The child’s numeric response**’ (between 0-99) in an open text field, “**No Response**,” or an “**Invalid Response**”.

If the child does not respond, you may wait five seconds and verbally repeat the question.

If the child responds verbally and uses a gesture [for example, saying the word “**three**,” but holds up two fingers], the verbal response should be recorded.

If no verbal response is given, but the child uses a gesture [for example, holding up three fingers], that number should be recorded.

If the child does not respond within 30 seconds, “**No Response**” should be selected.

If the child gives an invalid number (not between 0-99) or something other than a number (for example, “**star**” or “**candy**”), then tap the “**Invalid Response**” choice.

After entering the number or tapping one of the other options, the examiner should tap “**NEXT**” in the upper right-hand corner of the screen. Examiners should ensure that the child is ready to move on to the next item.

As soon as the examiner selects “**NEXT**”, another test item appears for one second with the corresponding response screen.

This sequence continues until all four items have elapsed and the test ends.

Pausing and Resuming, Stopping or Skipping the Test

If you need to pause the test for any reason, use the three-finger slide from right to left ([administrative gesture](#)).

If you pause or stop/delay during an instruction screen, when you resume, the app will return to the active screen.

If you pause or stop/delay during the test items, when you resume, the app will start at the beginning of any unanswered items in the item presentation sequence.

Who Has More

For more details and video examples, see the training video “Intro to Math Measures”

Overview

Who Has More is a performance-based measure that requires children, ages 25 months and older, to make quick estimations and choose which of the two arrays has more objects without time to count.

The arrays contain a specified quantity (1-18) of objects. One image set is displayed on the left side of the screen and the other image set is simultaneously displayed on the right side. Audio instructions direct the child to choose the set with the larger quantity of images by asking “**Who has more?**” The child should tap the set of images that matches their choice.

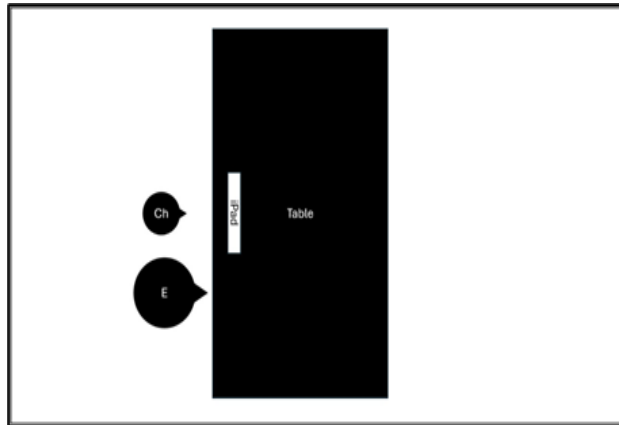
Administration

Materials

iPad with Baby Toolbox App; iPad stand; comfortable seating for child, examiner, and caregiver

Positioning

The examiner should sit at the table next to the child. The iPad should be on the stand facing both the child and the examiner, close enough that the child can comfortably reach it. The child should be sitting in a highchair next to the examiner, while the caregiver sits to one side so as not to interfere.



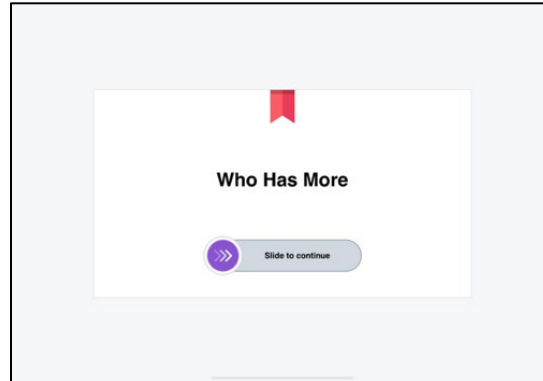
Materials needed

iPad with Baby Toolbox App; iPad stand; comfortable seating for child, examiner, and caregiver

Instructions

The measure has three parts: **Instructions and Demonstration**; **Practice Item**; and **Test Items**.

The measure begins with a title screen that shows a purple circle and a slide under the name: **“Who Has More.”**

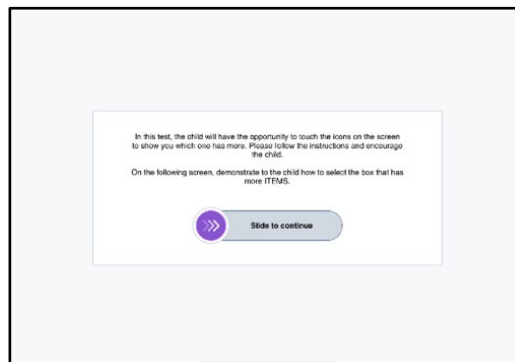


When ready to begin, slide the purple circle to begin the measure.

Part 1: Instructions and Demonstration Item

The screen below reads:

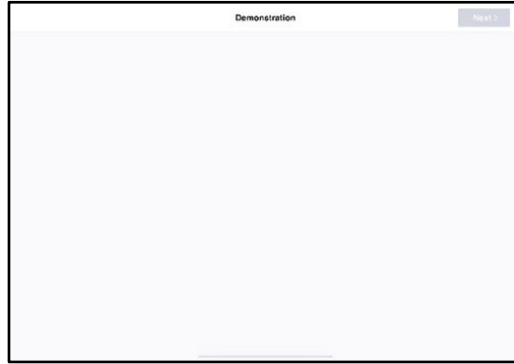
“In this test, the child will have the opportunity to touch the icons on the screen to show you which one has more. Please follow the instructions and encourage the child. On the following screen, demonstrate to the child how to select the box that has more ITEMS.”



Demonstration Item:

Slide the purple button to the right to begin the demonstration screens.

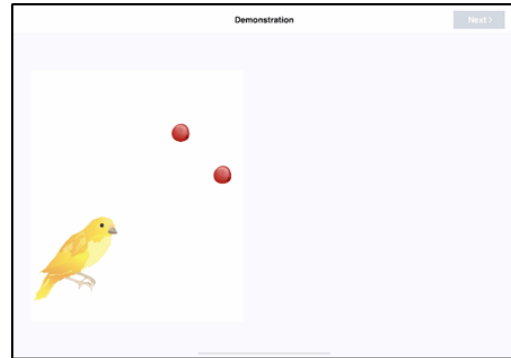
There is a blank screen followed by the four changes in the screen.



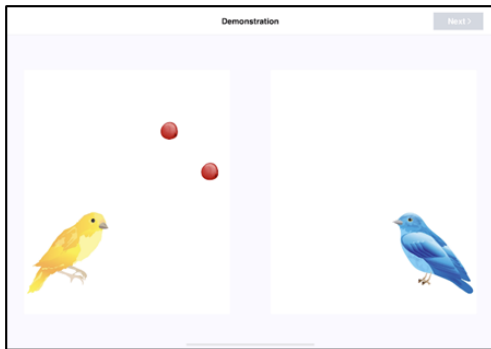
Audio says: "Look at the screen."



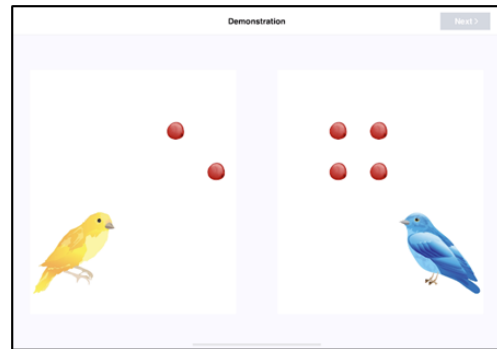
"This is the Yellow Bird"



"These are the Yellow Bird's"



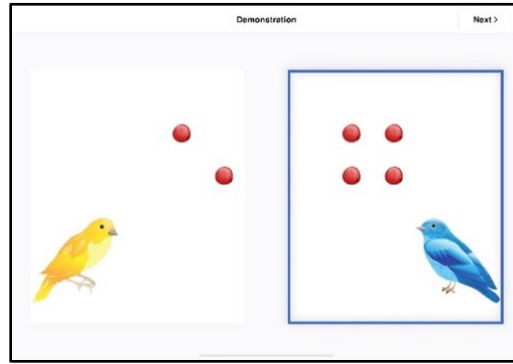
"This is the Blue Bird."



"These are the Blue Bird's. Who has more?"

The examiner should touch the bird that has more berries. Once the examiner chooses (taps on) a bird, a blue frame surrounds the choice; the "NEXT" button becomes active, and the examiner should tap it.

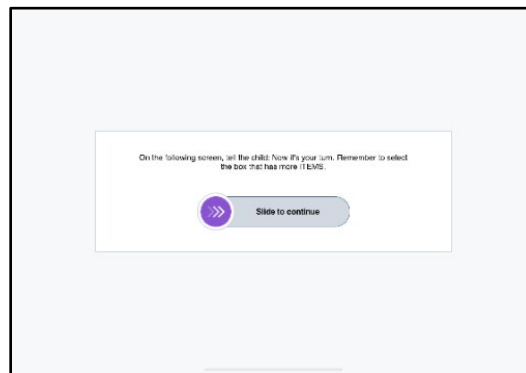
Because the choice is correct, the audio makes a trumpet sound; the app moves on to the next instructions and practice item.



Part 2: Instructions and Practice Item

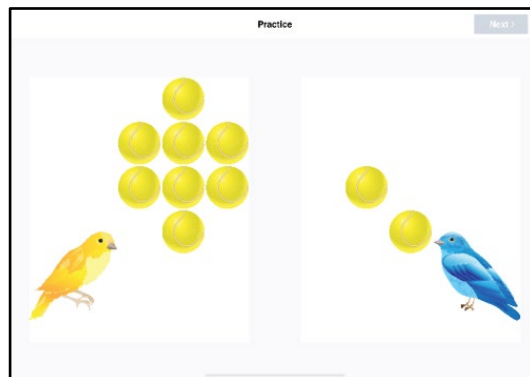
After the demonstration item, there is another instructional screen for the Practice Item. The screen reads:

On the following screen, tell the child: **“Now it’s your turn. Remember to select the box that has the most ITEMS”**



The examiner should slide the purple circle to the right to bring up the practice items.

Practice Item:



When the item appears on the screen, the audio asks **“Who has more?”** The examiner should encourage the child to choose, and then after they make a choice, touch the **“NEXT”** button.

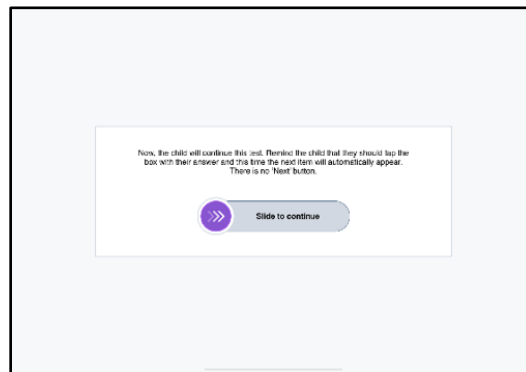
If the choice is correct, the audio makes a trumpet sound. If the choice is incorrect, the audio says, “**Try again**”. After answering the Practice Item correctly, or after three incorrect answers, the app moves on to live items.

Part 3: Live Test Items

Another instructional screen introduces the test items to the examiner.

This instructional screen reads:

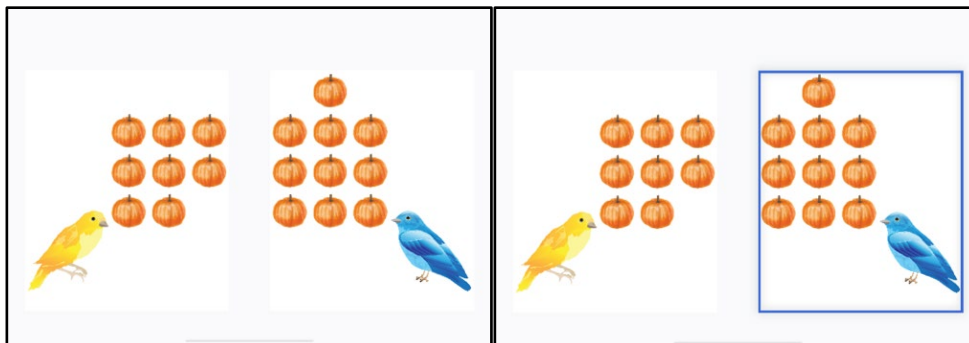
“Now, the child will continue this test. Remind the child that they should tap the box with their answer and this time the next item will automatically appear. There is no Next button.”



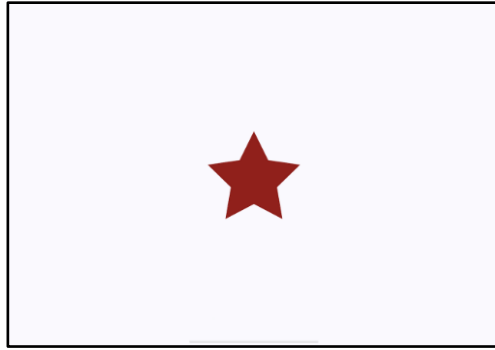
The examiner should slide the purple button to the right to bring up the test items.

Live Items

Below are two images from a test item: the first image shows the two birds each with an array of pumpkins and the second image shows the box around the child’s choice of response.



NOTE: You may need to remind the child to wait until the audio ends to select their response. After every five items, a screen with a red star appears to help maintain the child’s attention.



The test will continue presenting items until:

1. The iPad times out (over five seconds) on four live items in a row;
2. All the items have been administered.

NOTE:

- If the child has difficulty touching the screen, they may point to their choice and the examiner can touch the screen on their behalf.
- If the child is too eager to touch the screen before the audio ends, the examiner can pull the screen back out of reach until the audio has played and then bring it forward within reach for the child to respond.

Pausing and Resuming, Stopping or Skipping the Test

If you need to pause the test for any reason, use the three-finger slide from right to left ([administrative gesture](#)).

If you pause or stop/delay during an instruction screen, when you resume, the app will return to the active screen.

If you pause or stop/delay during the test items, when you resume, the app will start at the beginning of any unanswered items in the item presentation sequence.

Verbal Arithmetic

For more details and video examples, see the training video “Intro to Math Measures”

Overview

This measure is designed for children ages 36 months and older. This measure assesses a child’s ability to add and subtract in response to word problems asked by the examiner. The questions appear on the iPad screen and the examiner records how the child responds. The questions are always presented in the same order.

The questions are:

- “If I have two blocks and I find another one, how many do I have now?” (2+1)
- “If I have one block and my friend Donna gives me three more, how many do I have now?” (1+3)
- “If I have four blocks and I lose one, how many do I have now?” (4-1)
- “If I have two blocks and I lose one, how many do I have now?” (2-1)
- “If I have three blocks and my friend Jordan takes two, how many do I have now?” (3-2)

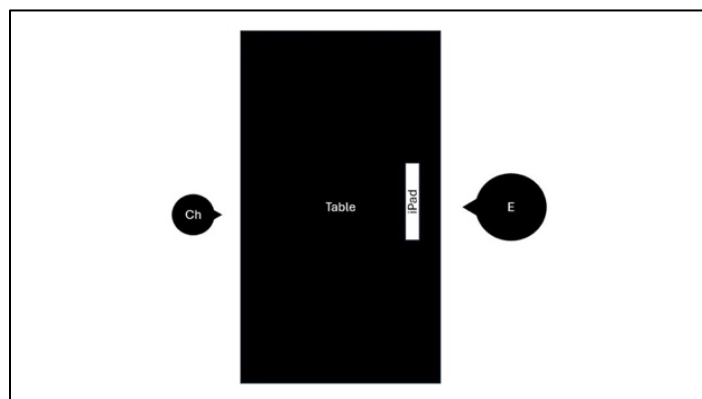
Administration

Materials needed

iPad with Baby Toolbox App; iPad stand; comfortable seating for child, examiner, and caregiver; five one-inch blocks for use as manipulatives

Positioning

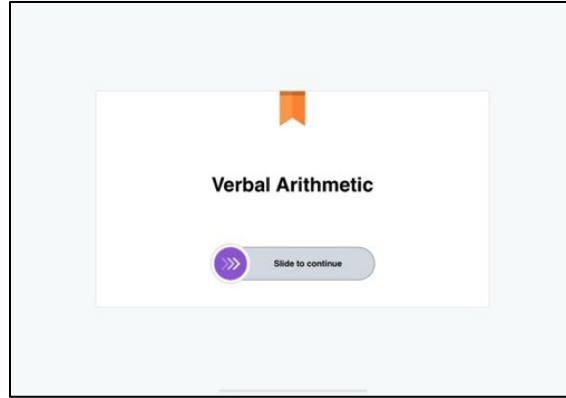
The examiner should sit at the table across from the child. The iPad should be facing the examiner on the stand. The child should be sitting in a highchair across from the examiner,



Instructions

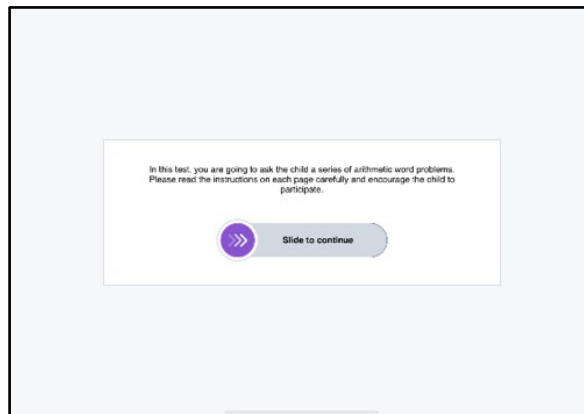
Starting the Test

The measure begins with a title screen that shows a purple circle and slide under the name: **“Verbal Arithmetic.”** The examiner should slide the purple button to the right to begin the measure.



The next screen outlines the task for the examiner. It reads:

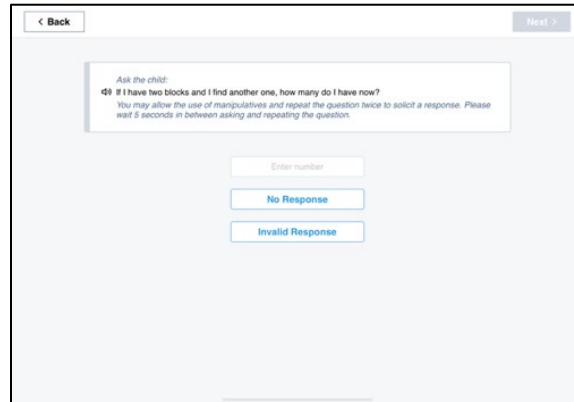
“In this test, you are going to ask the child a series of arithmetic word problems. Please read the instructions on each page carefully and encourage the child to participate.”



The examiner slides the purple circle to the right to begin.

Next, the examiner puts blocks in front of the child and says: **“You can use these (or your fingers) to help if you’d like.”**

Problem 1:



Problem 1 says, “**If I have two blocks and I find another one, how many do I have now?**”

If the child readily answers a number 0-9

9, the examiner types the numeral in the answer box, and the “**NEXT**” button in the upper right corner of the screen becomes active.

Tap the “**NEXT**” button to move to the next question.

If the child does not answer after 10 seconds, ask the question again and remind them that they may use the blocks or their fingers to help. If the child still gives no response after 10 seconds, tap the “**No Response**” choice.

If the child gives an invalid number (not between 0-99) or something other than a number (for example, “**star**” or “**candy**”), then tap the “**Invalid Response**” choice.

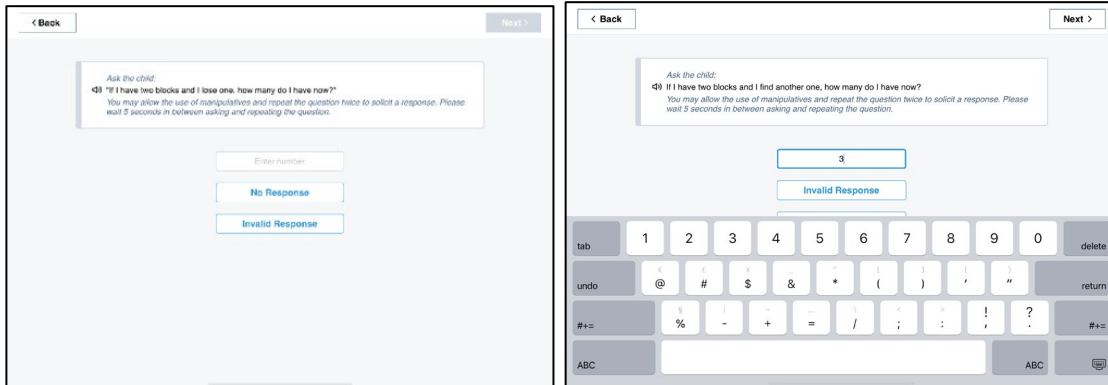
In the instance that a child responds verbally and also uses a gesture [for example, saying the word “**three**,” but holding up two fingers], the verbal response should be recorded.

If no verbal response is given, but the child uses a gesture, that number should be recorded.

Once a response is chosen, tap the “**NEXT**” button to move to the next question.

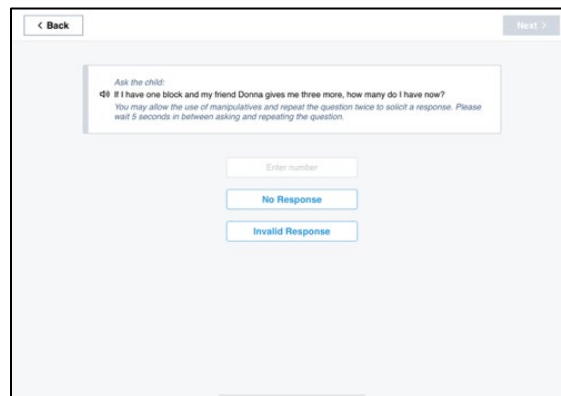
If the child changes their mind and wants to go back and change the previous answer, the examiner can do this by tapping on the “**BACK**” button.

The first screenshot below shows the item presentation, and the second screenshot shows what happens when the examiner puts a numeric answer on the screen and the “NEXT” button becomes active. The “NEXT” button also becomes active if one of the other choices is taken.



After tapping “NEXT,” the next live item appears.

Problem 2:



Problem 2 says, “If I have one block and my friend Donna gives me three more, how many do I have now?”

The sequence continues until all five items are presented. Remember to remind participants that they may use their fingers or the blocks if they do not respond within ten seconds.

Wait up to ten seconds before repeating or choosing the “No Response” option. You may repeat each question once.

Pausing and Resuming, Stopping or Skipping the Test

If you need to pause the test for any reason, use the three-finger slide from right to left ([*administrative gesture*](#)).

If you pause or stop/delay during an instruction screen, when you resume, the app will return to the active screen.

If you pause or stop/delay during test items, when you resume, the app will return to the instruction screen followed by any unanswered items.

Mullen Visual Reception

For more details and video examples, see the training video “**Mullen Visual Reception**”

Overview

MVR assesses a child’s comprehension of symbols, words, spatial relations, and pictures. A subset of the items from the Mullen Scales of Early Learning Visual Reception test form this measure. For each item, the examiner provides the child with prompts and observes their response.

Part 1 of the test is administered to all children from ages 5 months and older. If the child is under 25 months old, the test ends after Part 1.

Part 2 is administered only to children aged 25 months and older.

There are a total of sixteen possible items, although the exact items, the number of items, as well as the order of items administered will vary based on 1) The child’s age, and 2) Their responses. The exact start of the item is determined by participant's adjusted age.

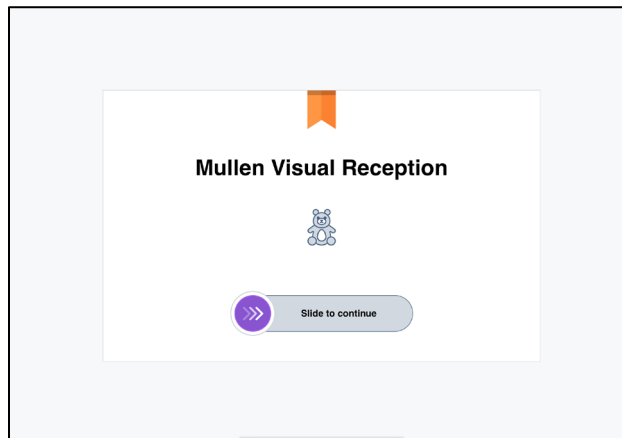
The iPad automatically brings up the next required item screen using internal programming. Each child will be administered between two and twelve items.

Mullen Visual Reception Part 1

Instructions

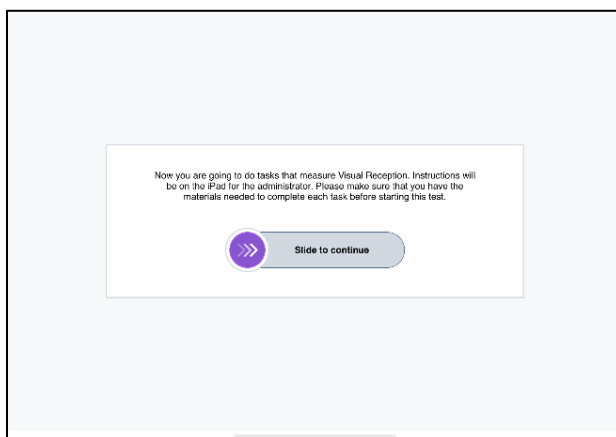
Starting the Test

The measure begins with a title screen that shows a purple circle and slide under the name: “**Mullen Visual Reception.**”



Slide the purple circle to the right to begin the measure.

The next screen is an instructional screen reminding the examiner that the instructions are on the iPad and that they may need to prepare special materials ahead of time to complete each task. There is a slide with a purple button. Slide the button to the right to continue. This instructional screen is shown below:



NOTE: Each subsequent screen has a series of instructions regarding the following: 1) Where the child (participant) should sit; 2) What the examiner should be doing; 3) What question needs to be scored; and 4) Where the examiner should score the child's response(s).

All instructions on the screen are for the examiner to administer.

Test items

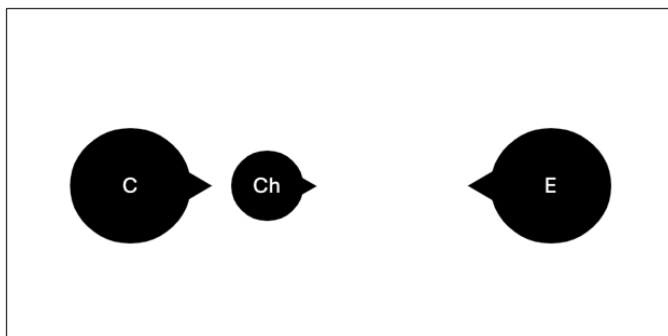
Tracks moving bull's-eye 180 degrees

Materials

Picture of bull's-eye on the iPad

Set-up

Child supported in caregiver's lap. Caregiver can be seated either on the floor or in a chair.



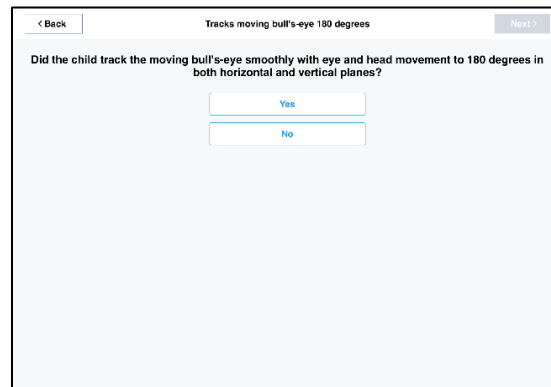
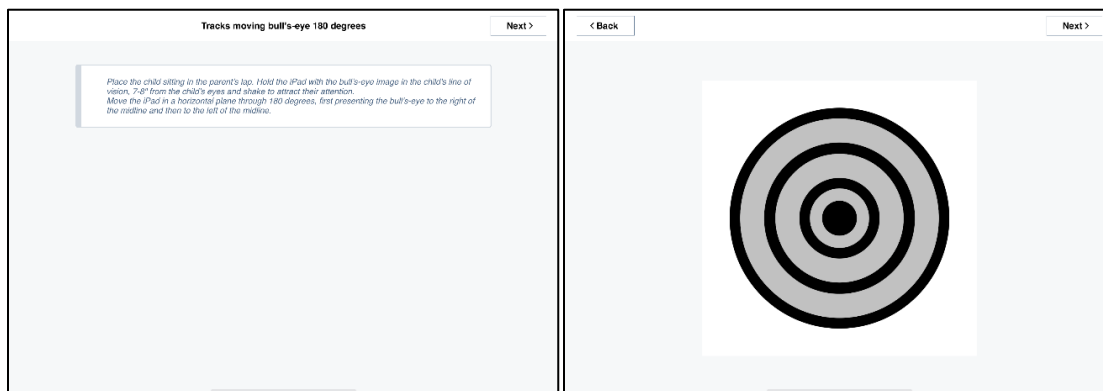
Instructions

1. Hold the iPad with the bull's-eye image in the child's line of vision, 7-8" from the child's eyes and shake the iPad to attract their attention.
2. Move the iPad in a horizontal plane through 180 degrees, first presenting the bull's-eye to your right of the midline and then to your left of the midline (about 4 seconds in each movement).
3. Then do the same moving up (just above child's forehead) and down (just below the child's chin line) from the midline (about 4 seconds in each movement).
4. These should be done in a rounded fashion. Select "**NEXT**" to show the bull's-eye and then "**NEXT**" again to respond.

Score

“Did the child track the moving bull's-eye smoothly with eye and head movement to 180 degrees in both horizontal and vertical planes?”

- Answer **“Yes”** if the child tracks the moving bull's-eye with eye and head movement
- Answer **“No”** if the child does not move eyes and head to track the bull's-eye image



Tracks moving bull's-eye 180 degrees

Did the child track the moving bull's-eye smoothly with eye and head movement to 180 degrees in both horizontal and vertical planes?

Yes

No

Stares at own hand

Materials

None

Set-up

Child on their back on the floor.

Instructions:

1. Lay the child on their back on the floor and move away. Ask the caregiver to move away.
2. Observe whether the child stares at his/her own hand. This can be while hands are in front of the child or if they are on the side of the child and their head is turned towards the hands.

Score

“Did the child stare at his/her own hand?”

- Answer **“Yes”** if the child looks at their own hand for at least 3 seconds in a 30 second segment
- Answer **“No”** if the child does not look at their hand at all OR looks less than 3 seconds at a time during the 30 second segment

Stares at own hand Next >

While the child is in the supine position on the floor, observe whether the child stares at his/her own hand. If you have not already observed this behavior, you may ask the parent to report if the child stares at his/her hand.

Did the child stare at his/her own hand?

Yes

No

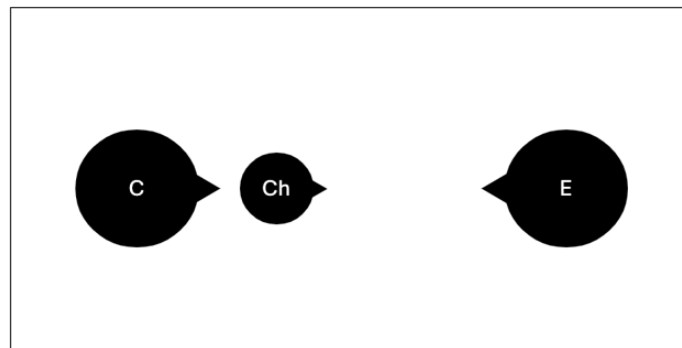
Tracks bull's-eye near and far

Materials

Picture of bull's eye on the iPad

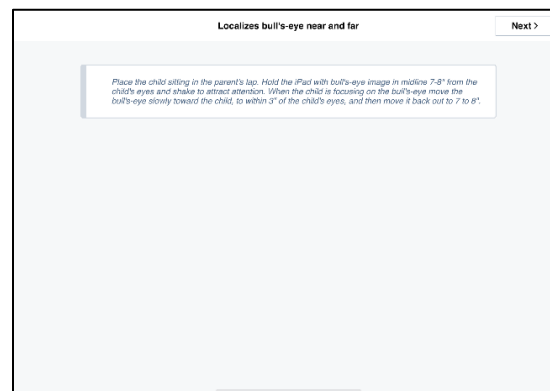
Set-up

Child supported in caregiver's lap. Caregiver can be seated either on the floor or in a chair.

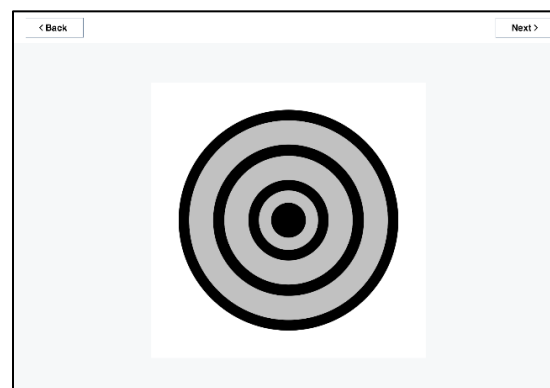


Instructions

1. Sit or kneel in front of the child. Hold the iPad with the bull's-eye image in the child's line of vision, 7-8" from the child's eyes, and shake to attract their attention.
2. When the child is focusing on the bull's-eye, move the bull's eye slowly toward the child, to within 3" of the child's eyes, and then move it back out to 7 to 8."
3. Attract the child's attention again and repeat, this time moving the bull's-eye out to 15" from the child's eyes.



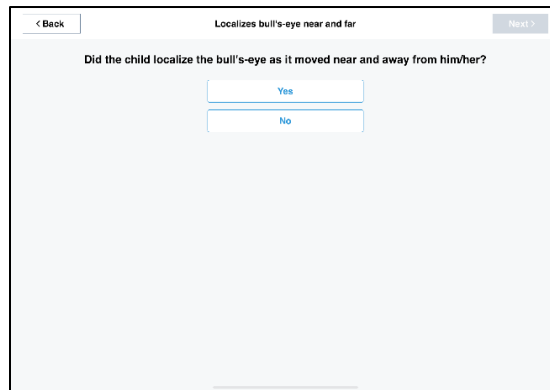
4. You may repeat each sequence only once. Select **"NEXT"** to show the bull's-eye and then **"NEXT"** again to respond.



Score

“Did the child localize the bull's-eye as it moved near and away from him/her?”

- Answer “**Yes**” if the child tracks the moving bull’s-eye at the near AND far points
- Answer “**No**” if the child does not move eyes to track the bull’s-eye image at near and/or far points



The screenshot shows a mobile application interface with a light gray background. At the top, there is a title bar with a left arrow and the text "< Back", a central title "Localizes bull's-eye near and far", and a right arrow and the text "Next >". Below the title bar, the question "Did the child localize the bull's-eye as it moved near and away from him/her?" is displayed. Underneath the question are two rectangular buttons: the top one is labeled "Yes" and the bottom one is labeled "No".

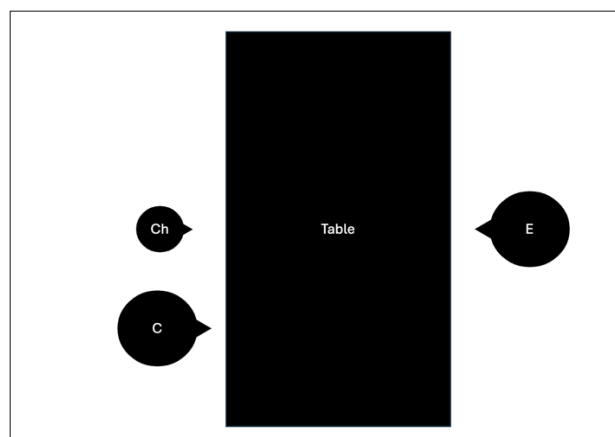
Looks for dropped spoon

Materials

Spoon

Set-up

Child sitting at a table in a highchair; may sit in caregiver’s lap if they cannot sit independently. Caregivers should be told not to react. Examiner sits across from the child with the iPad facing the examiner.



Instructions

1. Tap the metal spoon on the table in front of you until the child focuses on the spoon.
1. Then, slide the spoon to the edge of the table on the child's side.
2. While the child is looking at the spoon, raise the spoon vertically approximately 6" in the air. Deliberately drop the spoon, so that it vanishes from view.
4. On an uncarpeted floor, it will make a sound. On carpeted floor, place an object on the floor beneath the table so that it will make a sound.

Score

“Did the child turn and look over the side of the table, searching with his/her eyes for the dropped spoon?”

- Answer **“Yes”** if the child looked over the side of the table where the spoon dropped and searched with their eyes
- Answer **“No”** if the child did not look over the side of the table where the spoon dropped and/or searched with their eyes

The screenshot shows a digital interface for a behavioral assessment task. At the top, the title is "Looks for dropped spoon" with a "Next >" button. Below the title is a text box containing instructions: "Place the child sitting in the parent's lap. Tap the metal spoon on the table until the child focuses on the spoon. Then, slide the spoon to the edge of the table on the child's side. While the child is looking at the spoon, raise the spoon vertically approximately 6" in the air. Deliberately drop the spoon, so that it vanishes from view. On uncarpeted floor it will make a sound. On carpeted floor, place the an object on the floor beneath the table." Below the instructions is the question: "Did the child turn and look over the side of the table, searching with his/her eyes for the dropped spoon?". At the bottom, there are two buttons: "Yes" and "No".

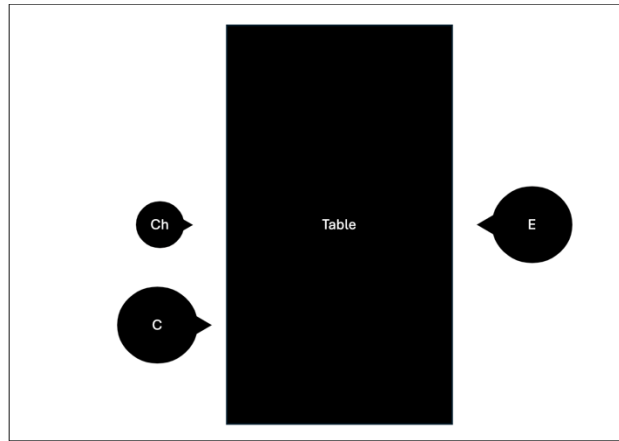
Looks for ring hidden under washcloth

Materials

Plastic ring, washcloth

Set-up

Child sitting at a table in a highchair; may sit in caregiver's lap if they cannot sit independently. Caregivers should be told not to react. Examiner sits across from the child with the iPad facing the examiner.



Instructions

1. Attract the child's attention with the colorful plastic ring.
2. While the child is watching, place the ring on the table and completely cover it with the washcloth just out of reach.
3. Encourage the child to look for the ring under the washcloth by pushing it towards them. Do this as quickly as possible.
4. If the child begins to reach it before it is completely hidden, re-administer.
5. If the child does not uncover the ring when it is completely covered, administer the item again, but this time with the ring only partially covered by the washcloth. One-third of the ring should remain visible

Score

“At what stage did the child uncover the ring?”

- Answer **“Child did not uncover ring”** if they never looked under the washcloth or retrieved ring in either administration (full or partial)
- Answer **“When partially hidden”** if the child retrieves the ring after the second administration (partial)
- Answer **“When fully hidden”** if the child retrieves the ring after the first administration (fully)

Looks for ring hidden under washcloth Next >

Place the child sitting in the parent's lap. Attract the child's attention with the colorful plastic ring. While the child is watching, place the ring on the table and completely cover it with the washcloth. Encourage the child to look for the ring under the washcloth. Do this as quickly as possible. If the child begins to reach before it is completely hidden, reach instead. If the child does not uncover the ring when it is completely covered, administer the item again, but this time with the ring only partially covered by the washcloth. One-third of the ring should remain visible.

At what stage did the child uncover the ring?

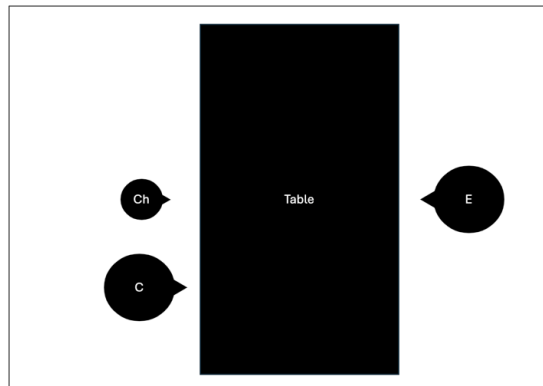
Turns cup right-side up

Materials

Plastic cup

Set-up:

Child sitting at a table in a highchair; may sit in caregiver's lap if they cannot sit independently. Caregivers should be told not to react. Examiner sits across from the child with the iPad facing the examiner.



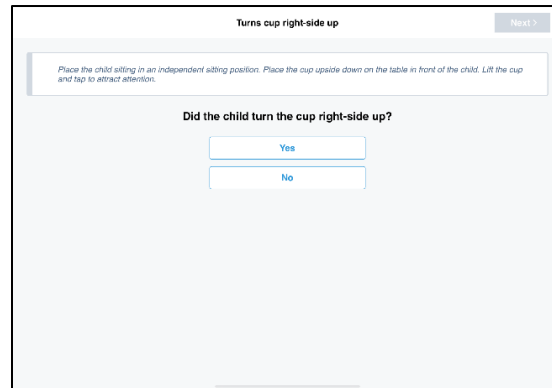
Instructions

1. Starting with the cup right side up, flip the cup upside down on the table in front of the child.
2. Lift the cup and tap it on the table twice to attract attention.
3. Observe the child's reaction to the incorrect position of the cup.

Score

“Did the child turn the cup right-side up?”

- Answer “**Yes**” if the child successfully turns the cup right-side up in a 30-second segment
- Answer “**No**” if the child does not successfully turn the cup right-side up OR does not at all attempt to turn the cup right-side up in a 30-second segment



Turns cup right-side up Next >

Place the child sitting in an independent sitting position. Place the cup upside down on the table in front of the child. Lift the cup and tap to attract attention.

Did the child turn the cup right-side up?

Yes

No

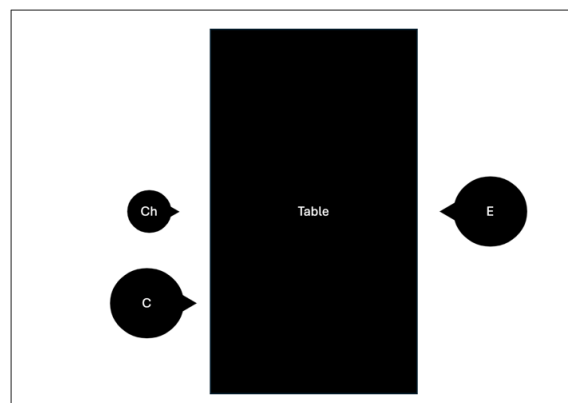
Makes object association

Materials

Spoon, ball, cup, hairbrush

Set-up

Child sitting at a table in a highchair; may sit in caregiver’s lap if they cannot sit independently. Caregivers should be told not to react. Examiner sits across from the child with the iPad facing the examiner.



Instructions

1. Place the items one at a time on the table in front of the child in this order: hairbrush, spoon, cup, ball.
2. Do not name the objects.
3. Allow the child to play with the objects for 30 seconds.
4. If the child does not use any object spontaneously in 30 seconds, demonstrate the use of that object and then hand it to the child.
5. In this order: put spoon to your mouth and pretend to eat; roll ball gently on the table; pretend to drink from cup; and pretend to brush your hair.
6. After each demonstration, say: “[Child's name] do.”
7. Do not demonstrate use of object more than once.

Score

“Which of the objects did the child appropriately use or imitate the examiner's use of?”

- Answer “Spoon,” “Ball,” “Cup,” “Hairbrush,” or “None”

Makes object association Next >

Place the child in an independent sitting position. Place the items one at a time on the table. Do not name the objects. Allow child to play with the objects. If the child does not use an object spontaneously, demonstrate the use of that object and then hand it to the child. Say:
“[Child's name], do.”
Do not demonstrate use of object more than once.

Which of the objects did the child appropriately use or imitate the examiner's use of?

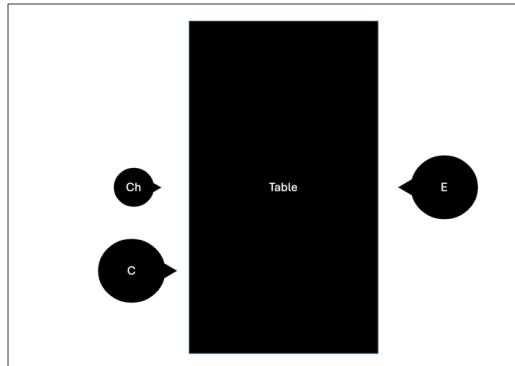
Looks for car under two washcloths

Materials

Toy car, 2 washcloths

Set-up

Child sitting at a table in a highchair; may sit in caregiver's lap if they cannot sit independently. Caregivers should be told not to react. Examiner sits across from the child with the iPad facing the examiner.



Instructions:

1. Place two washcloths side by side on the table in front of the child (about 6" apart).
2. Show the car to the child and say: **"I'm going to hide it."**
3. Do not name the car.
4. While the child is watching, hide the car under the washcloth on the child's left/your right.
5. Say: **"Find it."**
6. If the child does not find it after 15 seconds, repeat once more on the first side.
7. Next, show the car to the child and say: **"I'm going to hide it."**
8. Do not name it.
9. While the child is watching, hide the car under the second washcloth (the one on the child's right/your left).
10. Say: **"Find it."**
11. Do not repeat.

Score

“Did the child find the car when it was hidden under the second washcloth?” (on the child’s right)

- Answer “**Yes**” if the child retrieved the car from the washcloth when it was under the one on their right within 30 seconds **EVEN IF** they looked under the washcloth on the left. Answer “**No**” if the child does not retrieve the car from the second washcloth within 30 seconds

Looks for car under two washcloths Next >

Child should be sitting at the table. Place two washcloths side by side on the table in front of the child. Show the car to the child and say:

d) I'm going to hide it.
Do not name the car. While the child is watching, hide the car under the washcloth on the child's left. Say:

d) Find it.
If the child does not find, repeat. Do the same sequence on the right.

Did the child find the car when it was hidden under the second washcloth?

Yes

No

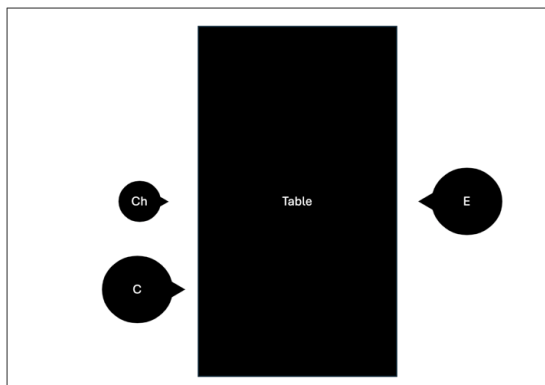
Shows interest in book as hinge

Materials

Book

Set-up

Child sitting at a table in a highchair; may sit in caregiver’s lap if they cannot sit independently. Caregivers should be told not to react. Examiner sits across from the child with the iPad facing the examiner.



Instructions

1. Demonstrate opening and closing the child's picture book.
2. Then, give it to the child and encourage them to look at the book and open and close it.
3. You may name what you are doing.

Score

“Did the child both open and close the book?”

- Answer “**Yes**” if the child both opens and closes the book in 30 seconds
Answer “**No**” if the child does not open and/or close the book in 30 seconds

The screenshot shows a digital assessment interface. At the top, it says "Shows interest in book as hinge" with a "Next >" button. Below this is a text box containing the instruction: "Child should be sitting at the table. Demonstrate opening and closing the child's picture book. Then, give it to the child and encourage them to look at the book and open and close it." Below the text box is the question "Did the child both open and close the book?" with two buttons: "Yes" and "No".

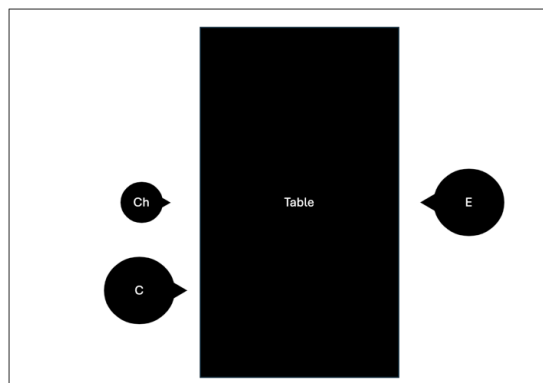
Attends to picture

Materials

Book

Set-up

Child sitting at a table in a highchair; may sit in caregiver's lap if they cannot sit independently. Caregivers should be told not to react. Examiner sits across from the child with the iPad facing the examiner.



Instructions:

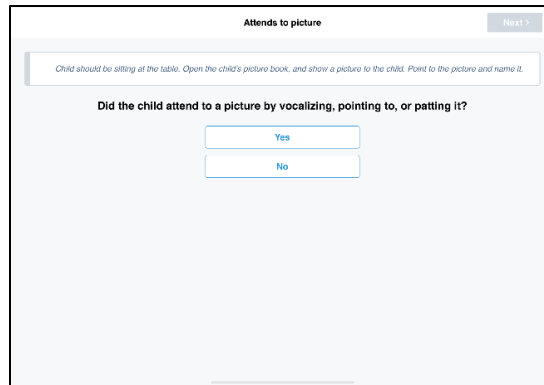
1. Open the child's picture book and show a picture to the child.
2. Point to the picture and name it.
3. You may do this several times, if no reaction within 10 seconds.
4. End after 30 seconds.

Score

“Did the child attend to a picture by vocalizing, pointing to, or patting it?”

Answer **“Yes”** if the child attends to a picture by vocalizing, pointing to, or patting it.

Answer **“No”** if the child does not attend to a picture at all.



Attends to picture Next >

Child should be sitting at the table. Open the child's picture book, and show a picture to the child. Point to the picture and name it.

Did the child attend to a picture by vocalizing, pointing to, or patting it?

Yes

No

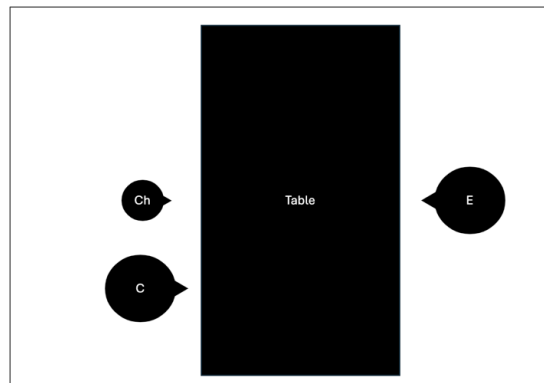
Looks for toy covered, then displaced

Materials:

Cup, bear, 1 washcloth

Set-up

Child sitting at a table in a highchair; may sit in caregiver's lap if they cannot sit independently. Caregivers should be told not to react. Examiner sits across from the child with the iPad facing the examiner.



Instructions

1. Place the teddy bear in the large nesting cup and show it to the child.
2. While the child is watching, cover the cup (with the bear in it) with the washcloth.
3. Then, tip the bear out of the cup and remove the cup, leaving the teddy bear under the washcloth with the washcloth arranged loosely so the outline of the bear does not show through.
4. Show the inside of the empty cup to the child.

Score

“Did the child find the bear under the washcloth?”

- Answer **“Yes”** if the child retrieved the bear from under the washcloth
- Answer **“No”** if the child does not retrieve the bear from under the washcloth

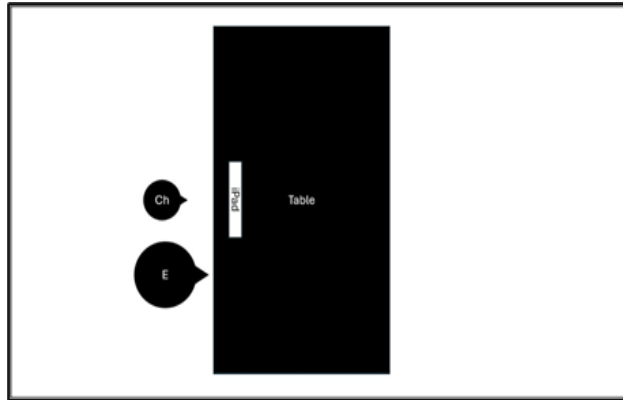
The screenshot shows a digital assessment interface. At the top, it says "Looks for toy covered, then displaced" with a "Next >" button. Below this is a text box containing instructions: "Child should be sitting at the table. Place the teddy bear in the large nesting cup and show it to the child. While the child is watching, cover the cup (with the bear in it) with the washcloth. Then, tip the bear out of the cup and remove the cup, leaving the teddy bear under the washcloth with the washcloth arranged loosely so the outline of the bear does not show through. Show the inside of the empty cup to the child." Below the text box is the question "Did the child find the bear under the washcloth?" and two buttons labeled "Yes" and "No".

Mullen Visual Reception Part 2

The last 5 items begin with an overall instruction for the examiner.

- **These items are for children who already completed the Touch Screen Tutorial.** (If you reach this screen and the child is under 25 months, use the three-finger slide from right to left (*administrative gesture*) to pause and delay the measure to after the Touch Screen Tutorial. The app will still record data from previous items.)

For all items in Part 2, the examiner should move to be seated next to the child with the iPad in front of the child.

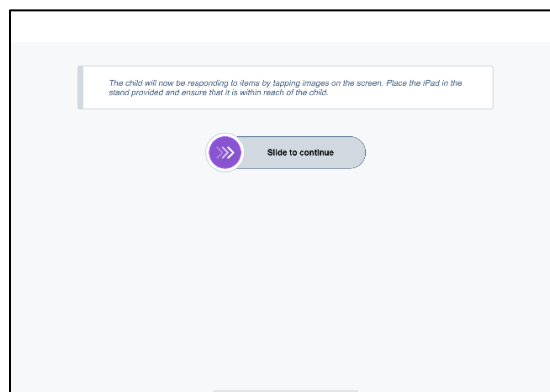


The screen reads:

“The child will now be responding to items by tapping images on the screen. Place the iPad in the stand provided and ensure that it is within reach of the child.”

NOTE:

For these items, you may need to remind the child to wait until the audio ends to select their response.



The examiner should slide the purple ball to the right to bring up the next screen.

Identifies colors:

1. This item shows 8 blocks with different colors.
2. Once the screen appears, the audio says: “**Look at the screen. Touch the [color] one.**”

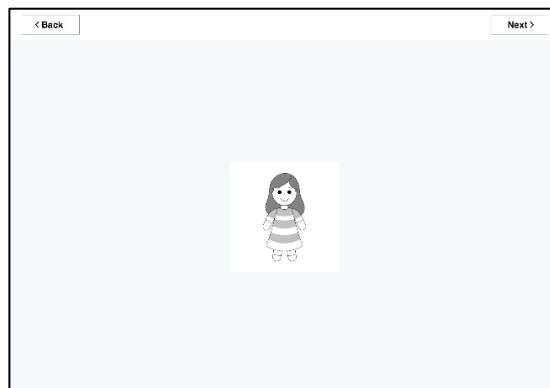
(Below is a picture of the screen that is used for answering)



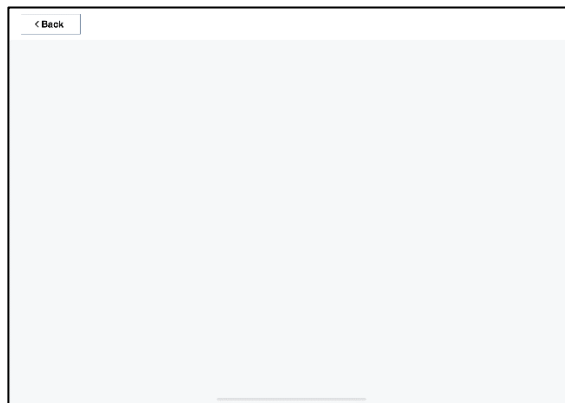
3. Encourage the child to tap the image that matches the color of the audio.
4. You may repeat the question once if there is no response after 5 seconds.
5. Once they have made a choice, touch the “**NEXT**” button as shown below.
6. When the “**NEXT**” button is selected, the audio says: “**Touch the [color] one.**”
7. This sequence continues until all eight colors have been asked.
8. After the last item and the examiner taps “**NEXT**”, the measure is complete.

Memory for one picture

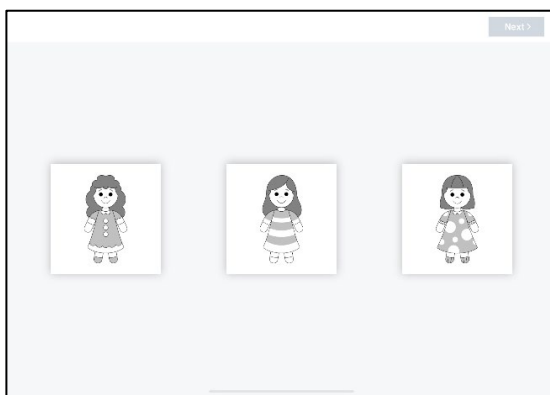
1. The next screen has the image of a doll and audio that says, “**Look at the screen.**”
2. When the child has seen the image for at least 10 seconds and is ready, the examiner taps “**NEXT**” as shown in the screen below.



3. After the examiner taps “NEXT”, a blank screen appears for 8 seconds.

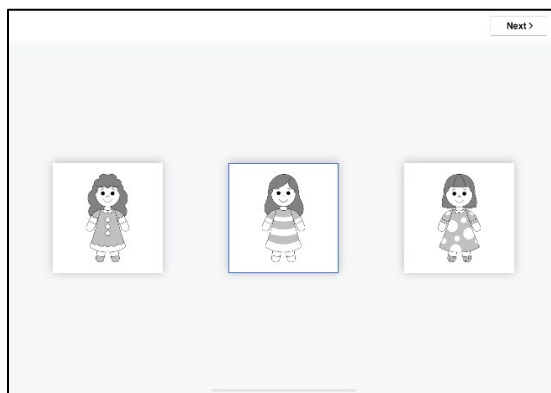


4. After 8 seconds, a new screen appears with three images and the audio says: “Touch the one you saw”



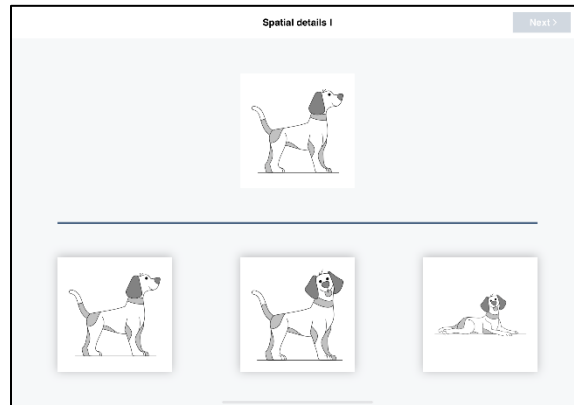
5. The examiner should encourage the child to choose. Once they make a choice and the examiner is sure that the child is ready to move on to the next item, they should touch the “NEXT” button as shown below.

Below is the screen with the active “NEXT” button:

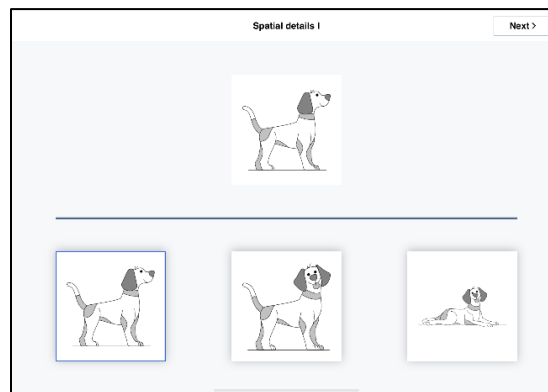


Spatial details

1. This item shows one image on top of a line and three images under the line.
2. Once the screen appears, the audio says: “**Look at the screen. Touch the one like this.**”



3. Encourage the child to tap one of the three images on the bottom of the screen that matches the image at the top of the screen.
4. You may point to the top of the screen and repeat the audio once “**Touch the one like this.**”
5. Once the child has made a choice, and the examiner is sure that the child is ready to move to the next item, the examiner should touch the activated “**NEXT**” button that is shown below.

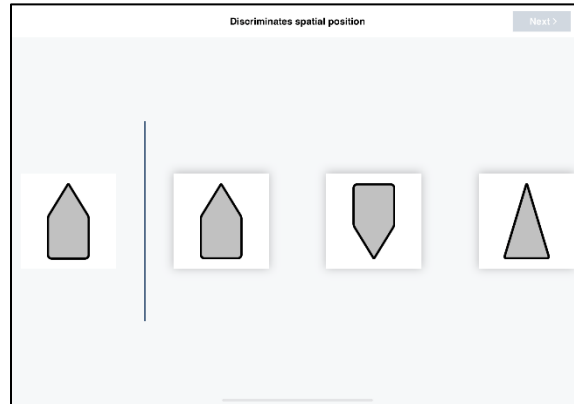


Discriminates spatial position

1. This item shows one image on the left of a vertical line and three images on the right of the line.

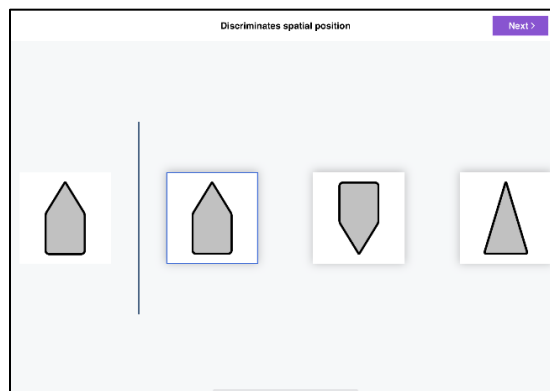
2. Once the screen appears, the audio says: **“Touch the one like this.”**

(Below is an example test item)



3. Encourage the child to tap one of the three images on the right of the screen that matches the image on the left of the screen.
4. You may point to the left image on the screen and repeat the audio once **“Touch the one like this.”**
5. Once the child has made a choice, the examiner should make sure the child is ready to move onto the next item before touching the activated **“NEXT”** button.
6. There are three more items like this one.

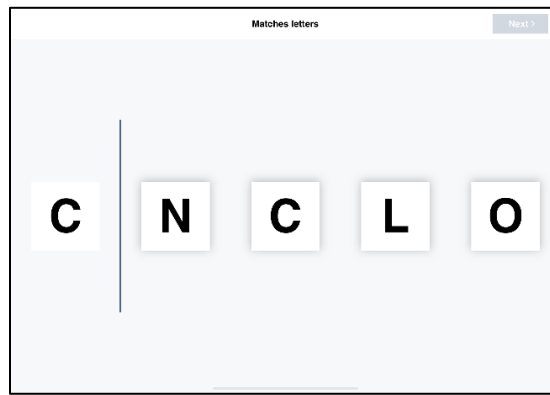
The activated “NEXT” button for the first item is shown below:



Matches letters

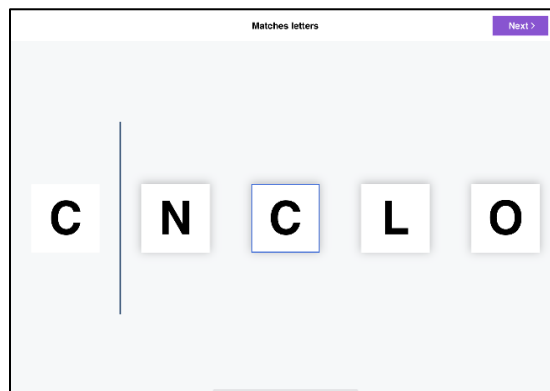
1. This item shows one image on the left of a vertical line and four images on the right of the line.
2. Once the screen appears, the audio says: **“Touch the one like this.”**

Below is an example test item.



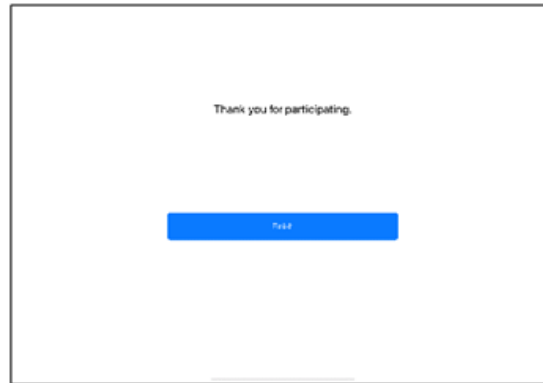
3. Encourage the child to tap one of the four images on the right of the screen that matches the image on the left of the screen.
4. You may point to the left image on the screen and repeat **“Touch the one like this”** once.
5. Once they have made a choice, the examiner should touch the activated **“NEXT”** button, once they are sure the child is ready to move on to the next item.
6. Including this item, there are six items with the same format.

The activated **“NEXT”** button for the first item is shown below:



After the last item and the examiner taps **“NEXT”**, the measure is complete

When the test items are completed, the final screen appears; it is shown below:



Pausing and Resuming, Stopping or Skipping the Test

If you need to pause the test for any reason, use the three-finger slide from right to left ([administrative gesture](#)).

If you pause or stop/delay during the instruction screen or during a test item, when you resume, the app will return to the next active screen.

If you skip the test, be sure to record the reason in the text field.

Mullen Language Scale – Receptive

For more details and video examples, see the training video: “**Mullen Language Scale – Receptive**”

Overview

“**The Mullen Receptive Language**” scale assesses a child’s receptive vocabulary or how well they understand and respond to the words or phrases that are directed to them. A subset of the items from the “**Mullen Scales of Early Learning Receptive Language**” test forms this NIH Baby Toolbox measure. It can be administered to all children ages 1 month and older.

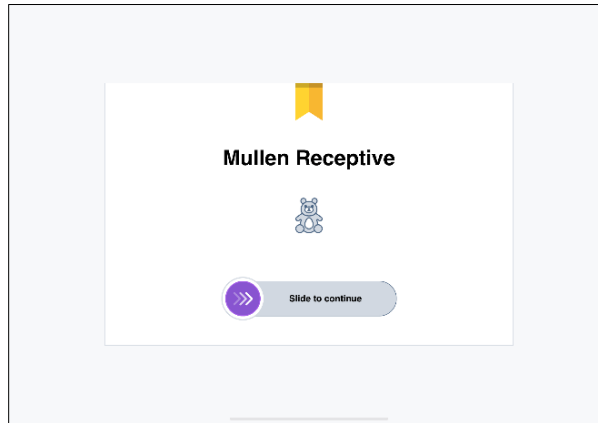
For each item, the examiner provides the child with prompts and observes their responses. There are a total of twelve possible items, although the exact items, the number of items, as well as the order of items administered will vary based on, 1) The child’s age, and 2) Their responses. The iPad automatically brings up the next required item screen using internal programming. A child will be administered between 2 and 12 items.

The items include:

- Reacting reflexively to sounds
- Responding to voice and face by smiling
- Responding to voice and face by vocalizing
- Coordinating listening and looking
- Recognizing familiar words
- Recognizing own name
- Understanding gesture and commands
- Giving toy on verbal request
- Comprehending questions
- Following directions
- Recognizing parts of the body
- Auditory Spatial Awareness

The iPad screen faces the examiner throughout the test. Each screen has a series of instructions regarding the following: Where the participant is lying or sitting; what materials are needed, what the examiner should be doing, and which questions need to be scored.

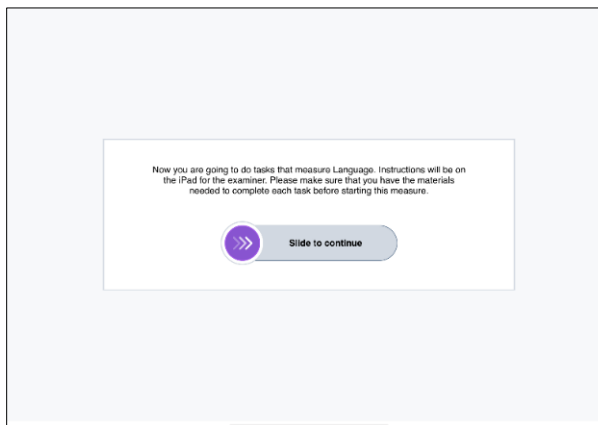
Administration



Like all the Toolbox measures, this measure has a title screen: “**Mullen Receptive**”. Below the measure name is a slide with a purple button. The examiner will slide the button to the right to continue with administration of the test.

The next screen is an instructional screen reminding the examiner that the instructions are on the iPad and that they may need to prepare special materials ahead of time to complete each task. When done reading the instructions, the examiner should slide the button to the right to continue.

Test items



RL1: Reacts reflexively to sounds

Materials

Toy blocks + can

Positioning

Child lying flat on their back on the floor

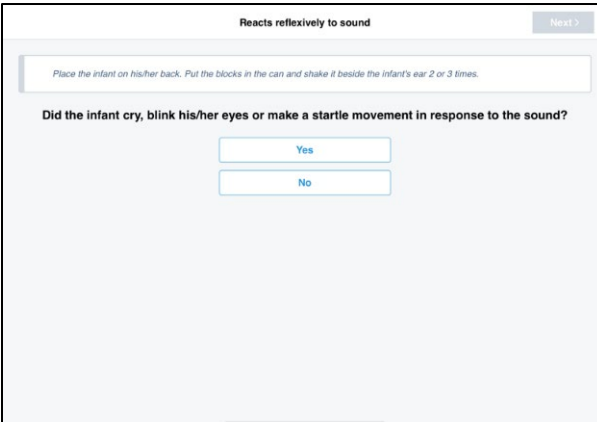
Instructions:

1. Warn the caregiver before you begin that this item can startle the child.
2. Put the blocks in the can and shake it (with full force) approximately 10 inches from either of the infant's ears. The infant's startle reactions generally follow immediately after the noise.
3. If child does not immediately respond, try a second time.

Score

“Did the child cry, blink his/her eyes or make a startle movement in response to the sound?”

- Answer **“Yes”** if the child cries, blinks his/her eyes, or makes a startle movement in response to the sound
- Answer **“No”** if the child does not react to the sound even after trying a second time



The screenshot shows a digital assessment interface. At the top, the title is "Reacts reflexively to sound" with a "Next >" button on the right. Below the title is a light blue box containing the instruction: "Place the infant on his/her back. Put the blocks in the can and shake it beside the infant's ear 2 or 3 times." Below this box is the question: "Did the infant cry, blink his/her eyes or make a startle movement in response to the sound?". There are two radio button options: "Yes" and "No".

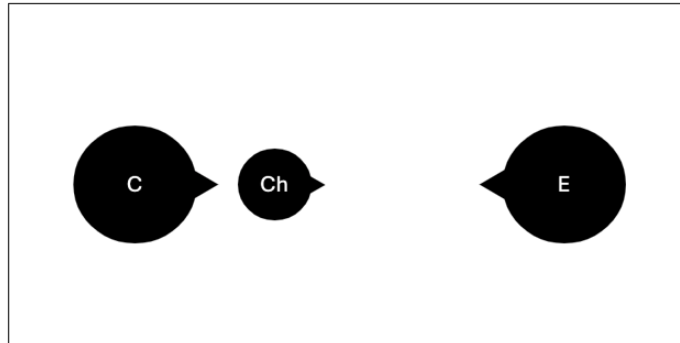
RL3: Responds to voice and face by smiling

Materials

None

Positioning

Child supported in caregiver's lap, either at the table or on the floor.



Instructions

1. Bend over the child.
2. Smile and then talk to the child with exaggerated “baby talk.”

Score

“Did the child look at the speaker and smile?”

- Answer “**Yes**” if the child looked at the speaker and smiled
- Answer “**No**” if the child did not look and smile, or if they looked without smiling.

Responds to voice and face by smiling Next >

Place the infant on his/her back on the table pad or cradled, face upward, in the parent's arms.
Bend over the infant, smile, and then talk to the infant with exaggerated "baby talk."

Did the child look at the parent/examiner and smile?

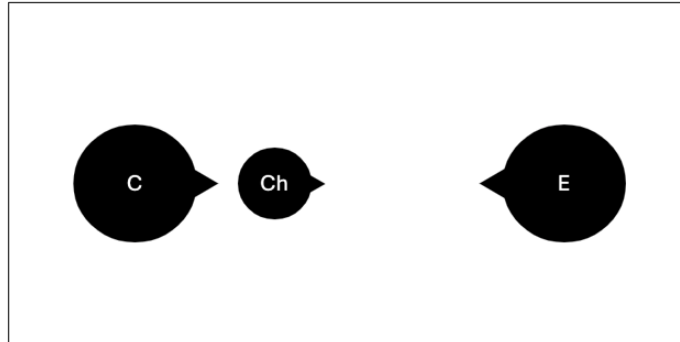
RL5: Responds to voice and face by vocalizing

Materials

None

Positioning

Child supported in caregiver's lap, either at table or on the mat.



Instructions:

1. Attract the child's attention.
2. Smile at the child and say **"Boo!"** in a playful voice with inflection.

Score

"Did the child laugh, giggle or vocalize happily?"

- Answer **"Yes"** if the child laughed, giggled, or produced a happy vocalization, (indicates pleasure)
- Answer **"No"** if the child did not respond or looked upset

Responds to voice and face by vocalizing Next >

Place the infant in the parent's lap in either the parent-propped position, with the head and torso fully supported against the parent's chest, or in the supported sitting position, with support under the arms, at the waist, or on the lower trunk.
Attract the infant's attention. Then, smile at the infant and say:
☞ Boo (in a playful voice, with inflection)
Either the examiner or parent may give the item.

Did the infant laugh, giggle, or vocalize happily?

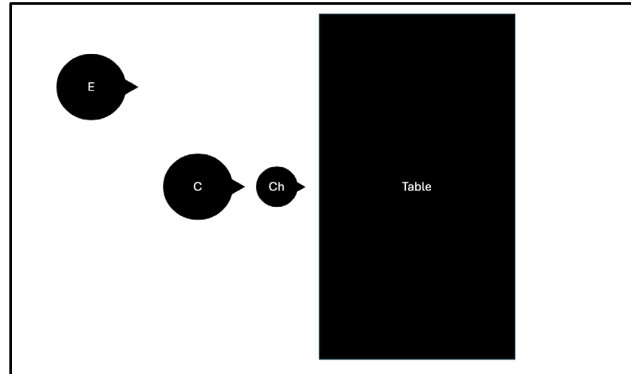
RL6: Coordinates listening and looking

Materials

None

Positioning

Child sits at the table in the highchair or in caregiver's lap. Examiner moves behind the child.



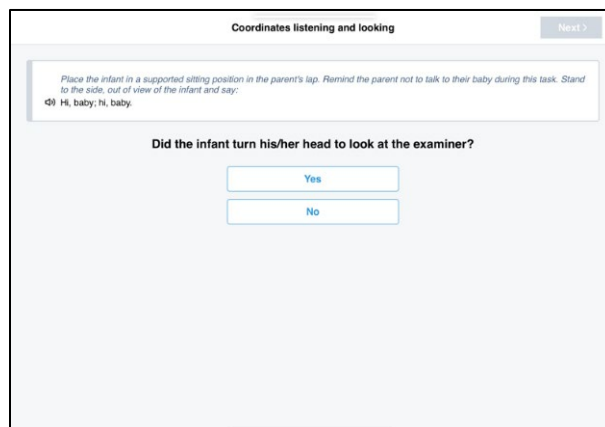
Instructions:

1. Stand to the side, out of view of the child (3-4 feet away).
2. Wait for the child to not be looking at you.
3. Say “**Hii baby, hi baby.**”

Score

“Did the infant turn his/her head to look at the examiner?”

- Answer “**Yes**” if they turned their head to look in response to your voice
- Answer “**No**” if they ignored you



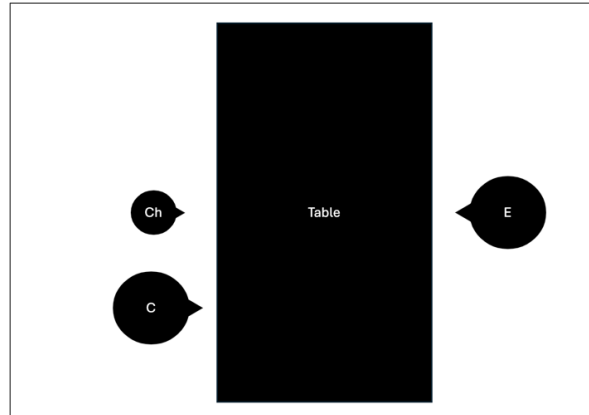
RL9: Recognizes familiar words

Materials

None

Positioning

Child sits at the table in a highchair or in caregiver's lap. Examiner sits across from child at the table.



Instructions:

1. Ask caregiver for some words that the child typically responds to, for example, **“bottle”** or **“mama”**.
2. Say these words to the child. (Introduce word by itself; then offer in a sentence – e.g., **“bottle, do you like your bottle?”**)

Score:

“Did the child pay attention to the words and respond with facial movements or vocalizations?”

- Answer **“Yes”** if the child responds to words using facial movements (expression) eye-movements, or vocalizations
- Answer **“No”** if the child does not respond

Recognizes familiar words Next >

Ask the parent for some words that the child typically responds to, for example, “bottle”, “bye-bye”, or “mama”. Say these words to the child.

Did the child pay attention to the words and respond with facial movements or vocalizations?

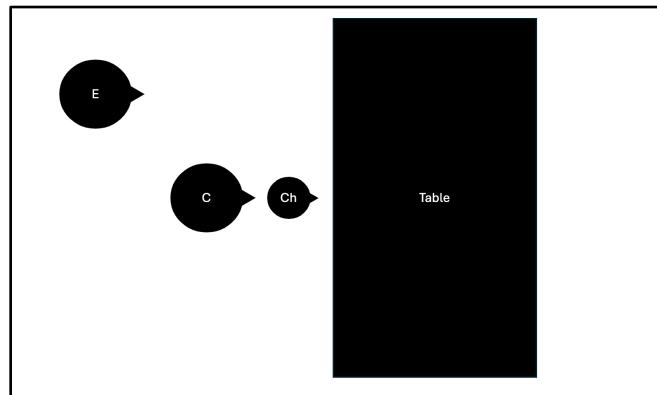
RL10: Recognizes own name

Materials

Toy

Positioning

Child sits at the table in the highchair or in caregiver's lap. Examiner sits across from child at the table. Examiner begins across the table and then moves behind the child (as shown in the diagram below).



Instructions:

1. Hand the child a toy.
2. While the child is attending to the toy, the examiner moves off to the side or behind the child.
3. Examiner calls him/her by name.

Score

“Did the child respond to his/her name by turning toward the examiner?”

- Answer **“Yes”** if the child look or turns to face the examiner
- Answer **“No”** if the child does not look up from the toy

The screenshot shows a digital form titled "Recognizes own name" with a "Next >" button in the top right corner. Below the title is a text box containing the instruction: "While the child is attending to a toy, move off to the side or behind the child, and call him/her by name." Below the text box is the question: "Did the child respond to his/her name by turning towards the examiner?" There are two radio button options: "Yes" and "No".

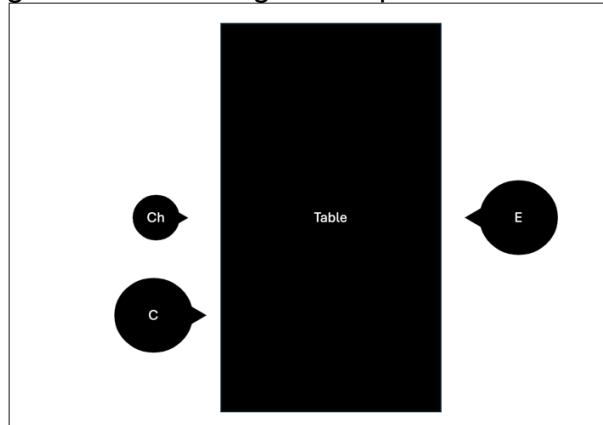
RL13: Understands gestures and commands

Materials

A familiar toy

Positioning

Child sits at the table in the highchair or in caregiver's lap. Examiner sits across from child at the table.



Instructions:

1. Place familiar toy on the table in front of the child.
2. Encourage the child to play with it.
3. When the child is holding the toy (after playing with it), hold out your hand (palm up) for the toy and say: **“Give it to me”**.
4. Repeat if necessary.

Score

“Did the child either give you the toy, or start to give you the toy, but then keep it?”

- Answer **“Yes”** if the child responded to the verbal request and gave you the toy. Includes if the child starts to give you the toy, but then keeps it.
- Answer **“No”** if the child ignores your request.

Understands gesture and commands

Place the toy on the table in front of the child. Encourage the child to play with it. When the child is holding a toy (after playing with it), hold out your hand for the toy and say:
Give it to me.
Repeat if necessary.

Did the child either give you the toy or start to give you the toy, but then keep it?

Yes

No

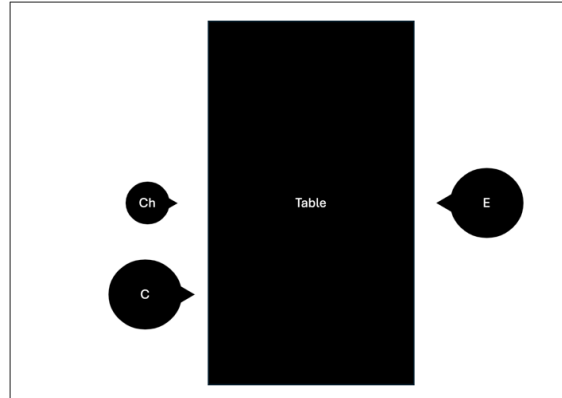
RL15: Gives toy on verbal request

Materials

A familiar toy

Positioning

Child sits at the table in the highchair or in caregiver's lap. Examiner sits across from child at the table.



Instructions

1. Explain task to caregiver. **'Tell them *not* to put their hand out.'**
2. Give child toy and allow them to play with the toy for a moment.
3. When the child is playing with the toy, say: **"Give the (toy) to mommy (mama, daddy, grandma)."**
4. Name the toy, but do not gesture toward it or look at it, and do not gesture toward the caregiver.

Score

"Did the child give the parent the toy in response to your request?"

- Answer **"Yes"** if the child gave the caregiver the toy or held the toy out to the caregiver.
Answer **"No"** if the child ignored the response or tried to give the toy to you.

Gives toy on verbal request

Allow the child time to play with a familiar toy. Then, when the child is playing with the toy, say:
Give the (toy) to mommy (daddy).
Name the toy but do not gesture toward it or look at it.

Did the child give the parent the toy in response to your request?

Yes

No

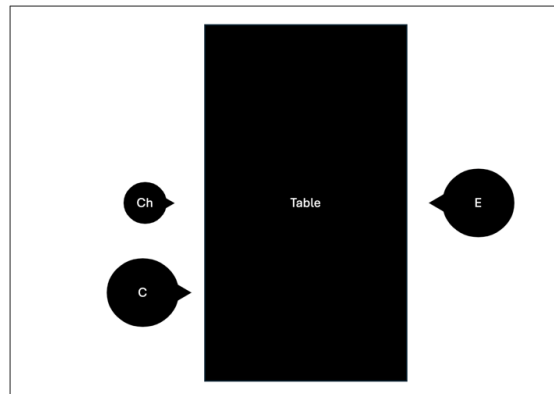
RL16: Comprehends questions

Materials

None

Positioning

Child sits at the table in the highchair or in caregiver's lap. Examiner sits across from child at the table.



Instructions:

1. Ask the child **“Where is the chair?”** wait for response.
2. Ask the child **“Where is the door?”** wait for response

Score

“Did the child identify at least one of the objects? He/She may look, gesture, nod head or point in response”

- Answer **“Yes”** if the child looked at, gestured toward, pointed toward, or nodded their head toward at least one of the items in response
- Answer **“No”** if the child just looked at you, or pointed to unrelated objects

Comprehends questions Next >

Ask the child the following questions:

1) Where is the chair?

2) Where is the door?

Did the child identify at least one of the objects? He/she may look, gesture, nod head or point in response.

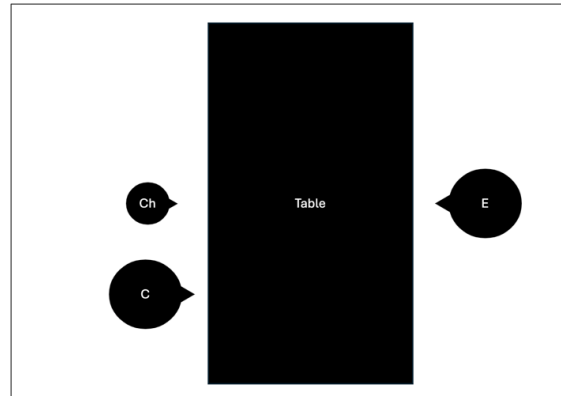
RL17: Follows directions

Materials

Block, toy car

Positioning

Child sits at the table in the highchair or in caregiver's lap. Examiner sits across from child at the table.



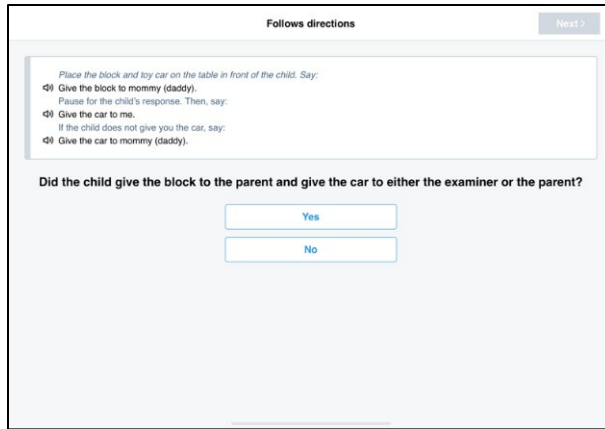
Instructions:

1. Explain the task to caregiver. 'Tell them **not** to put their hand out.' Make sure you sit on your hand, so that you do not gesture.
2. Place the block and toy car on the table in front of the child.
3. Say "**Give the block to mommy (daddy, mama, grandma).**" Pause for the child's response.
4. Then say, "**Give the car to me.**"
5. If the child does not give you the car, say "**Give the car to mommy (daddy, mama, grandma).**"

Score

"Did the child give the block to the caregiver and give the car to either the examiner or the parent?"

- Answer "**Yes**" if the child gives the block to the caregiver *and* gives the car to either the examiner or caregiver.
- Answer "**No**" if the child only responds to one request or ignores both requests.



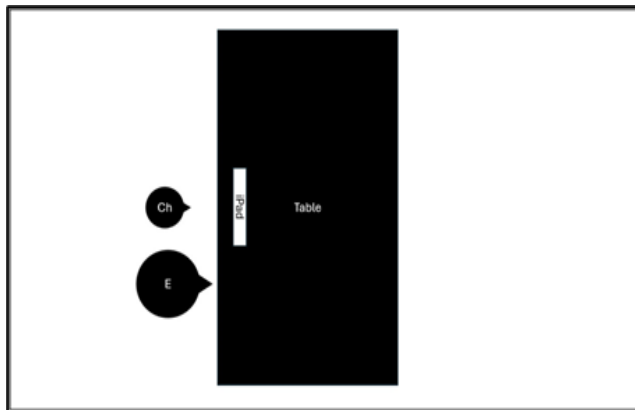
RL18: Recognizes parts of the body

Materials

Images on the iPad. Paper and pencil to keep track of child's answers

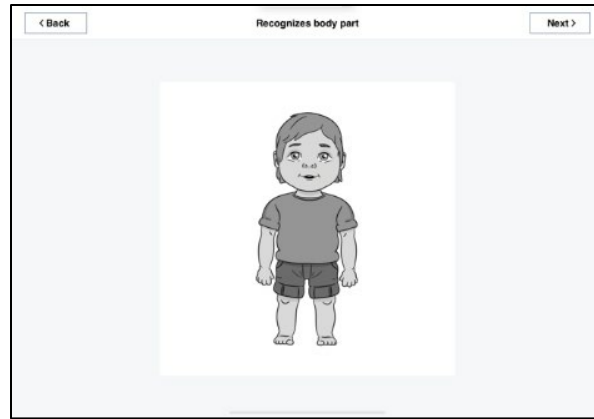
Positioning

Child sits at the table in the highchair or in caregiver's lap. Examiner moves to sit next to the child so that both have the iPad in front of them.



Instructions:

1. Make sure child can see the iPad screen.
2. On instruction screen, tap "**Next**" button at the top right.
3. Show the picture to the child.

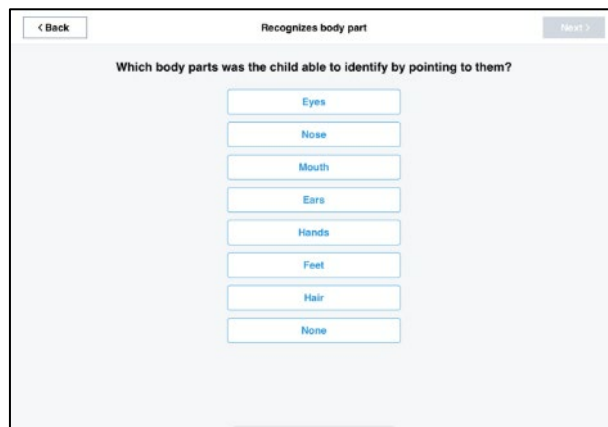


4. Say, “**Show me the dolly’s eyes**”.
5. Say, “**Show me the dolly’s nose**”.
6. Say, “**Show me the dolly’s ears**”.
7. Say, “**Show me the dolly’s hands**”.
8. Say, “**Show me the dolly’s feet**”.
9. Say, “**Show me the dolly’s hair**”.
10. Encourage the child to point to each body part as it is said.
11. Record child’s response on a paper so that you don’t have to keep their responses in mind.
12. Tap “**Next**” button at the top right to proceed to the scoring screen.

Score

“Which body parts was the child able to identify by pointing to them?”

- Depending on the child’s response, select the names of the body parts that the child correctly identified: “**Eyes, Nose, Mouth, Ears, Hands, Feet, Hair, or None**”



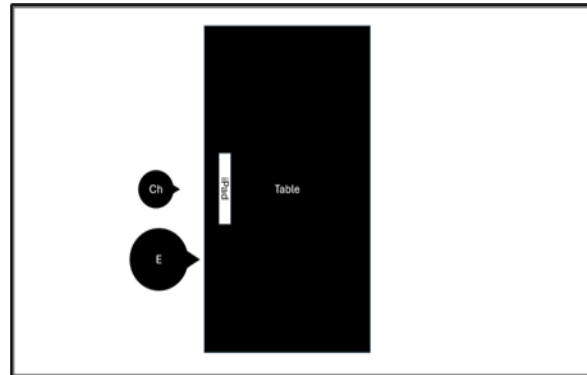
RL 22 Auditory Spatial Awareness

Materials

1 block, 2 drinking cups (same size, color) toy table, plastic teddy bear

Positioning

Child is in highchair sitting at the table. Examiner either across or next to the child.



Instructions

1. Place the 2 cups on the table in front of the child, one cup with the open side up and the other cup with the open side down.
2. Demonstrate putting the block in the open cup and say: **“This block is in the cup.”**
3. Then put the block on the upside-down cup and say: **“This block is on the cup.”**
4. Reverse the positions of the cup and give the block to the child.
5. Say: **“Put the block in the cup.”**

Auditory spatial awareness Next >

Place the 2 cups on the table in front of the child, one cup with the open side up and the other cup with the open side down. Demonstrate putting the block in the open cup, and say:

- ☞ The block is in the cup.

Then, put the block on the upside-down cup, and say:

- ☞ This block is on the cup.

Reverse the positions of the cups, and give the block to the child and say:

- ☞ Put the block in the cup.

Remove the cups and the block, and place the toy table and the plastic teddy bear on the table in front of the child. Say:

- ☞ Put the teddy bear under the table.

Repeat, using the toy table and teddy bear, for the following positions: (Behind the table, in front of the table and beside the table.)

What positions was the child able to place either item? (in, under, behind, in front of, beside)

6. Remove the cups and block and place the toy table and the plastic teddy bear on the table in front of the child.
7. Say: **“Put the teddy bear under the table.”** Following the child’s response, remove the teddy bear and hold it in your hand (or place in neutral position).
8. Then say: **“Put the teddy behind the table.”** Following the child’s response, remove the teddy bear and hold it in your hand (or place in neutral position).
9. Then say: **“Put the teddy in front of the table.”** Following the child’s response, remove the teddy bear and hold it in your hand (or place in neutral position).

10. Then say: “Put the teddy beside the table”

Auditory spatial awareness Next >

Place the 2 cups on the table in front of the child, one cup with the open side up and the other cup with the open side down. Demonstrate putting the block in the open cup, and say:

- ❑ This block is in the cup.

Then, put the block on the upside-down cup, and say:

- ❑ This block is on the cup.

Reverse the positions of the cups, and give the block to the child and say:

- ❑ Put the block in the cup.

Remove the cups and the block, and place the toy table and the plastic teddy bear on the table in front of the child. Say:

- ❑ Put the teddy bear under the table.

Repeat, using the toy table and teddy bear, for the following positions: Behind the table, in front of the table and beside the table.

What positions was the child able to place either item? (in, under, behind, in front of, beside)

In the cup

Under the table

Behind the table

In front of the table

Beside the table

None

Scoring

- “Which positions was the child able to place either item?” (In, under, behind, in front of, beside)
- Depending on the child’s response, select: “In the cup,” “Under the table,” “Behind the table,” “In front of the table,” “Beside the table, None.”

Auditory spatial awareness Next >

Place the 2 cups on the table in front of the child, one cup with the open side up and the other cup with the open side down. Demonstrate putting the block in the open cup, and say:

- ❑ This block is in the cup.

Then, put the block on the upside-down cup, and say:

- ❑ This block is on the cup.

Reverse the positions of the cups, and give the block to the child and say:

- ❑ Put the block in the cup.

Remove the cups and the block, and place the toy table and the plastic teddy bear on the table in front of the child. Say:

- ❑ Put the teddy bear under the table.

Repeat, using the toy table and teddy bear, for the following positions: Behind the table, in front of the table and beside the table.

What positions was the child able to place either item? (in, under, behind, in front of, beside)

In the cup

Under the table

Behind the table

In front of the table

Beside the table

None

Pausing and Resuming, Stopping or Skipping the Test

If you need to pause the test for any reason, use the three-finger slide from right to left ([administrative gesture](#)).

Because there is no timing for this measure, you may pause at any time. If you need to take a break, however, it is best to take it between test items. You will be taken back to the next available uncompleted item if you choose to resume.

If you wish to Stop or Skip, you will be asked to provide a reason for doing so.

Mullen Language Scale – Expressive Prompted

For more details and video examples, see the training video: “**Mullen Expressive Language Scales – Prompted and Observational**”.

Overview

“**The Mullen Expressive Prompted Language**” scale assesses a child’s expressive vocabulary or what words or communicative sounds/gestures the child can produce or say. A subset of the items from the Mullen Scales of Early Learning Expressive Language test forms this NIH Baby Toolbox measure. It can be administered to any child age 1 month or older.

For each item, the examiner provides the child with prompts and observes their responses. There are a total of five possible items, although the exact items, the number of items, as well as the order of items administered will vary based on 1) The child’s age, and 2) Their responses. The iPad automatically prompts the next required item screen using internal programming. The child will be administered between two and five items.

The items assess:

- Voluntary Babbling
- Saying First Words
- Playing Gesture/Language Game
- Naming Objects
- Labeling Pictures

The iPad screen faces the examiner throughout this test. Each screen has a series of instructions regarding the following: what the examiner should be doing and what questions need to be scored.

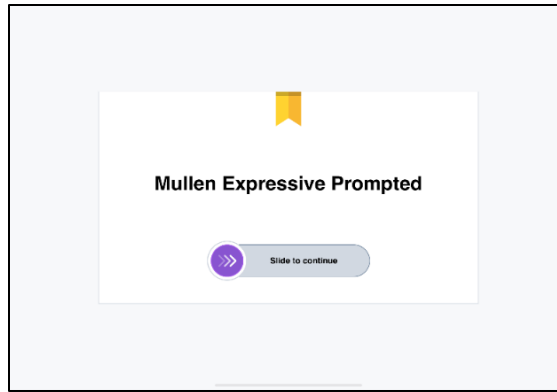
Administration

Materials and Set-up

An iPad loaded with the Baby Toolbox app, red ball; child picture book; toy car; key; plastic knife.

Starting the measure

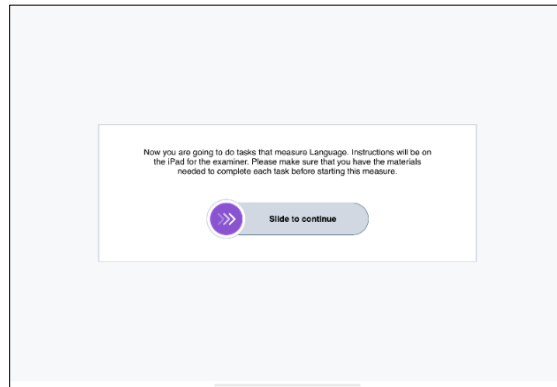
Like all the Toolbox measures, this measure has a title screen: “**Mullen Expressive Prompted.**”



Below the title is a slide with a purple button. The examiner will slide the button to the right to continue with administration of the test.

Instructional Screen

The next screen is an instructional screen that reminds the examiner that the instructions are on the iPad and that they may need to prepare special materials ahead of time to complete each task. The examiner will slide the purple button to the right to continue.



Test items

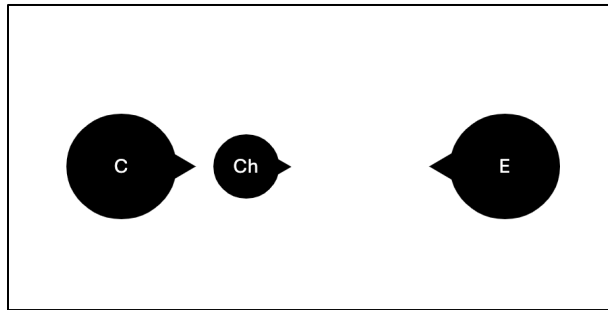
EL7: Voluntary Babbling

Materials

None

Positioning

Child sitting on caregiver's lap or in highchair facing examiner



Instructions

1. Attract the child's attention.
2. With a pleasant inflection in your voice, say, **"bu bu bu"** or **"du du du"**.

Score

"Did the child vocalize using one-syllable babble string, a series of more than two sounds run together, such as **"bu bu bu," "du, du, du" or **"mu, mu, mu"**"**

- Answer **"Yes"** if the child vocalizes using a one-syllable babble string, a series of more than two sounds run together such as **"Bu, bu, bu"** or **"Du, du, du"** or **"Mu, mu, mu"**. Also answer **"Yes"** if the child produces different sounds together (**"bu du ga"**)
- Answer **"No"** if the child is silent, produces a single sound (e.g., **"ba"**) or non-syllable sounds (raspberries, shrieks)

Voluntary Babbling Next >

During testing, attract the child's attention. With a pleasant inflection in your voice, say:
bu, bu, bu or du, du, du.

Did the child vocalize using a one-syllable babble string, a series of more than two sounds run together, such as "bu, bu, bu" or "du, du, du" or "mu, mu, mu"?

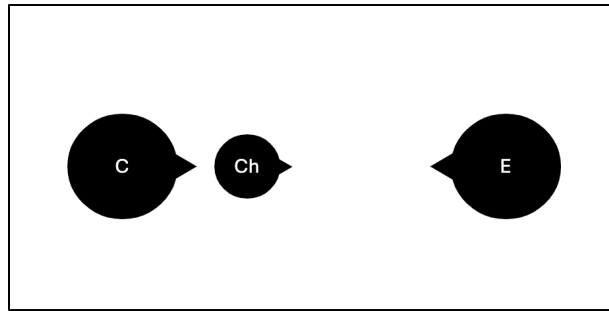
EL10: Plays Gesture/Language Game

Materials

None

Positioning

Child sitting on caregiver's lap or in highchair facing examiner



Instructions:

1. Ask the caregiver which gesture/language games the child enjoys, 'such as pat-a-cake or peek-a-boo.'
2. Demonstrate the game the caregiver suggests while encouraging the child to engage in the game you demonstrate.

Score

“Did the child engage in a gesture/language game?”

- Answer **“Yes”** if the child shares enjoyment, smiles, imitates the game, or laughs.
- Answer **“No”** if the child has flat affect or looks away

A screenshot of a digital form titled "Plays GestureLanguage Game" with a "Next >" button in the top right corner. Below the title is a text box containing the instruction: "Ask the parent which gesture/language games the child enjoys, such as pat-a-cake or peek-a-boo. Demonstrate the game the parent suggests while encouraging the child to engage in the game you demonstrate." Below this is the question "Did the child engage in a gesture/language game?" followed by two radio button options: "Yes" and "No".

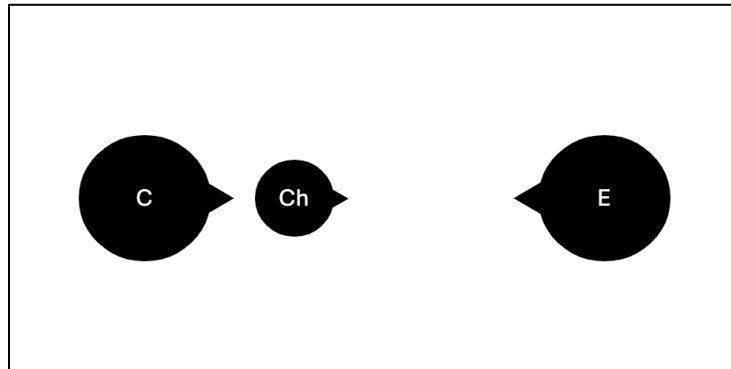
EL 11: Says First Words

Materials

None

Positioning

Child sitting in caregiver's lap or in highchair facing examiner.



Instructions

1. During testing, observe the child's early word approximations, word imitations, or use of first word(s).
2. Ask the caregiver what words the child uses
3. Try to elicit the words the caregiver reports
4. The caregiver may also encourage the child to imitate words

Score

- “How many words or word approximations did the child use?”
- Answer, “Zero”, “One”, “Two to Seven”, or “Eight or more”

The screenshot shows a digital assessment interface titled "Says First Words" with a "Next >" button in the top right corner. Below the title is a text box containing instructions: "During testing, observe the child's early word approximations, word imitations, or use of first word(s). If the child is able to spontaneously use two words or more, ask the parent what words the child uses and try to elicit the words the parent reports. The parent may also encourage the child to imitate words. This item may be scored based on the parent's report of the child's use of words." Below this text box is the question "How many words or word approximations did the child use?" followed by four radio button options: "Zero", "One", "Two to Seven", and "Eight or more".

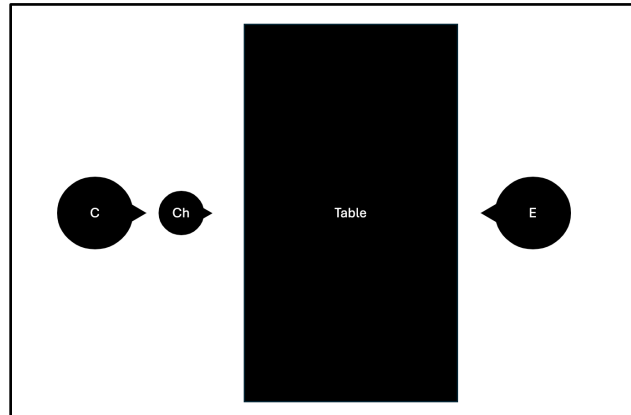
EL15: Names Objects

Materials

Ball, book, car, key, toy plastic knife

Positioning

Child sitting in caregiver's lap or in a highchair facing examiner.



Instructions

1. Place the ball, book, car, key and knife on the table in front of the child (but far enough that the child cannot grab the items).
2. Point to each item, one at a time, and say: **“What is this?”** For the first object (ball) only, if the child is slow to respond, say: **“What do we call this?”**.

Score

“Tap the objects the child was able to name.”

Select: **“Ball”, “Book”, “Car”, “Cup”, “Key”, “Knife”, “None”**

The screenshot shows the 'Names Objects' app interface. At the top, there is a title bar with 'Names Objects' and a 'Next' button. Below the title bar, there is a text box containing instructions: 'Place the ball, book, car, cup, key, and knife randomly on the table in the front of the child. Point to each object, one at a time, and say: "What is this?" For the first object (ball) only, if the child is slow to respond, say: "What do we call this?"'. Below the text box, there is a section titled 'Tap the objects the child was able to name.' with a list of seven buttons: 'Ball', 'Book', 'Car', 'Cup', 'Key', 'Knife', and 'None'.

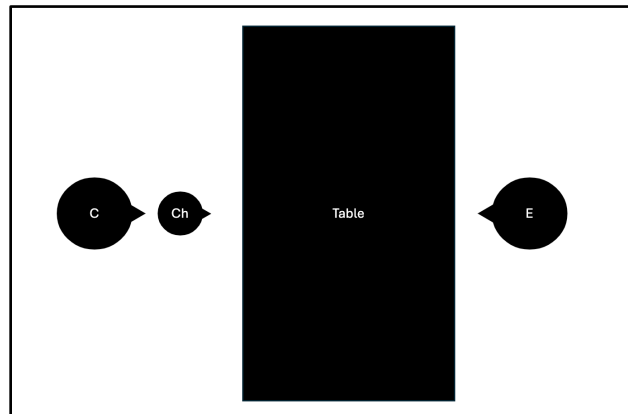
EL16: Labels Pictures

Materials

Images on the iPad

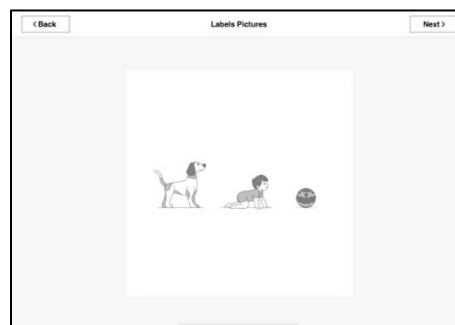
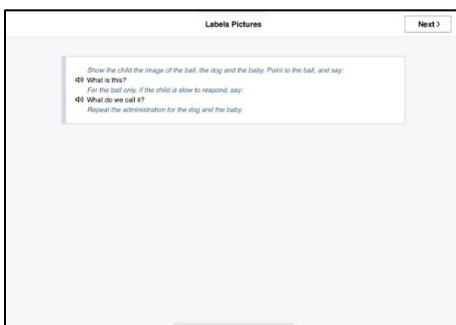
Positioning

Child sitting in caregiver's lap or in a highchair facing examiner.



Instructions:

1. Tap **“Next”** to show the child the image of the ball, the dog and the baby.
2. Point to the ball and say, **“What is this?”**. For the ball only, if the child is slow to respond, say: **“What do we call it?”**
3. Repeat the administration for *Dog* and *Baby*.



Score

“Was the child able to name any of the objects in the pictures?”

- Answer **“Yes”** if the child names at least one picture. You may also answer **“Yes”** if you have previously observed the child naming a picture in a child's picture book.
- Answer **“No”** if the child does not label any of the pictures.

Pausing and Resuming, Stopping or Skipping the Test

If you need to pause the test for any reason, use the three-finger slide from right to left ([administrative gesture](#)).

Because there is no timing for this measure, you may pause at any time. If you need to take a break, however, it is best to take it between test items. You will be taken back to the next available uncompleted item if you choose to resume.

If you wish to Stop or Skip, you will be asked to provide a reason for doing so.

Mullen Language Scale – Expressive Observational

For more details and video examples, see the training video:

“Mullen Expressive Language Scales - Prompted and Observational”

Overview

The Mullen Expressive Observational Language scale assesses a child’s expressive vocabulary or what words or communicative sounds/gestures the child can produce or say. A subset of the items from the Mullen Scales of Early Learning Expressive Language test form this Toolbox measure. The items consist of the total observations that the examiner makes over the course of the entire Baby Toolbox assessment. At the end of the assessment, the examiner enters their observations into the iPad screen.

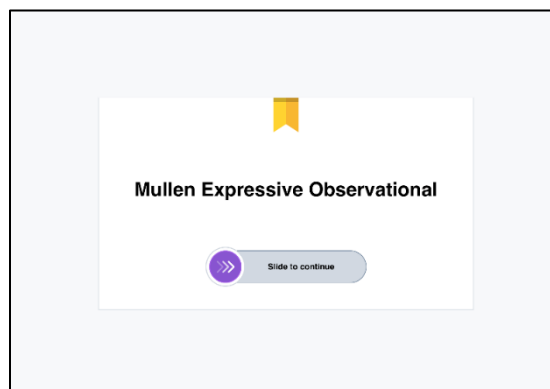
Throughout the assessment, pay attention to the child’s vocalizations. Keep the Mullen Expressive Observational print-out nearby (*see attached*) and if/when you observe a vocalization on the list, check it off so that you can record it later. These behaviors can occur at any time.

Administration Materials

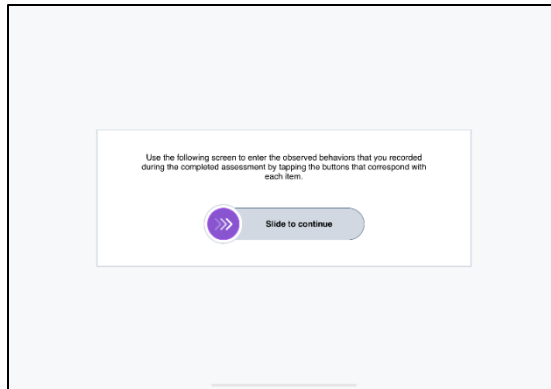
This measure only requires a printed, separate log ([see Appendix 2](#)) on which the examiner can record their observations and the iPad to which they will transfer the details of the log upon completion of the entire Baby Toolbox assessment.

Starting the Measure

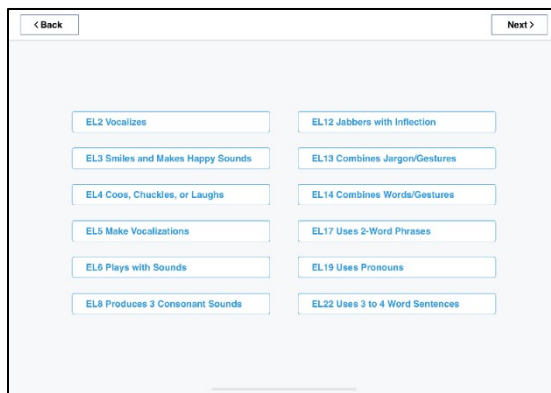
Like the other measures in the Baby Toolbox, this measure has a title screen: **“Mullen Expressive Observed.”** Below the measure name is a slide with a purple button. The examiner will slide the button to the right to continue with other instructions for the test.



The next screen is an instructional screen reminding the examiner to enter their observations that are recorded on the observation log by tapping the appropriate button(s) on the iPad data screen. The examiner will slide the purple button to the right to continue.



The iPad with the Data Screen faces the examiner while they complete their ratings. After the data are entered, the examiner should tap “NEXT” to continue. The data screen is shown below:



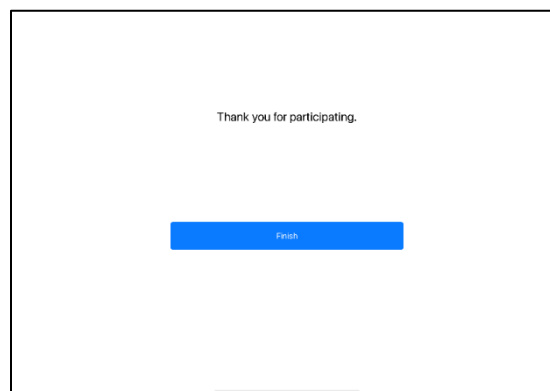
Scoring

Below are definitions for each of the possible observed behaviors:

- **“EL 2. Vocalizes”**: Child produced any vocalizations (throaty sounds) (high-pitched “oooo”).
- **“EL 3. Smiles and makes happy sounds”**: Child smiled and made happy sounds (not crying) in response to smiles or social stimulation from either the parent or examiner
- **“EL 4. Coos, chuckles or laughs”**: These sounds reflect vocalizing pleasure. Select if the infant made at least two of the three sounds.
- **“EL 5. Make vocalizations”**: These include reflexive vocalizations (“*ah, eh, m*”) (internal state) Select if the infant produced at least two different sounds. The sounds do not have to be produced together (e.g., can be “*ba*” at one point and “*ga*” at another point. The key difference between EL2 and EL5 is that EL5 requires multiple sounds. (If you select EL5, you probably heard EL2 also)
- **“EL6: Plays with sounds”**: Sounds often facilitated by saliva buildup. Sounds include “*o, u, ah-goo*”, or a simple series of sounds such as “*a-a-a-*”. The key is that item implicates playing with vocalizations and is not about the child’s internal state.

- **“EL8: Produces 3 consonant sounds”**:_Examples may include **“p,d,k,g,m.”** Must produce three different sounds to receive credit.
- **“EL12: Jabbers with inflection”**: Jabbering involves changes in vocal inflections and reflects the different tones and pitch used in conversational speech
- **“EL13: Combines jargon/gesture”**:_The use of jargon (non-meaningful connected speech sounds) together with pointing, touching, or looking
- **“EL 14: Combines words/gestures”**: The child makes one verbal request while pointing/gesturing. Often, a child uses words (or word approximations) along with gestures to express a need. For example, the child might spontaneously make a request for **“more”** (toys, cookie, drink) and point to a desired object.
- **“EL17: Uses two-word phrase”**:_At least one self-initiated two-word phrase (e.g., **“more juice”**, **“bye-bye ball”**, **“car go”**)
- **“EL19: Uses pronouns”**: Uses at least one pronoun such as **“my”**, **“mine”**, **“you”** **“me”**. There can be errors with syntax.
- **“EL22: Uses 3- to 4-word sentences”**: Uses at least one three- to four-word sentence (e.g., **“Mommy get in car”**, **“me go too”**)

When the ratings are completed, the following screen appears:



MacArthur Bates CDI-CAT Comprehension

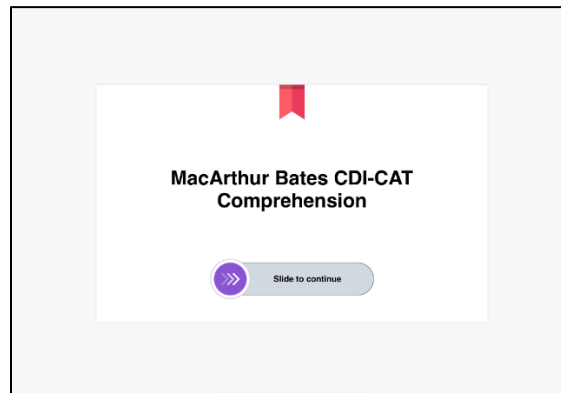
Overview

The MacArthur Bates CDI-CAT Comprehension (Receptive Language) scale is a parent report scale that assesses a child's receptive vocabulary or what words a child, age 7 to 24 months, understands. Items from MacArthur-Bates Communicative Development Inventories form this Toolbox measure. All the questionnaires are formatted in the same way. The iPad automatically presents the questionnaire that matches the age of the child, and the caregiver only answers the questions that are relevant to the particular age. If the caregiver chooses to skip an item, there is a warning screen asking the caregiver to confirm that they do not want to respond to that item. Then the caregiver indicates that they either want to skip the item or make a response choice.

Additional details on administering parent/caregiver report tests can be found in the [Intro to Parent Report Measures](#) chapter of this manual.

Administration

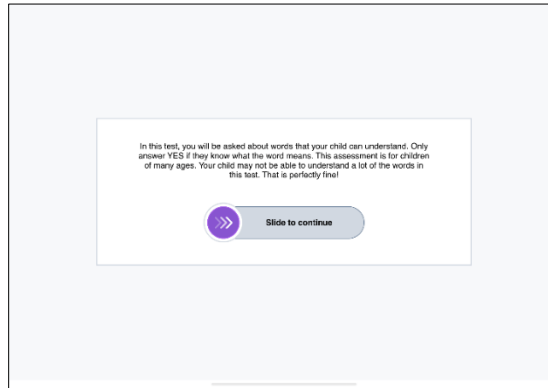
Starting the Measure



If this is the first measure, the examiner hands the iPad to the caregiver and demonstrates how to start the measure, saying: **“To start the measure, slide the purple button under the name of the measure: MacArthur Bates CDI-CAT Comprehension to the right.”**

This measure may be started by either the parent/caregiver or the examiner. Following the title screen, there is an instructional screen for the parent/caregiver that explains when they should answer **“YES”** or **“NO”** on the iPad screen.

The first instructional screen is shown below.

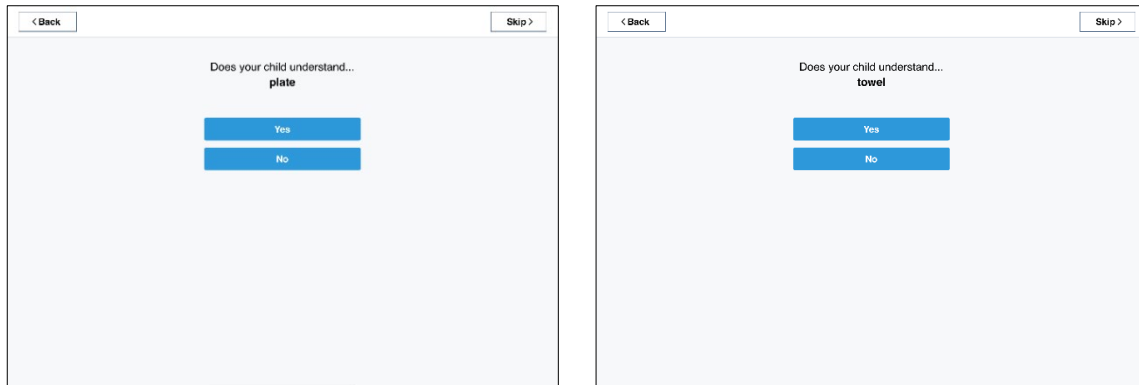


This instructional screen reads: “In this test, you will be asked about the words that your child can understand. Only answer YES if they know what the word means. This assessment is for children of many ages. Your child may not be able to understand a lot of the words in this test. That is perfectly fine!”

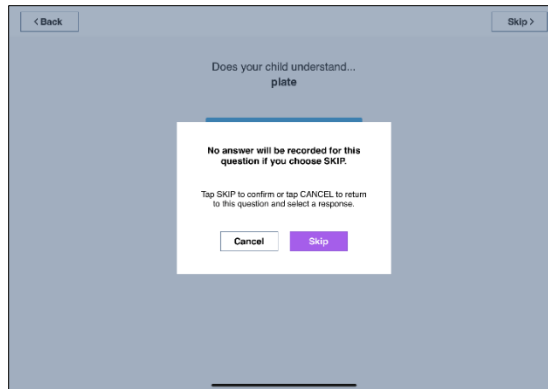
Once the parent/caregiver has read the instructions, they should slide the purple button to the right to start administration of the test items.

Test Items

Below are two examples of test items



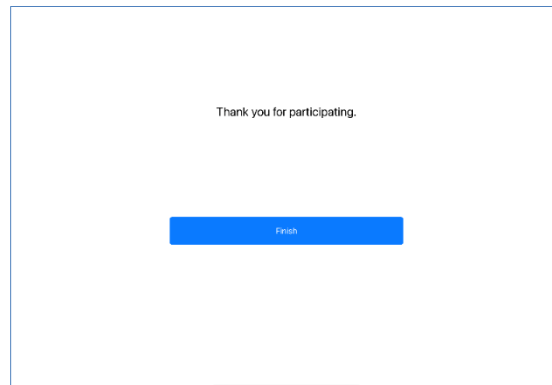
Once the parent/caregiver makes a choice, the App automatically moves to the next item. If the parent taps “**SKIP**”, a verification screen appears and asks for confirmation of that choice. The verification screen is shown below:



This instructional screen reads:

“No answer will be recorded for this question if you choose SKIP. Tap SKIP to confirm or CANCEL to return to this question and select a response.”

Once the parent/caregiver makes a choice, the App moves to the next item. After the parent/caregiver responds to all the items, the test is complete, and the following screen appears:



MacArthur Bates CDI-CAT Production

Overview

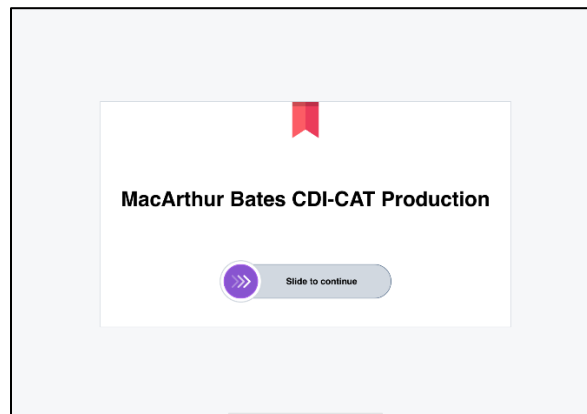
The MacArthur Bates CDI-CAT Production (expressive language) scale is a parent report scale that assesses a child’s expressive vocabulary or what words a child, age 9 month and older, can say. Items from MacArthur-Bates Communicative Development Inventories form this Toolbox measure.

All the questionnaires are formatted in the same way. The iPad automatically presents the questionnaire that matches the age of the child, and the caregiver only answers the questions that are relevant to the particular age. If the caregiver chooses to skip an item, there is a warning screen asking the caregiver to confirm that they do not want to respond to that item. Then the caregiver indicates that they either want to skip the item or to make a response choice.

Additional details on administering parent/caregiver report tests can be found in the [Intro to Parent Report Measures](#) chapter of this manual.

Administration

Starting the Measure



If this is the first measure, the examiner hands the iPad to the caregiver and demonstrates how to start the measure, saying: **“To start the measure, slide the purple button under the name of the measure: MacArthur Bates CDI-CAT Production to the right.”**

This measure may be started by either the parent/caregiver or the examiner.

Following the title screen, there is an instructional screen for the parent/caregiver that explains when they should answer **“YES”** or **“NO”** on the iPad screen.

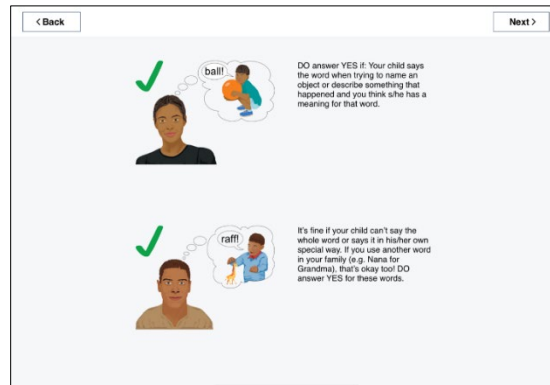
The first instructional screen is shown below:



This instructional screen reads:

“In this test, you will be asked about the words that your child can say. Only answer YES if they know what the word means AND they can say it by themselves. You’ll see some examples on the next two screens. This assessment is for children of many ages. Your child may not be able to say a lot of the words in this test. That is perfectly fine!”

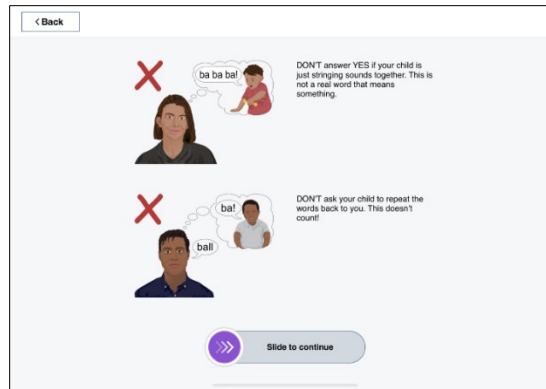
Once the parent/caregiver has read the instructions, they should tap “NEXT” to move to the next instructional screen.



This instructional screen reads:

“DO answer YES if: Your child says the word when trying to name an object or describe something that happened, and you think s/he has a meaning for that word. It’s fine if your child can’t say the whole word or says it in his/her own special way. If you use another word in your family (e.g. Nana for Grandma), that’s okay too! DO answer YES for these words.”

After reading the instructions about when to choose “YES” as a response, they should tap “NEXT” to move to the next instructional screen.



This instructional screen reads:

“DON’T answer YES if your child is just stringing sounds together. This is not a real word that means something.”

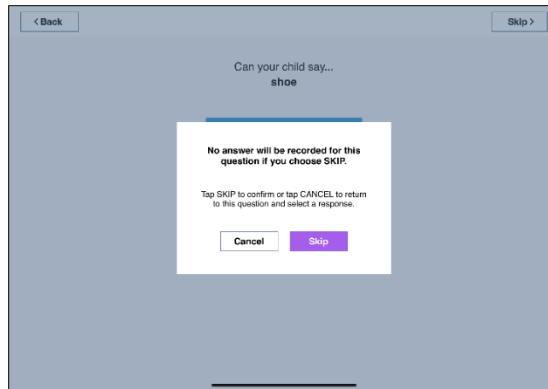
“DON’T ask your child to repeat the words back to you. This doesn’t count!”

After reading the instructions about when to choose **“NO”** as a response, they should slide the purple button to the right to start administration of the test items.

Test Items

Below are two examples of test items:

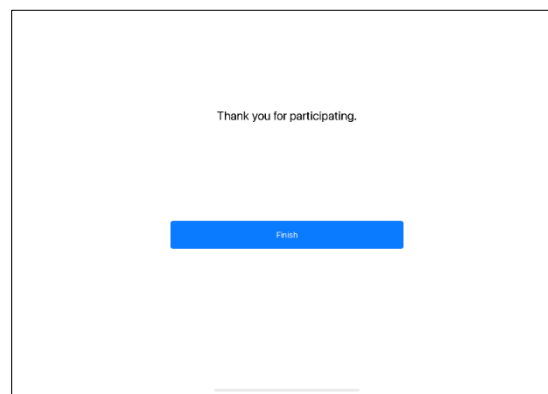
Once the parent/caregiver makes a choice, the App automatically moves to the next item. If the parent/caregiver taps **“SKIP”**, a verification screen appears and asks for confirmation of that choice. The verification screen is shown below:



This instructional screen reads:

“No answer will be recorded for this question if you choose SKIP. Tap SKIP to confirm or CANCEL to return to this question and select a response.”

Once the parent/caregiver makes a choice, the App again moves to the next item. After the parent/caregiver responds to all of the items, the test is complete, and the following screen appears.



Chapter 6: Motor

For more details and video examples, see the training video “**Motor Overview**”.

Introduction

There are two primary measures in the motor domain:

Get up and Go assesses postural transition and locomotion. Lay the child on their back and see if they can roll over, get off the ground, travel, get onto and off a platform.

Reach to Eat assesses manual behaviors. Pass the child blocks and Cheerios and observe how they grasp them.

Available supplementary third measure:

Sit and Stand assesses stationary postural control. Place the child in sitting and standing postures and see how long they can stay in that position

Contact NIH Baby Toolbox Support if you wish to use the Sit and Stand test.

<https://nihbabytoolbox.org/support/>

When you begin a task in the app, you'll first see a set of questions to ask the caregiver. These questions help determine which tasks to administer based on the child's reported skill level. Each task is performance-based: you'll record the child's behavior using the iPad while administering the task. Afterward, you'll review the recording and answer questions about the child's behaviors.

For the best recording:

- Use the recommended iPad stand to record the child's behavior during the task.
- Some tasks use the front-facing camera; some use the back-facing camera. These are specified in the test instructions.
- Always make sure your iPad is set to capture all the behaviors before you begin to administer the tasks.
- Be aware that the camera records both video and audio. The recordings may be stored and can be viewed or exported later. Please refer to the [Using the NIH Baby Toolbox App](#) chapter to learn more about these settings.
- Always begin recording before administering the task. It is okay to capture more video than is necessary.
- Each recording can last up to 5 minutes. For most measures, this will be more than enough but keep the time limit in mind in case the measure goes on too long.

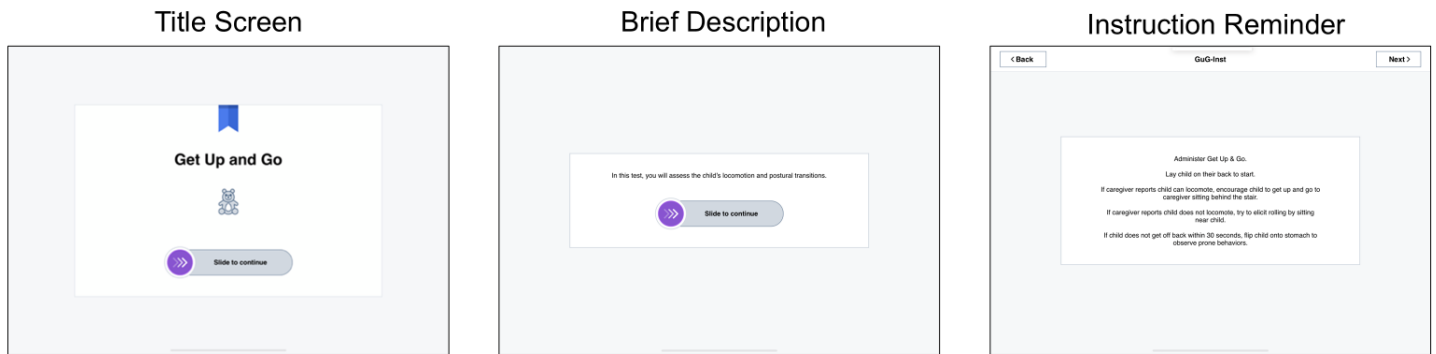
For scoring:

- The examiner is guided through trimming the video, watching segments, and assigning codes to the child's behavior.

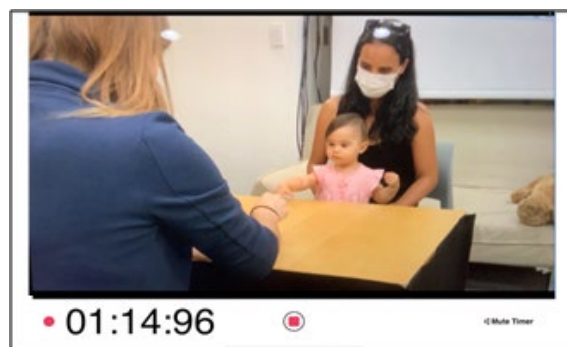
- The questions asked will vary based on branching logic and the responses entered (i.e., if the child got off their back, you're asked how. If the child did not get off their back, you're asked different questions)
- For all tasks, make sure you are set up ahead of time and have all possible materials available.
- While scoring, give the child extra toys to play with and ask the parent to help keep the child occupied.

Common Structure across all measures

All the measures have a common structure; they all begin with a title screen, then a brief description, and then an instruction reminder. These screens are shown below:

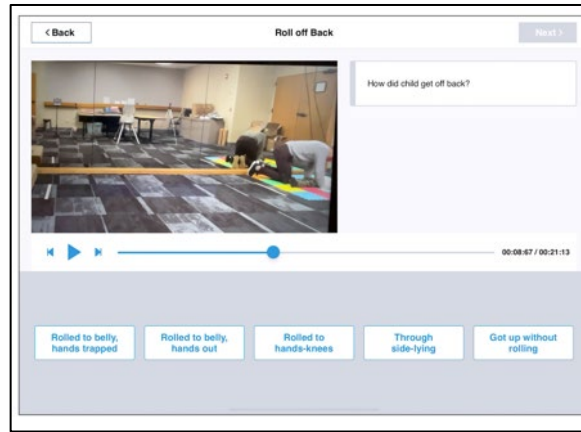


Following the Instruction reminder you will see the Video Capture Screen. When you see the video capture screen, make sure that the iPad is set up on the tripod (stand) and positioned to record the entire event.



The Start/Stop recording button in the middle begins and ends the recording. A timer, on the bottom left, is accompanied by an auditory cue. This helps you keep track of time during the task. If the timer is distracting to the child, you can mute it (bottom right). After you record the task, you can review the video and choose to either **“Save & Continue”** or **“Delete and Re-record”**.

Once you “**Save & Continue**”, you will be asked questions about what the child did. Each screen will show the recorded video, and controls to allow you to review the video. Use the blue marker or the arrow keys to scroll through the video and find the intended behavior. You may need to go back and forth between single frames when reviewing subtle behaviors.

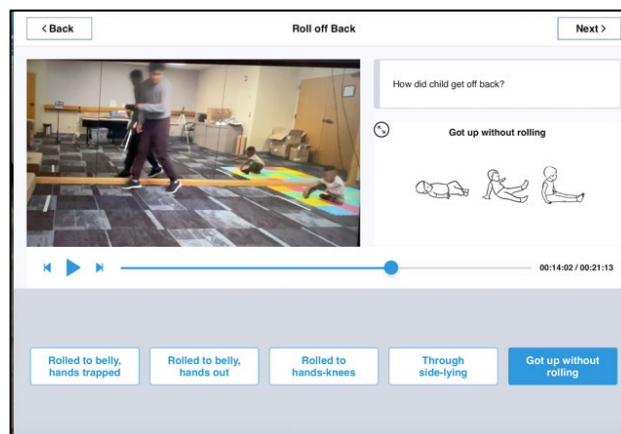


Response options to the question are along the bottom. When you click on a response button, more information about the behavior (and sometimes an image) will pop up under the question.

You can enlarge the additional information by tapping the button in the top left. Tap “**Close**” to return to the selection screen.



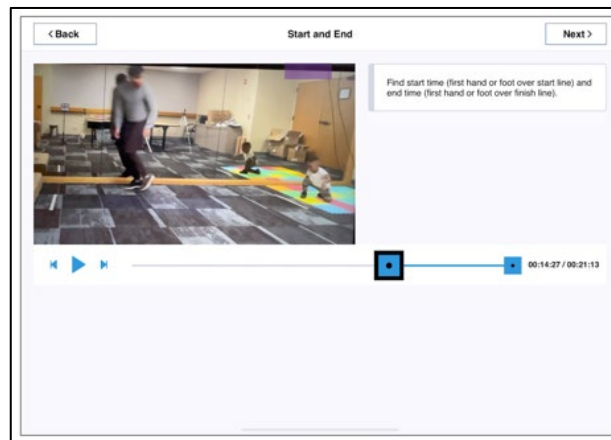
Select the correct response by tapping “**NEXT**” at the top.



Find Time/Segment

Some questions (specifically in “**Get up & Go**” and “**Sit & Stand**”) will ask you to indicate specific times. For those questions, the screen will show two squares on the timeline. The selected square will appear larger and outlined in black. Move the squares to indicate the beginning and end of a segment.

- Tapping the **left/right** arrow buttons will move the selected square forward/backward
- Tapping the “**Play**” button will play the current selected segment
- Tap the “**Next**” button when you are satisfied with the endpoints of your segment.



Going Back

Based on the branching nature of the questions, you may realize that you made an error on the question before. Tap “**Back**” if you think you made a mistake. Note, you can only go back one screen. Even when the test is complete, you can go back one screen if you think you made a mistake in scoring.

Get Up & Go

For more details and video examples, see the training video: “**Get Up and Go**”.

Overview

In this task you will assess the child’s postural transitions (e.g., getting from back to belly; sit to stand) and locomotion (e.g., crawling, walking). All children begin the task in the same position—placed on their back. Children who can crawl, walk, or move in any way, are encouraged to get off their backs and travel 3 meters. Children who can travel 3 meters are encouraged to go up onto a platform and then to come back down. Children who cannot crawl are encouraged to roll over from back to front and are placed on their stomachs to demonstrate prone skills.

Set-up

Find a suitable hallway or large room. Measure the distance of 3 meters. Mark the start and finish with tape (**see Figure 1**). For the youngest pre-locomotor children and crawlers, test them on a clean, non-skid (won’t move under the child) carpet or foam mat. Do not put a blanket or cloth on the floor for testing.

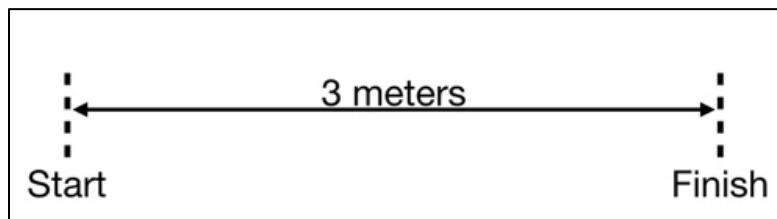


Figure 1. 3-meter distance for Get Up & Go

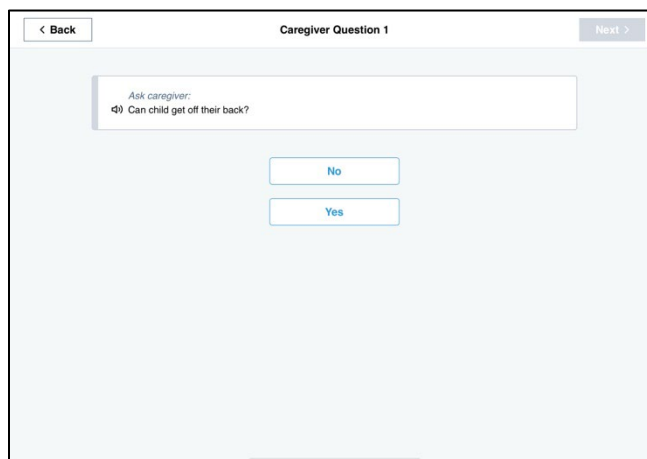
Children of all ages should be barefoot. If possible, babies should wear only their diaper or a onesie or other garment that reveals the arms and legs; older children should wear a T-shirt and shorts so their arms and legs can be seen clearly. Clothing should not constrain the child’s movement (e.g., no long dresses, heavy or tight clothing that impedes movement; nothing too slippery on the knees).

Materials (see [Appendix 1](#))

36 × 36 × 6-inch box, filled with books, paper reams, or another material to make it sturdy for child to climb/stand on. Masking/painters tape and measuring tape to mark start and end lines
Carpet, foam mat, or other soft, clean floor covering (recommended but not required)
Appealing toy/snack to entice child to get up and go.

Caregiver Questions

Prior to beginning the recording, the app will ask, **“Can child get off their back?”**

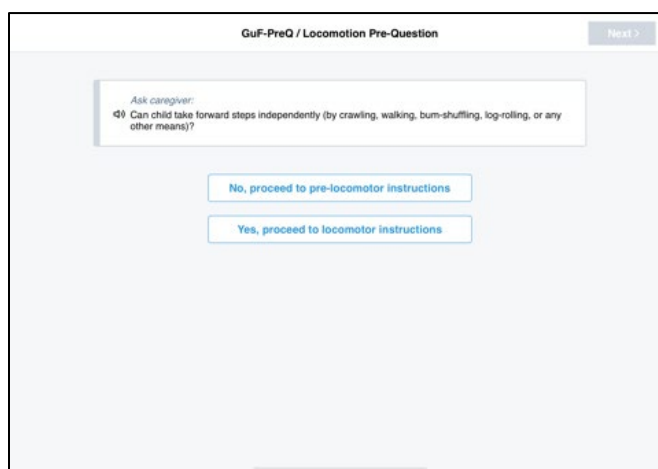


If you observed the child get off their back (*e.g., roll over from supine to prone*) over the course of administering the Toolbox, choose **“Yes.”**

If you did not observe the child get off their back, ask the caregiver if they have seen their child get off their back. Say to caregiver, **“When [CHILD] is lying flat on their back, like on the floor or in their crib, did you ever see [CHILD] get off their back by intentionally rolling over to their belly or sitting up or standing up? All by themselves without any help from you? Have you seen it happen at least 3 times in the past week?”**

A **“Yes”** response is based on actually seeing the child display this behavior, not based on an inference (put child down on their back at night and in the morning, child was on their belly).

Then the app will ask, **“Can child take forward steps independently (by crawling, walking, bum-shuffling, log-rolling, or any other means)?”** If you observed the child, take steps (crawling, walking, bum shuffling, etc.) over the course of administering the Toolbox, choose **“Yes.”**



If you did not observe the child taking steps, ask the caregiver if they have seen their child take steps. Say to caregiver, **“Did you see [CHILD] intentionally take at least 1 crawling or walking step all by themselves, without holding onto anything? Steps in a forward direction, not just pivoting in circles? Have you seen them do it at least 3 times in the past week?”**

A **“Yes”** response is based on actually seeing the child display this behavior, not based on an inference (put child down in one place a while later you found the child in a different location).

If you chose **“Yes,”** you will administer the locomotor version of **“Get Up & Go”**

If you chose **“No,”** you will administer the pre-locomotor version of **“Get Up & Go”**

Administration (tasks)

Locomotion Version

Brief Summary

Place the child on their back. Together with the caregiver, encourage the child to get up, go as quickly as possible over to the platform, get onto the platform, and then get off the platform and return to the start line. If the child does not get off their back within 30 seconds, try the task one more time (perhaps with new incentives to get up and go).

Detailed Description

For Locomotor, infants and children, you will need the full 3-meter distance and the 6-7-inch-high platform. Place the platform so the front edge is 12 inches beyond the finish line. Ask the caregiver to sit/crouch behind the box. Position the iPad camera to capture the whole scene so that you can see the child at the start location and at the end location on the platform (**Figure 2**).

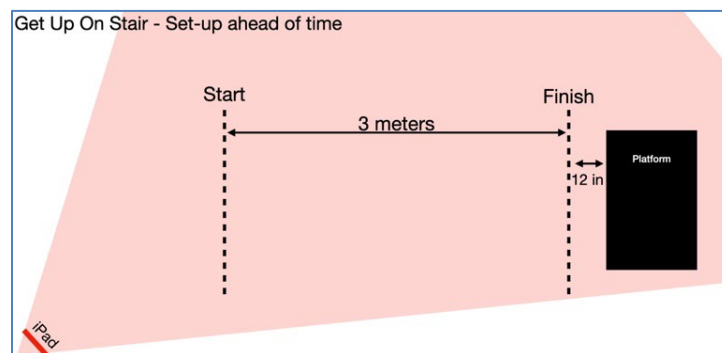


Figure 2. Room set up and location of iPad for locomotor Get Up & Go

Place the child on the floor on their back just before the start line with their feet pointing toward the finish line. After placing the child in position, quickly go just beyond the platform, crouch down next to

the caregiver, and encourage the child to get up and go to the platform (**Figure 3**).

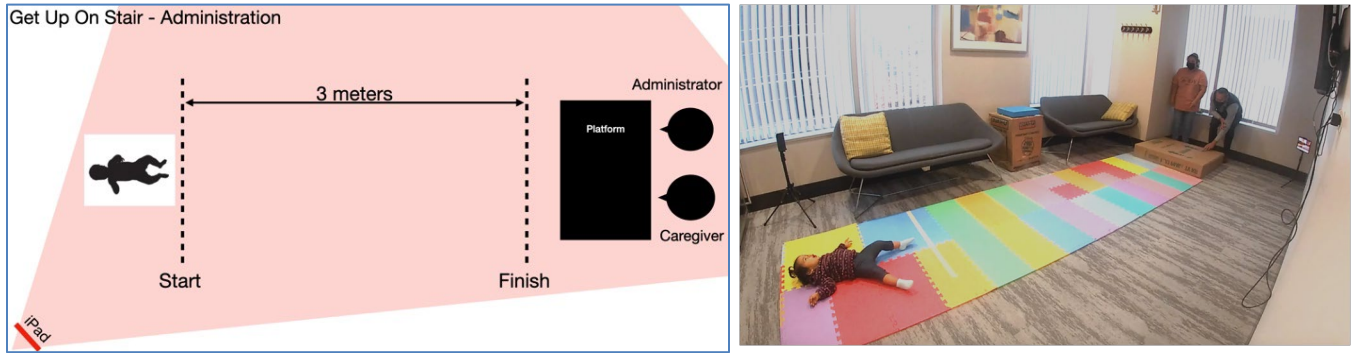


Figure 3. Location of administrator, caregiver, child, and iPad for locomotor Get Up & Go

The goal is to get the child to get off their back, move continuously and as fast as they can from the start to the finish line, and get onto and off the platform. Use desirable toys and snacks (cheerios are good and you'll need them for "**Reach to Eat**"), and cheer, gesture, and call to the child to get them excited and motivated to come as quickly as possible (e.g., "**Come here!**" "**Come get this!**" "**Come see this!**"). Note that songs can cause the child to stop moving to listen or dance; thus, songs are less effective motivators than toys and snacks. If the child does not get off their back within 30 seconds, try placing them into a prone position and administer again.

For crawlers and unsteady walkers, you might need to spot the child as they go up the stair. But move your arms or body away if the child tries to hold onto you for support. If the child gets onto the stair, hold the child on the stair and have the caregiver go to the start line and encourage the child to get down from the stair and go to the start line (**Figure 4**).

Stay near the child to spot them as they try to get down. Keep your hands near the child even if they seem totally steady as they step down—if they lose balance or fall, you need to be ready to support them. Move your arms or body away if the child tries to hold onto you for support.

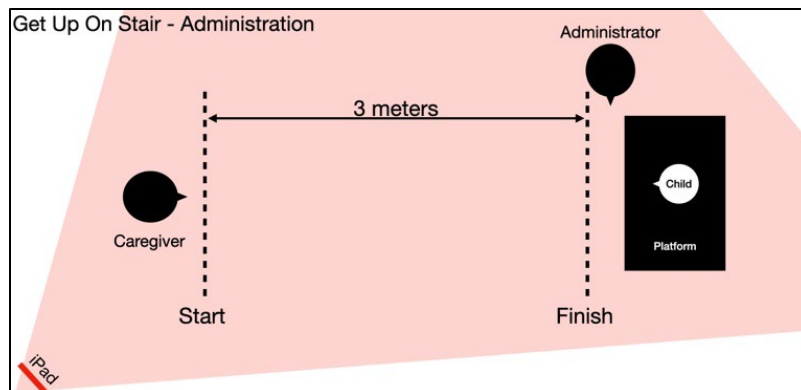


Figure 4. Location of administrator, caregiver, child, and iPad to get down from stair in locomotor Get Up & Go

Pre-Locomotor Version

Brief summary

Place the child on their back. Together with the caregiver, try to get the child to roll over onto their stomach. If the child does not roll over within 30 seconds, place them onto their stomach and try to get

them to lift their head and chest, or even take a few crawling steps or shift postures for 30 seconds.

Detailed description

For Pre-Locomotor infants, you only need the space around the start line. The end line and platform are unnecessary. Position the iPad camera to capture the child at the start line, far enough back to be able to see if they take crawling steps or shift postures.

First, test rolling from supine to prone. Test rolling on the side caregiver says is child’s “preferred” side (the direction child rolls most frequently and easily). If the caregiver hasn’t seen the child roll or doesn’t know a preferred side, test either side. Ask the caregiver to sit/crouch down a few feet before starting line (**Figure 5**). Hold the child with one hand supporting their neck and the other hand supporting their buttocks (**Figure 6**), and place the child down on their back, with the top of their head near the caregiver. Child is facing the ceiling, with their feet pointing toward the start line. After placing the child in position, quickly crouch down next to the caregiver (**see Figure 2**). Hold and shake a toy above the child’s face so they see the toy and begin to reach for the toy. When the child’s arms are outreached toward the toy and before the child grasps the toy, move the toy along a diagonal on the floor toward yourself (**see Figure 5**), while encouraging the child to roll over to get the toy. Call the child’s name and encourage them to roll over (saying things like “**Come here**” and “**Come see**” and “**Can you get it?**”); appear to be excited, but not so entertaining that the child is content to lie on their back watching you. Stop testing when the child rolls from supine to prone or after 30 seconds elapsed, whichever occurs first.

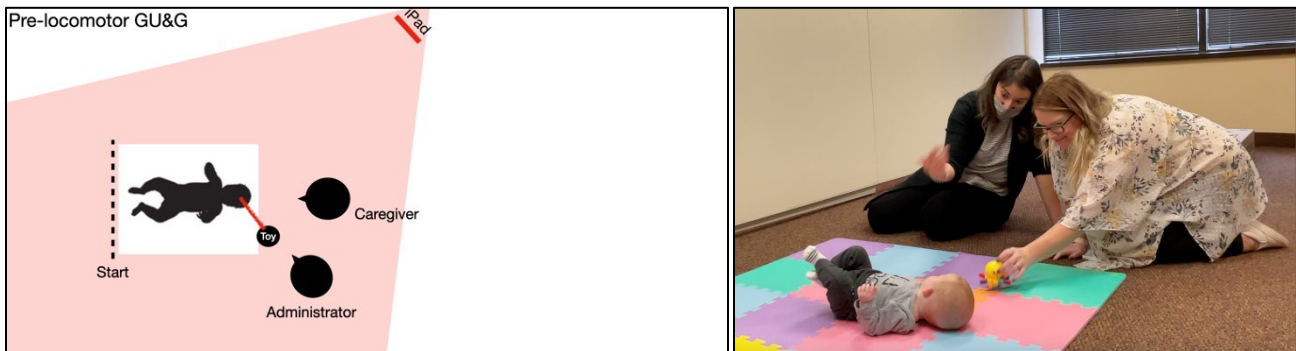


Figure 5. Location of administrator, caregiver, child, and iPad for pre-locomotor Get Up & Go



Figure 6. How to hold and place infant into supine position for pre-locomotor Get Up & Go

Second, test prone skills. If the child did not roll over within 30 seconds, place the child into a prone position. Hold the child with one hand supporting their chest (for very young infants with droopy heads, drape the baby’s chest over your forearm) and the other hand supporting their thighs, and place child on their stomach with their head near the caregiver and feet pointing toward the start line. If the child rolls over on their own, go straight to testing prone skills.

Position yourself in front of the child and call their name while shaking a toy in the air in front of their head, just barely within reach, encouraging them to lift their head, prop on their elbows or arms, or even take forward steps. Test prone skills for 30 seconds.

“Get up and Go” – Scoring Questions

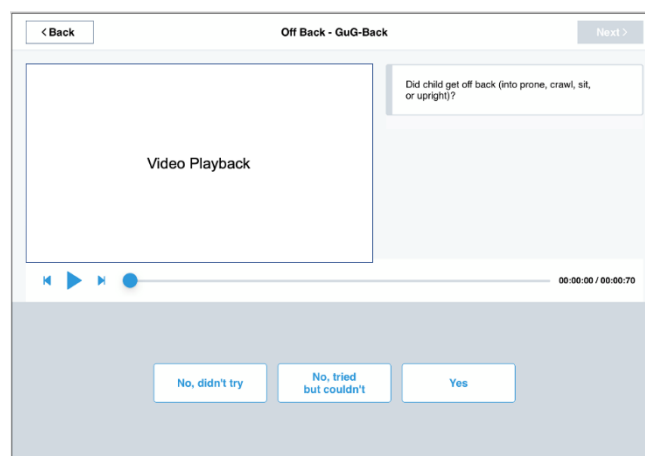
Below are the possible questions that you may see during scoring portion of the assessment. The initial questions may apply to both the Pre-Locomotion and Locomotion versions. The latter questions apply to Locomotion only.

The questions you see will depend on your responses to previous questions. Each answer shapes the next questions, ensuring they’re tailored to what the child did.

Here we review each question, providing additional information about the question (in some cases) and additional information about the responses, in some cases. (Drawings of responses are shown in the app.)

Getting off back

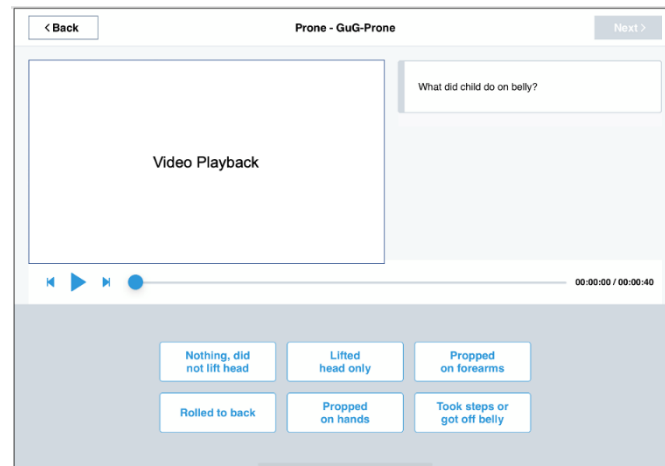
“Did the child get off back (into prone, crawl, sit, or upright)?”



- **“No (didn’t try)”**
Child just laid on their back without trying to roll, or get off their back. Either child is incapable (really can’t get off their back) or noncompliant (just doesn’t want to do it).
- **“No, tried but couldn’t”**
Child deliberately tried to roll (head turns to the side, and one leg pushes against the surface or swings over body, or shoulder lifts from ground), but child stays supine, or rolls only onto their side, but they could not get all the way off their back onto their belly, or all the way into sitting or an upright posture.
- **“Yes”**

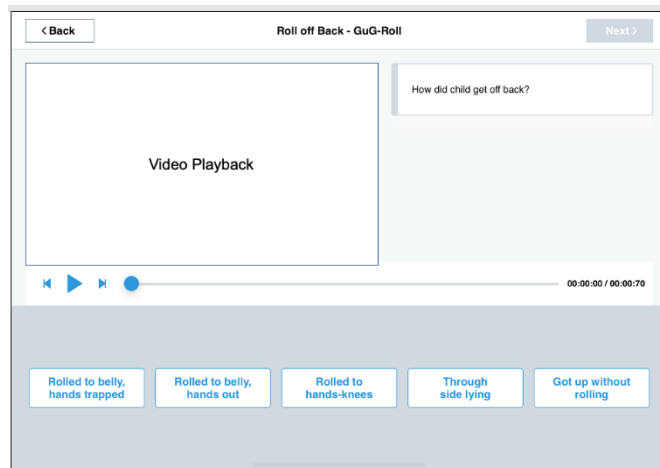
Child got all the way off their back onto their belly or into sitting or upright posture.

“What did child do on belly?”



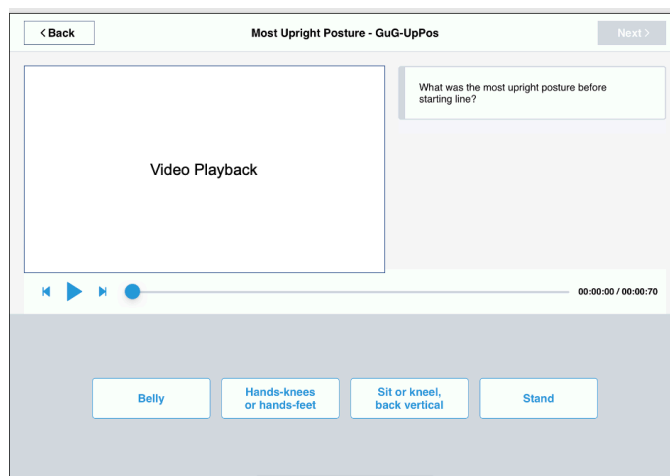
- **“Nothing, did not lift head”**
- **“Lifted head only “**
Forearms on floor, most of chest on floor, forearms near shoulders
- **“Propped on forearms”**
Lifted head and chest and propped on forearms with elbows bent
- **“Rolled onto back”**
Rolled all the way from belly to back, not just to their side.
- **“Propped on hands”**
Lifted head and chest and propped on hands (elbows straight)
- **“Took steps or got off belly”**
Took steps in any posture, or got off belly (into sit, hands-knees) with or without taking steps

“How did child get off back?”



- **“Rolled to belly, hands trapped”**
- **“One or both hands trapped under chest”**
- **“Rolled to belly, hands out”**
No hands trapped under chest
- **“Rolled to hands-knees”**
Belly off floor. First leg to come over was flexed and bore weight as the body came around, back stayed parallel to floor, 2 hands on floor
- **“Side lying”**
Pushed up through partial roll, belly never touched floor
- **“Got up without rolling”**

“What was the most upright posture before starting line?”



The most upright posture involves the head at highest point for at least 0.5 seconds. If the child got up into sitting position and held it for 0.5 seconds, and then got onto hands-knees, sitting would be the highest posture. If the child got into sitting position, then stood up, standing would be the highest posture. If the child slightly crosses the starting line in the process of getting into hands-knees or sit or stand, then score the most upright posture. If the child changes to a more upright posture partway to the stair, then select the initial posture before the starting line (e.g., gets onto hands-knees before the starting line, crawls several steps toward stair, then stands up and walks to stair, answer the most upright posture is hands-knees or hands-feet).

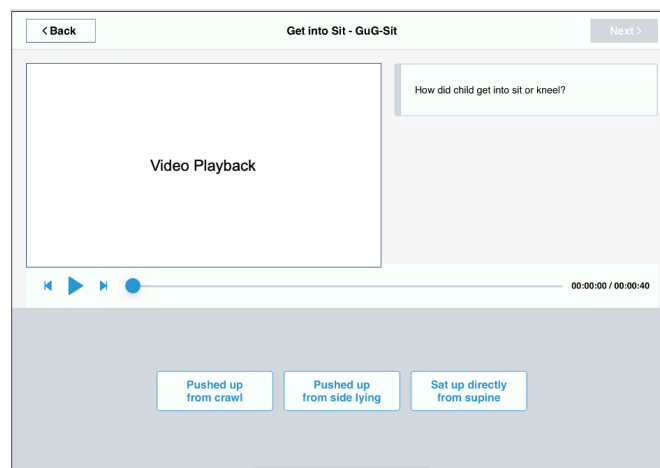
- **“Belly”**
- **“Hands-knees or hands-feet”**

“Sit or kneel, back vertical”

Sitting includes legs straight out in front, or one leg bent behind or both legs bent behind in the shape of the letter “W” (w-sit). What’s critical is that the sit happens for at least 0.5 seconds (that it’s not just transitioning through “sit” into crawl). This difference can be subtle. Select **“sit”** if child’s most upright posture is squatting with knees bent and butt close to ground.

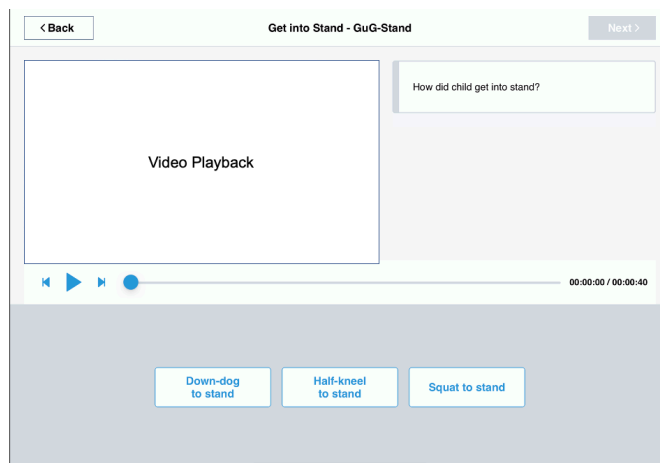
- **“Stand”**

“How did child get into sit or kneel?”



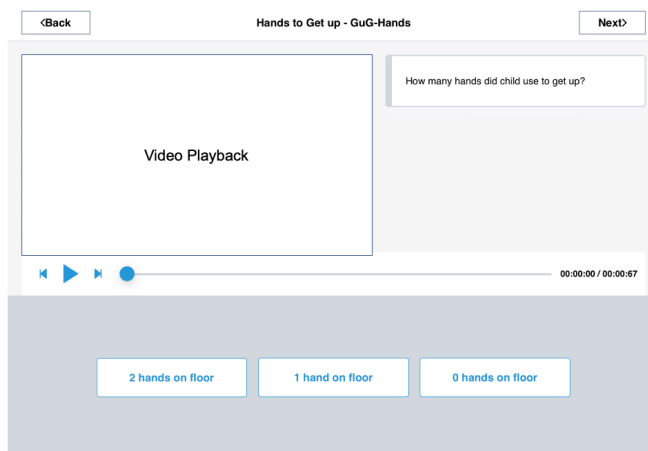
- **“Pushed up from crawl”**
- **“Pushed up from side lying”**
Without going through hands-knees or hands-feet
- **“Sat up directly from supine”**

“How did child get into stand?”



- **“Down-dog to stand”**
Both hands and feet are on the floor simultaneously. Head must be below the level of the butt at some point in this posture. Butt is never below the level of the knees. Legs can be straight or slightly bent at the knees—hence the term **“down-dog”** (like the yoga position). Hands must touch floor to push body to upright.
- **“Half-kneel to stand”**
One knee and one foot touch the floor simultaneously. Head must be above the level of the butt. Hands can touch the floor, not to push body to upright.
- **“Squat to stand”**
Both feet are on the floor simultaneously. Head must be above the level of the butt. Butt must be below the level of the knees as they rise to upright. Hands can touch the floor, not to push body to upright.

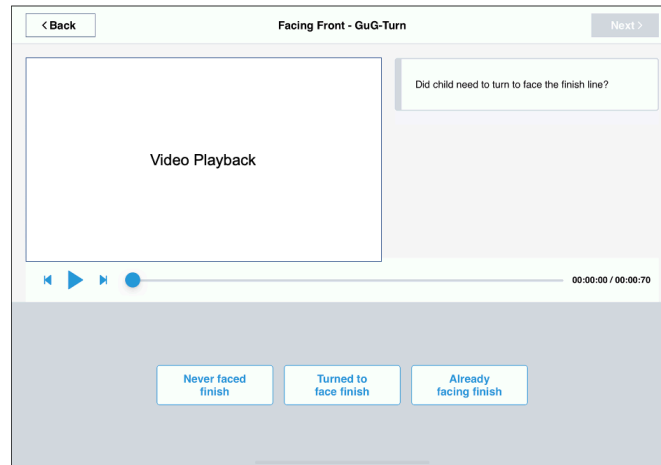
“How many hands did child use to get up?”



Code how many hands are on the floor simultaneously as the child's butt lifts from the floor. (Code reflects leg strength and balance control.)

- **“0 hands on floor”**
- **“1 hand on floor”**
- **“2 hands on floor”**

“Did child need to turn to face the finish line?”



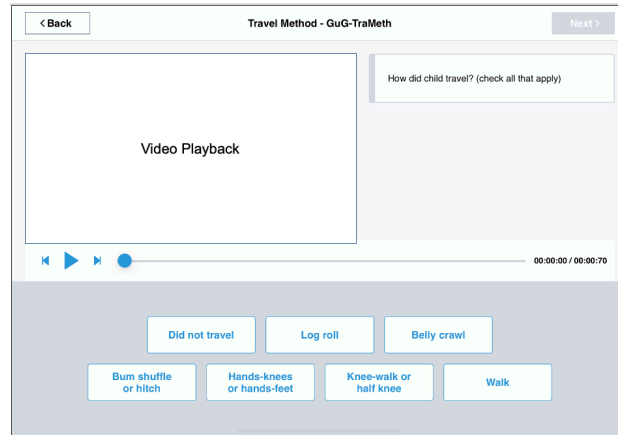
Code whether the child needed to turn their body to face the finish line after they achieved their most upright position. (*Code reflects planning.*) Code the direction of the child's whole body (knees and shoulders), not only the orientation of their face.

This does not imply where the child's face was oriented, but rather, their whole body. For kids who end up standing, it should be about their knees and shoulders facing the finish line. For kids that are crawling, it's about their whole body situated forward. We are interested in whether or not they turn after they've achieved the final posture, not about how the child gets into the final posture.

- **“Never faced finish”**
- **“Turned to face finish”**
After achieving final posture, child needed to take steps, pivot, or rotate body to face the finish line
- **“Already facing finish”**
Child was facing finish line the entire time, or child incorporated turning into the process of getting up.

The rest of the scoring questions only apply to children who locomote.

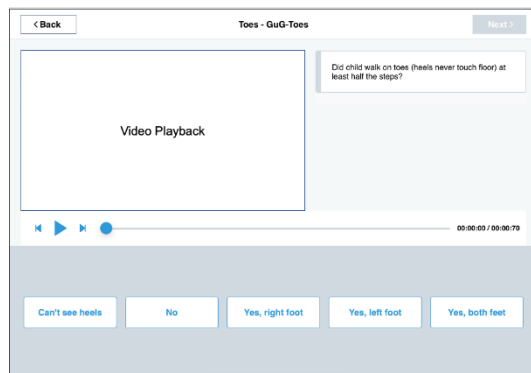
“How did child travel? (check all that apply)”



Only select if the child took at least 2 complete forward steps with either knees or feet. If log rolling, turned 360° at least 2 times. If belly crawling or bum shuffling, moved body forward at least 2 times (regardless of what body part they used for propulsion).

- **“Did not travel”**
- **“Log roll”**
- **“Belly crawl”**
Abdomen on floor
- **“Bum shuffle or hitch”**
One or both buttocks on floor
- **“Hands-knees or hands-feet”**
- **“Knee-walk or half-kneel”**
- **“Walk”**

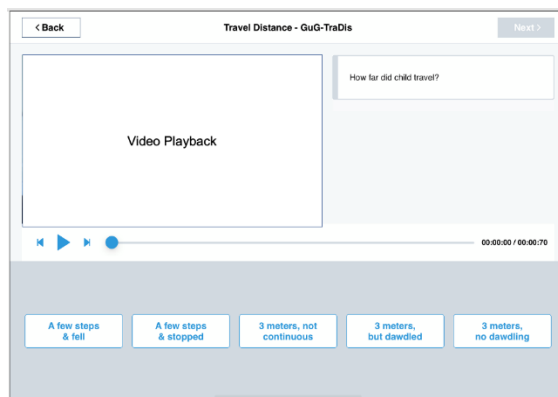
“Did child walk on toes (heels never touch floor) for at least half the steps?”



The aim is to capture toe-only walking or toe-heel walking rather than the typical heel-toe walking.

- **“Can’t see heels”**
Due to camera angle, you can’t report on toe walking
- **“No”**
- **“Yes, right foot”**
- **“Yes, left foot”**
- **“Yes, both feet”**

“How far did child travel?”



The aim is to select trials appropriate for measuring speed of locomotion (*traveled 3m continuously*). It is important to differentiate trials where the child moves continuously to the goal from trials with multiple bouts of locomotion where child falls or pauses to rest, recover balance, or gets distracted.

Note, that newly mobile infants move in choppy bursts with pauses between each step, but these pauses are much shorter than 3 seconds. Estimate (don’t time) 3-second pauses. Transitions from

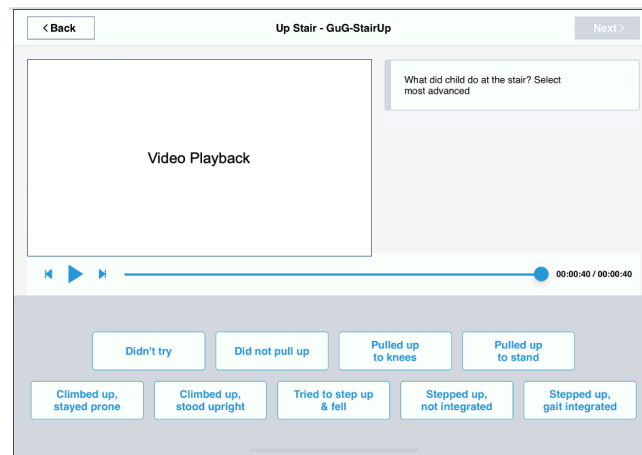
one form of locomotion to another (e.g., walk to crawl, belly to hands-knees crawl) do not count as a pause. Child can fall while crawling on hands/knees or hands/feet (lose balance and fall to chest).

- **“A few steps & fell”**
Never made it to finish line
- **“A few steps & stopped”**
Never made it to finish line
- **“3 meters, not continuous”**
Got to finish line but fell, stopped, or took detour along the way
- **“3 meters, but dawdled”**
Got to finish line, but intentionally dawdled
- **“3 meters, no dawdling”**
Got to finish line, without obvious intentional dawdling

Find Start time (first hand or foot over start line) and stop time (first hand or foot over the finish line)

Behavior at Stair

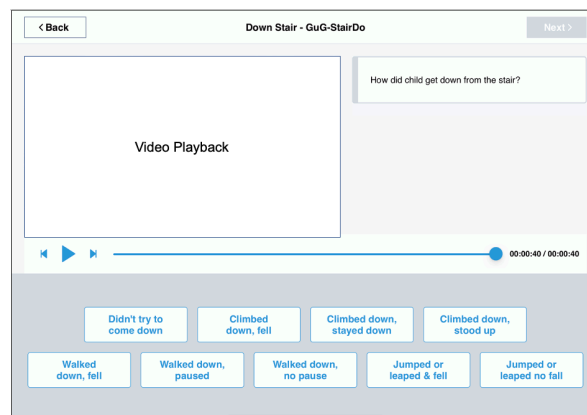
“What did child do at the stair? Select most advanced.”



- **“Didn't try”**
Didn't try to go up the stair. Stopped in front of the stair or went around the stair.
- **“Did not pull up”**
Tried to put hands on stair but did not pull to knees.
- **“Pulled up to knees”**
Pulled up to knees but did not get onto the stair

- **“Pulled up to stand”**
Pulled up to stand but did not get both knees onto the stair. Might have gotten 1 knee onto the stair
- **“Climbed up, stayed prone”**
Climbed up the stair on hands-knees or hands-feet and did not stand up. If child climbs up and gets onto knees, that counts as “climbed up, stayed prone.”
- **“Climbed up, stood upright”**
Climbed up the stair on hands-knees or hands-feet and stood upright
- **“Tried to step up & fell”**
Tried to step onto the stair and fell. Child walked to the stair and tried to step up while walking but fell
- **“Stepped up, not integrated”**
Stepped onto the stair without using hands but not integrated with gait. If the child walks to the stair and holds onto the examiner for support, select “stepped up, not integrated.”
- **“Stepped up, gait integrated”**
Stepped onto the stair without using hands and integrated with gait. Child steps onto the stair independently without holding examiner for support or breaking gait.

“How did child get down from the stair?”



- **“Didn’t try to come down”**
- **“Climbed down, fell”**
Tried to sit/back/crawl down but fell. Examiner intervened and caught child or child fell to floor.
- **“Climbed down, stayed down”**
Sat/backed/crawled down without falling, did not stand up to walk

- **“Climbed down, stood up”**
Sat/backed/crawled down without falling, then stood up and walked
- **“Walked down, fell”**
Tried to step down but fell. Examiner intervened and caught child or child fell to floor.
- **“Walked down, not integrated”**
Stepped down without falling, not integrated. With no help from examiner. Child’s walking movements were not continuous. Had to stop walking at the edge of the stair or after taking a step or two on the floor.
- **“Walked down, integrated”**
Stepped down without falling and integrated with gait. With no help from examiner. Child’s walking movements were continuous.
- **“Jumped or leaped & fell”**
Jumped with two feet or leaped with one foot, but fell. Examiner intervened and caught child or child fell to floor.
- **“Jumped or leaped no fall”**
Jumped with two feet or leaped with one foot without falling.

Pausing and Resuming, Stopping or Skipping the Test

If you need to pause the test for any reason, use the three-finger slide from right to left ([administrative gesture](#)).

If you need to pause or stop while recording, you will need to re-record the event. If you need to pause or stop while answering questions, you will return to the place where you left off.

If you wish to Stop or Skip, you will be asked to provide a reason for doing so.

Reach to Eat

For more details and video examples, see the training video “**Reach to Eat**”.

Overview

This task assesses children’s reaching and tool-use behaviors. You will proceed through tasks depending on whether the child is “**successful.**” All tasks are administered on both hands; for each task, always administer the right hand first, followed by the left hand before going to the next task.

To ensure that child uses the target hand, ask the caregiver to gently hold the child’s non-target arm (not the hand). Caregiver should not hold child’s arm until you are ready to start the trial; caregivers often begin holding immediately, and children often object to the additional time constrained.

For older children who can follow instructions, point to the non-target hand and ask the child to put it below the table or to sit on it. Then point to or touch the target hand and ask the child to perform the task using the target hand.

Set-up

Figure 1 shows the set-up for all the tasks in “**Reach to Eat**”. Place the iPad on the table, so the camera is recording from an orthogonal view. Put the iPad on the side away from the hand you will use to hold the cup in place. Hold the cup with your non-dominant hand (so iPad is placed on your dominant-hand side).

For younger infants, the caregiver will hold the child in their lap, with the child facing the table, supporting the child by holding them at the armpits, chest, or hips as needed. The child needs to be fully upright and supported, not slumped or hunched. The caregiver should scoot forward in their chair until the child’s chest is just touching the front edge of the table.

Make sure the caregiver is holding the child up enough to comfortably reach the tabletop. Adjust the table height or caregiver’s chair height so that the tabletop is at the appropriate level (approximately below child’s elbows) so that the child does not need to reach upward. Ensure that the child’s target arm is above the table before starting the task.

For older children, ask the child to sit at the table on their own chair. Adjust the table height or chair position so that the child’s chest is just touching the front edge of the table, and the tabletop is at the appropriate level (approximately below child’s elbows) so that the child does not need to reach upward. Ensure that the child’s target arm is above the table before starting the task.

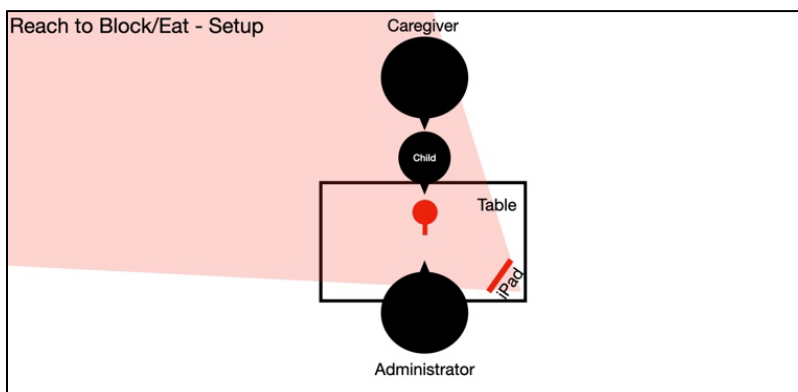


Figure 1. Set up for Reach to Eat (all tasks)

Materials: (see [Appendix 1](#) for details)

“Large base” = 1-cup size measuring cup with a flat base, diameter of approximately 8.25 cm (3.25 in), and a flat handle attached to the bowl of the cup

“Small base” = Formula spoon with a flat base, diameter of approximately 2.5 cm (1 in), and a flat handle attached to the bowl of the spoon.

Approximately 10 cheerios or similarly sized dry cereal or puff snack child likes (must be a snack that “melts” in child’s mouth to prevent choking)

1-inch (2.5 cm) wooden cube

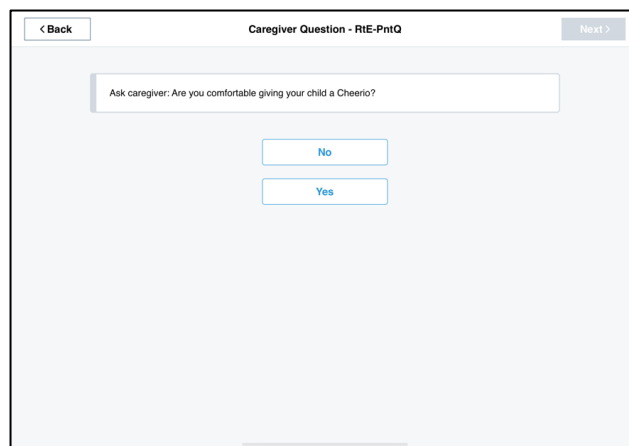
1 spoon (approximately 6.2 inches (15.75 cm long) with a 1.25 in (3.18-cm) diameter bowl.

Tissues to dry off spoon

Hand sanitizer (to clean child’s hands before they eat food and before you touch food that they will eat)

Caregiver Questions

For children at least 6 months of age, prior to beginning the recording, the app will prompt you to ask the caregiver, “**Are you comfortable giving your child a Cheerio?**”



It is not necessary for the child to eat Cheerios to administer the Cheerio task, but it is necessary for the child to eat a small, dry snack that quickly dissolves in the mouth. So, “no” answers really specify that the child does not eat solid food, or the child does not eat a small dry replacement snack.

Do not administer the task using fresh fruit, cheese, or other food items that are hard, because the child may choke.

- If the caregiver says “**No**”, you will administer the Block task.
- If the caregiver says “**Yes**”, you will administer the Cheerio task.
- If the child is under 6 months of age, you will administer the Block task.

Block Task

Brief summary

Figure 2 gives an overview of the Block task for Reach to Eat and a phot of the task with the large base. The examiner begins the task by encouraging the child to grasp the block from the large base, testing first the right hand and then the left hand. If the block falls to the table, encourage the child to grasp the block from the table. The trial ends when the child grasps the block, the block falls to the floor, or 30 seconds elapse, whichever occurs first.

Detailed description

The block task has 2 trials, first the right hand, then the left hand.

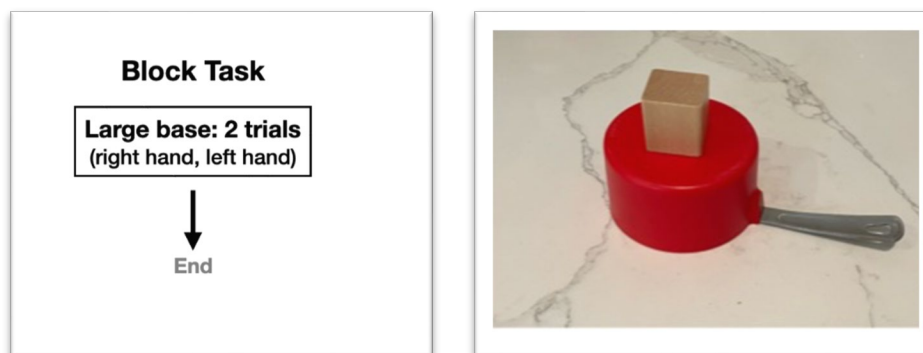


Figure 2. Overview of Block task for Reach to Eat & photo of task with large base

First administer the block task on child's right hand. Hold the overturned measuring cup (large base) by the handle with your non-dominant hand and place the block on top of the base with your dominant hand (so that you don't obstruct the camera view with your non-dominant hand while child performs the task). Ask the caregiver to gently hold the child's left arm.

Use both hands to move the base and block to midline in front of the child within easy reach (about half the child's arm's length away from the child's chest). When the base is in position, let go of the block and quickly pull your dominant hand back, but continue to hold the base down by the handle with your non-dominant hand so that it cannot move if the child bumps it.

Be sure your hand and arm holding the base do not obstruct either the child's access to the block or the camera view.

If the child does not immediately notice the block, you can draw their attention to it by pointing to the block and saying things like "**Look at that!**" and "**What's this?**" If your words still do not draw the child's attention to the block, you can pick the block up and hold it in their line of sight until they notice it or bang it lightly against the measuring cup while saying things like "**Look at this!**" before returning it to the measuring cup. If the child is focused on you instead of the block, disengage eye contact and watch the child through the iPad screen instead of directly looking at the child.

As soon as the child grasps the block, immediately remove the base.

If the child knocks the block off the base to the table, immediately remove the base, and encourage the child to grasp the block from the table. (If you leave the measuring cup on the table, children often become distracted by the cup and want to play with it instead of the block, and it sometimes impedes

a subsequent grasp).

After you administer the Block task on the child's right hand, administer the task again on the child's left hand, asking the caregiver to gently hold down the child's right hand.

Cheerio Task

Brief summary

Encourage the child to grasp the cheerio from the small base, testing first the right hand and then the left hand. If Cheerio falls onto the table, encourage the child to grasp the Cheerio from the table. The trial ends when the child grasps the Cheerio, or the Cheerio falls to floor, or 30 seconds elapse, whichever occurs first.

Detailed description

The Cheerio task always begins with two trials with the small base (one trial to test the child's right hand, followed by one trial to test the child's left hand).

Based on the child's success with the small base (grasps Cheerio with either hand), you will either administer two trials with the large base (first right hand, then left hand) or you will administer four trials (two to right hand and then two to left hand) with the spoon inside the large base (**Figure 3**).



Figure 3. Task overview of Cheerio task for Reach to Eat and photo of task

Small Base Trials

First administer the small base to the child's right hand. Hold the overturned formula scoop (small base) by the handle with your non-dominant hand and hold the Cheerio on top of the base with your dominant hand. Ask the caregiver to gently hold the child's left arm.

Use both hands to move the base and cheerio to midline in front of the child within easy reach (about half the child's arm's length away from the child's chest). When the base is in position, let go of the cheerio and quickly pull your dominant hand back, but continue to hold the base down by the handle with your non-dominant hand so that it cannot move, if the child bumps it.

Be sure your hand and arm holding the base do not obstruct either the child's access to the Cheerio or the camera view.

If a younger child does not immediately reach for the Cheerio, point to it and encourage them by saying things like **“Can you get it?”** and **“Look, eat the Cheerio, yum yum!”** For older children, you can just say **“OK, go!”**

If the child still does not reach, pick up the Cheerio and mime eating it, saying things like “**Yummy.**” If the child is focused on you instead of the Cheerio, disengage eye contact and watch the child through the iPad recording instead of directly looking at the child. As soon as the child reaches for the Cheerio, immediately remove the base.

If the child knocks the Cheerio off the base to the table, immediately remove the base, and encourage the child to grasp the block from the table. (If you leave the formula scoop on the table, children often become distracted by the scoop and want to play with it instead of the Cheerio and it sometimes impedes a subsequent grasp).

After you administer the small base to the child’s right hand, administer the task again on the child’s left hand, asking the caregiver to gently hold the child’s right arm.

Determining next items

If the child succeeded in lifting the Cheerio from the small base on at least one trial (with either hand), proceed to the spoon trials. If the child did not succeed with either hand on the small base, proceed to the large base trials.

“**Success**” means that the child grasped and lifted the cheerio directly from the base without letting it fall to the table. “**Failure**” means any other outcome—not reaching for the Cheerio, failing to grasp the Cheerio, knocking the Cheerio to the table prior to grasping, knocking the Cheerio to the floor prior to grasping, or grasping the Cheerio from the table.

Large base trials

Large base is administered exactly like small base, but with the Cheerio on the large base.

Spoon trials

You will administer four spoon trials in the following order: Right hand easy, right hand hard, left hand easy, left hand hard (**See Figure 4**). Place the 1 cup measuring cup right side up so that it sits on the table.

For easy trials, place the spoon inside the cup with the handle up and pointed in the direction of the child’s target hand. Place the Cheerio in the bowl of the spoon.

For hard trials, place the spoon inside the cup with the handle up and pointed away from the child’s target hand. Place the Cheerio in the bowl of the spoon.



Figure 4. Positioning of cup, spoon handle, & child for easy & hard spoon task for “Reach to Eat”

Prior to the first easy trial, demonstrate how to use the spoon: Grasp the spoon using an underhand precision grip (normal adult grip when using a spoon, see **Figure 5**) and mime eating the Cheerio from spoon.

Say “**Can you use the spoon to eat the Cheerio like this?**” and “**Yum yum yum**” as you bring the Cheerio to your mouth. (Do not actually touch the spoon to your mouth or eat the Cheerio.)



Figure 5. Photo of demonstrating spoon task for Reach to Eat

First administer the spoon to the child’s right hand. Hold the cup by the handle with your non-dominant hand and hold the spoon handle (with Cheerio inside bowl of spoon) with your dominant hand. Ask the caregiver to gently hold the child’s left arm. Use both hands to slide the cup and spoon to midline in front of the child within easy reach (about half the child’s arm’s length away from the child’s chest).

When the cup is in position, let go of the spoon and quickly pull your dominant hand back, but continue to hold the cup by the handle with your non-dominant hand so that it cannot move if the child bumps it.

Be sure your hand and arm holding the cup do not obstruct either the child’s access to the spoon or the camera-view. Encourage the child to grasp the spoon in order to eat the Cheerio.

If the child tries to grasp the Cheerio directly from the bowl of the spoon, pull the cup back, again mime using the spoon to eat the Cheerio, and then present the cup and spoon again.

If the child is focused on you instead of the spoon, disengage eye contact and watch the child through the iPad recording instead of directly looking at the child.

After the child has grasped the spoon (or insisted on picking up the Cheerio from the bowl of the spoon), dry the spoon with a tissue (so Cheerio doesn’t stick to the spoon), and administer the hard spoon trial to the child’s right hand (handle pointed away from their hand).

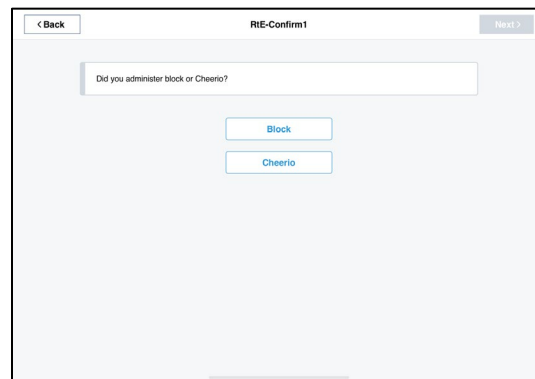
After administering the easy and hard trials to child’s right hand, ask caregiver to gently restrain child’s right hand and administer easy followed by hard spoon trials to child’s left hand.

Scoring “Reach to Eat”

(Note: we repeat the same questions and codes across both hands and both bases. So, be careful that you are answering for the correct hand and correct base. Here, we show codes only for the right hand and one base. You will see the same questions for both hands and both bases; coding rules are the same for all.)

Block Trials

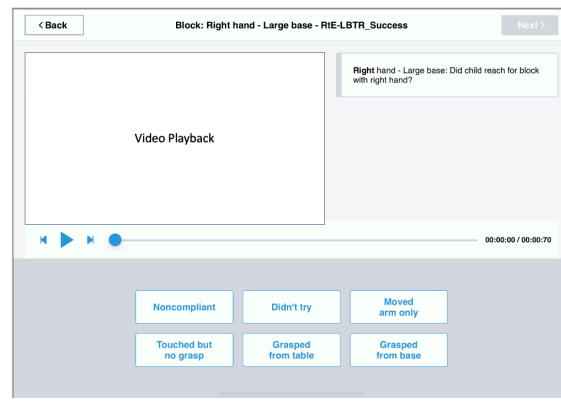
“Did you administer block or Cheerio?”



The screenshot shows a mobile application interface with a title bar containing '< Back' on the left and 'Next >' on the right. The main content area has a text input field with the question 'Did you administer block or Cheerio?'. Below the input field are two buttons: 'Block' and 'Cheerio'.

- “Block”
- “Cheerio”

“Right hand – Large base: Did child reach for block with right hand?”

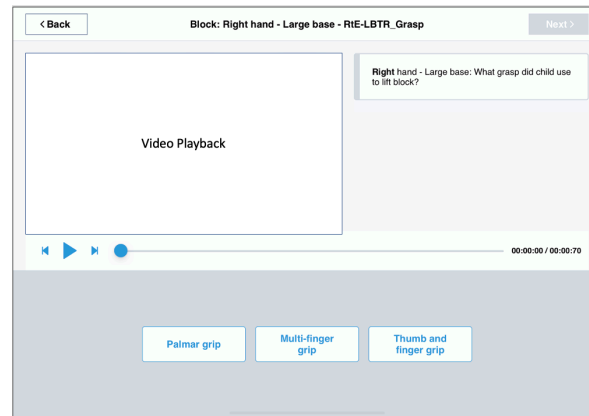


The screenshot shows a mobile application interface with a title bar containing '< Back' on the left and 'Next >' on the right. The main content area is split into two sections. The left section is a video player with the text 'Video Playback' and a progress bar at the bottom showing '00:00:00 / 00:00:70'. The right section contains the question 'Right hand - Large base: Did child reach for block with right hand?'. Below the video player and question are six buttons: 'Noncompliant', 'Didn't try', 'Moved arm only', 'Touched but no grasp', 'Grasped from table', and 'Grasped from base'.

- “Noncompliant”
Repeatedly pulled restrained (left) hand out to try to reach with restrained (left) hand.
- “Didn’t try”
- “Moved arm only”
Child moved arm, but never contacted block.
- “Touched but no grasp”
Child’s hand touched block, or knocked block off base, but did not grasp block and lift it off base or table.

- **“Grasped from table”**
Child knocked block to table, then grasped and lifted block off table.
- **“Grasped from base”**
Child grasped block and lifted it off base.

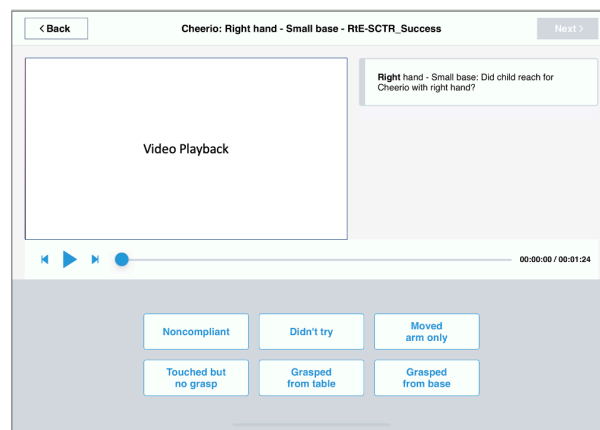
“Right hand – Large base: What grasp did child use to lift block?”



- **“Palmar grip”**
Whole hand grasped block. Fingers curled around block and held block against palm.
- **“Multi-finger grip”**
Thumb and 2-4 fingers grasped block. Block held in fingers, not against palm.
- **“Thumb & finger grip”**
Block held between thumb and one other finger.

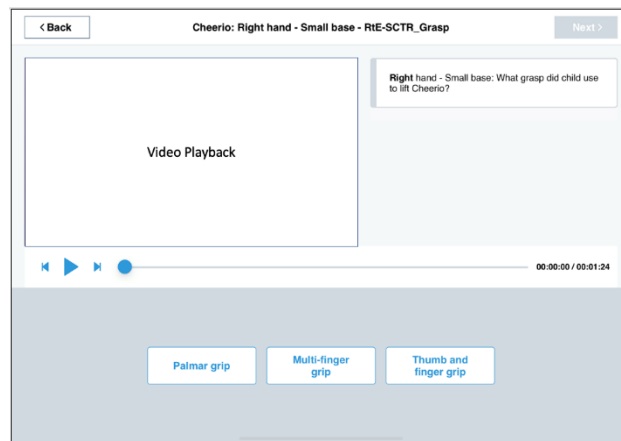
Cheerio Trials

“Right hand – Small base: Did child reach for Cheerio with right hand?”



- **“Noncompliant”**
Repeatedly pulled restrained (left) hand out to try to reach with restrained (left) hand.
- **“Didn’t try”**
- **“Moved arm only”**
Child moved arm, but never contacted Cheerio
- **“Touched but no grasp”**
Child’s hand touched Cheerio, or knocked Cheerio off base, but did not grasp Cheerio and lift it off base or table.
- **“Grasped from table”**
Child knocked Cheerio to table, then grasped and lifted Cheerio off table.
- **“Grasped from base”**
Child grasped Cheerio and lifted it off base.

“Right hand – Small base: What grasp did child use to lift Cheerio?”

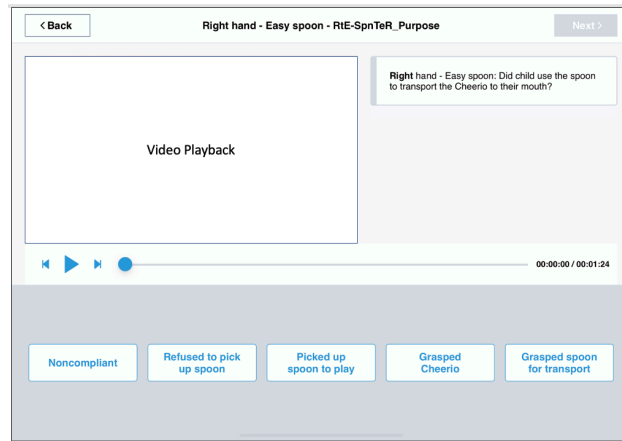


- **“Palmar grip”**
Whole hand grasped Cheerio. All four fingers curled into a fist with Cheerio encased within closed fingers.
- **“Multi-finger grip”**
Thumb and 2-4 fingers grasped Cheerio. Cheerio held in fingers or knuckles, not against palm.
- **“Thumb & finger grip”**
Cheerio held between thumb and one other finger.

(Repeat questions for Block or Cheerio for left hand)

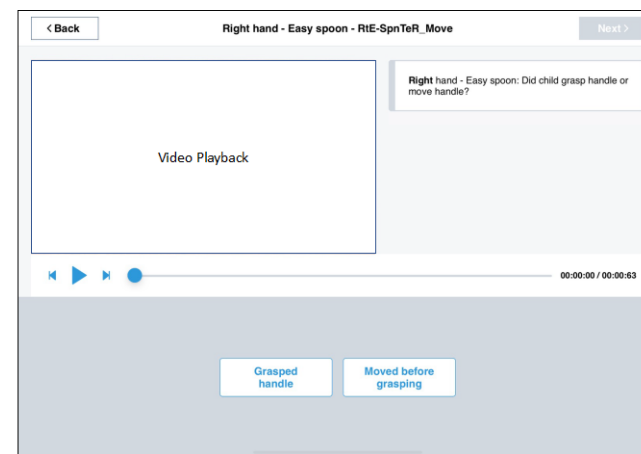
Spoon Trials

“Right hand – Easy spoon: Did child use the spoon to transport the Cheerio to their mouth?”



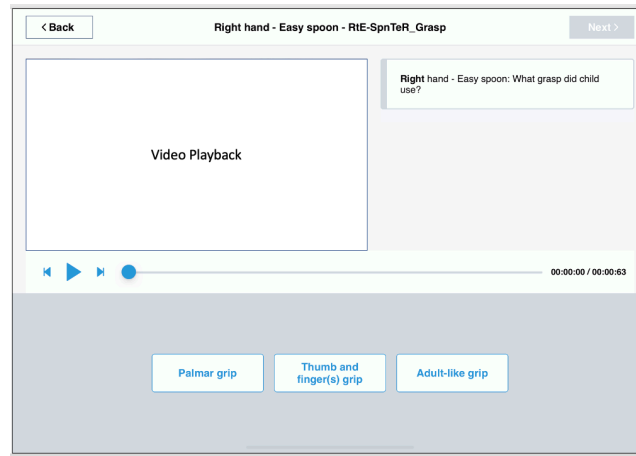
- **“Noncompliant”**
Repeatedly pulled restrained (left) hand out to try to reach with restrained (left) hand.
- **“Refused to pick up spoon”**
Uninterested in grasping spoon or Cheerio.
- **“Picked up spoon to play”**
Grasped spoon with right hand but did not try to transport Cheerio.
- **“Grasped Cheerio”**
Grasped Cheerio with right hand directly from bowl of spoon.
- **“Grasped spoon for transport”**
Grasped spoon with right hand to bring to mouth.

“Right hand – Easy spoon: Did child grasp handle or move handle?”



- **“Grasped handle”**
Grasped handle in the position it was presented.
- **“Moved before grasping”**
Rotated handle 180 degrees so that it was facing the reaching hand before grasping to lift.

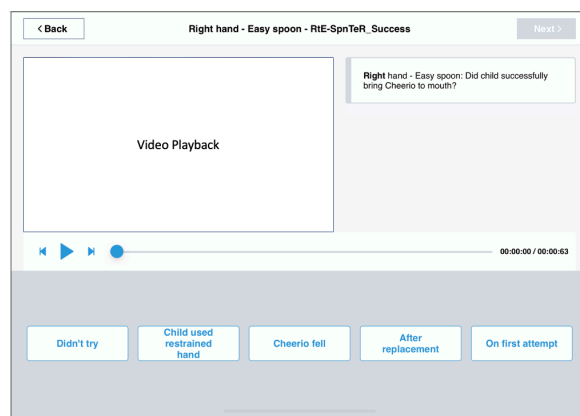
“Right hand – Easy spoon: What grasp did child use?”



Code grasp at the moment when the child lifts the spoon out of the cup. Do not code grasps before lifting the spoon or while moving the spoon to the other side of the cup. Children are unlikely to test out multiple grasps or move the spoon to the other side of the cup on easy trials.

- **“Palmer grip”**
Whole hand grasped spoon against palm. All four fingers curled into a fist with spoon encased within closed fingers.
- **“Thumb and finger(s) grip”**
Spoon held in fingers, not against palm. Also includes grasping spoon with thumb and pointer finger or thumb and another finger.
- **“Adult-like grip”**
Held spoon with thumb and fingers. Spoon handle rested against pointed finger or incrook of hand.

“Right hand – Easy spoon: Did child successfully bring Cheerio to mouth?”



- **“Didn’t try”**
Child did not try to bring Cheerio to mouth.
- **“Child used restrained hand”**
Child got restrained (left) hand out and used it to touch Cheerio or spoon.
- **“Cheerio fell”**
Cheerio fell. Child then ate Cheerio with hands, lost Cheerio, or replaced Cheerio on spoon but dropped on next attempt.
- **“After replacement”**
Cheerio fell. Child then replaced Cheerio on spoon and successfully brought it to mouth.
- **“On first attempt”**
Child brought Cheerio directly to mouth

(Repeat questions for hard Spoon, and then easy and hard spoon for left hand)

Pausing and Resuming, Stopping or Skipping the Test

If you need to pause the test for any reason, use the three-finger slide from right to left ([administrative gesture](#)).

If you need to pause or stop while recording, you will need to re-record the event. If you need to pause or stop while answering questions, you will return to the place where you left off.

If you wish to Stop or Skip, you will be asked to provide a reason for doing so.

Sit and Stand (experimental)

Sit and Stand test assesses stationary postural control. Place the child in sitting and standing postures and see how long they can stay in that position

This is an experimental test. Contact NIH Baby Toolbox Support if you wish to use it.

<https://nihbabytoolbox.org/support/>

Chapter 7: Social-Emotional

Introduction to Social Observation Measure

For more details and video examples, see the training video: *“Intro to Social Observation Measure”*

Overview

The **“Social Observation Measure” (SOM)** provides a means of assessing social functioning in young children, ages 9-42 months, in both a semi-structured administrator-led interaction and in a less-structured caregiver-child interaction.

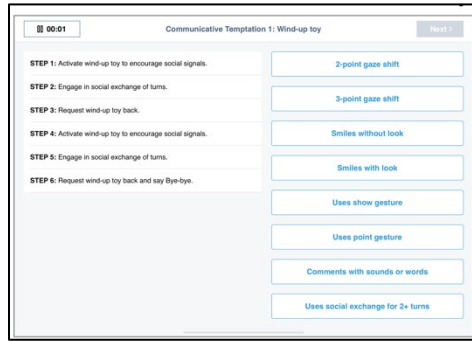
The combination of these two contexts allows us to assess children’s social functioning in response to specific, standardized verbal prompts and probes, and during the course of more spontaneous social interactions with the caregiver or caretaker.

Three inter-related constructs are central to social functioning; these are:

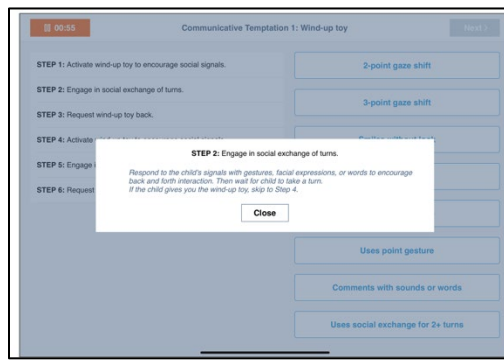
1. **Social communication:** Involves joint attention, recognizing and responding to others’ communicative behaviors, sharing one’s own intentions in communication, and using the intentions of others to guide one’s own behavior. Social communication also includes following conversational rules related to initiating and maintaining reciprocity in conversations, repairing miscommunications, following communicative conventions, and taking into account the perspective of others in social interactions and communication.
2. **Prosocial behavior:** Includes voluntary actions intended to benefit others; these include helping people to achieve their goals, sharing resources with others, and comforting others when they are in distress.
3. **Intentional Actions/Pretend play:** Or acting **“as if”**, is a type of symbolic play. It involves the use of objects, actions, or ideas to represent other objects, actions, or ideas, as well as the assignment of roles to inanimate objects or people. Basic forms of pretend play are present by the age of 18-months or earlier; however, pretend play becomes increasingly symbolic, abstract and sophisticated as children age.

There are two versions of this measure: One for children ages 9-23 months and the other for children 2-4 years (24-42 months). “The Social Observation Measure” (SOM) is a performance-based measure that yields a 10-minute assessment for each version.

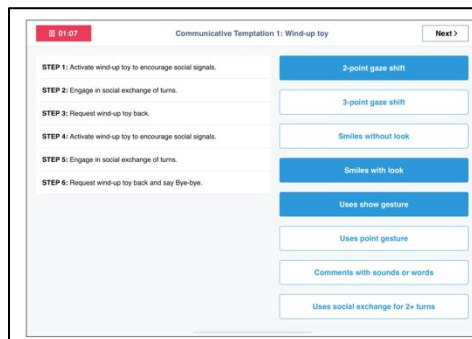
Both versions use the same type of screen that looks like the one shown below:



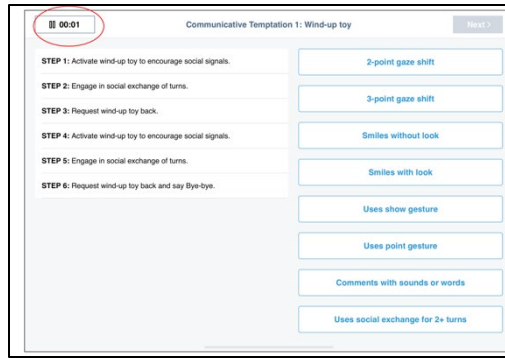
You will see an interval title at the top, a reminder of the actions for administration on the left, and the behaviors to code in that interval on the right. There is also a timer in the top left to help you keep track of the interval timing.



Clicking on a step in the instructions will bring up a pop-up with a more detailed reminder of what to do. These details should be memorized when you are administering the measures and used primarily to help you in practice.



You will select any behaviors observed during the interval by tapping on them; unselect them by tapping a second time at the end of the interval. You tap **“NEXT”** to record the scores. You cannot go back to an earlier screen once you tap “NEXT”.



The timer helps you keep each interval to the suggested time. It will make a ding 10 seconds before the next interval begins to let you know when you are close to the end. This is when you should record your scores. If you have not done so, the app will ding again at the minute mark, letting you know that you should press “**NEXT**” and move on to the next interval. If necessary, you can pause the timer, but this should primarily be used only in practice.

Practicing this measure

This task involves a lot of manipulatives. The good news is that the children really love it. The bad news is that it is a lot to keep track of. All the materials need to be prepared in bags or boxes by intervals so that they are easy to find. You will want to practice taking them out and putting them back. You have limited time during administration.

Practicing is the best way to prevent wasting time and having a less than smooth administration. At the end of each interval, it is easiest to just toss the manipulatives into a large bucket or bin on one side of the table so that you can clean and sort them later.

Pausing and Stopping

If you need to pause the test for any reason, use the three-finger slide from right to left ([*administrative gesture*](#)).

If you need to pause or stop during the social observation measures, know that you will start again at the same interval where you paused. Pausing will bring you back to the same time where you left off, but stopping and resuming later will bring you back to the start of the interval. It is advisable to only pause between intervals so as not to interfere with the timing.

Social Observation Measure Younger (9-23 months)

For more details and video examples, see the training video: “SOM Younger Part 1” and “SOM Younger Part 2”.

Overview

This measure consists of 10 minutes and covers 3 contexts:

- 1) Communicative temptations that encourage social communication and reciprocal social interaction;
- 2) Probes that encourage social attention and social communication; and
- 3) Semi-structured play opportunities.

For each minute (interval), the examiner provides the child with a defined set of toys that are designed to stimulate the child to engage in the desired behaviors. The examiner should present all the steps in a total of 10 minutes. If the child refuses a step, the examiner should try to encourage the child or ask the parent to encourage the child, and then move on to the next step.

The caregiver will position the child in a supported seat or highchair, limiting mobility that is appropriate for the child’s age. The examiner will gather the materials for the age interval and set up the opportunities for the child. During the last 4 minutes (Part 2), the parent will be invited to sit closer to the child and the examiner will provide instructions to the parent on what to do for the parent-child play context.

Manipulatives: (see [Appendix 1](#) for details)



Recommended manipulative organization:

- **Bin 1:** Minutes 1 & 2 (wind-up toy, car)
- **Bin 2:** Minute 3 (jar, figure, koosh ball)
- **Bin 3:** Minutes 5-6 (board books)
- **Bin 4:** Minute 7: Baby and feeding set #1

- **Bin 5:** Minute 8: Feeding set #2, pot with lid, spatula
- **Bin 6:** Minute 9: Large bowl and serving spoon

Instructions for the Examiner to Respond to Child

During the 10 minutes of the “**Social Observation Measure**”, use the following strategies to respond to the child’s social signals and keep the interaction going with back-and-forth turns between the child and examiner (or caregiver).

Follow the instructions for setting up each minute and wait for the child to initiate a turn (verbal or nonverbal). Then take a turn in response to each of the child’s social signals by using any of the following:

- 1) Name the object or picture the child is looking at
- 2) Make a sound effect that goes with the object or picture the child is looking at
- 3) Describe what the child is looking at or doing with their hands
- 4) Repeat a word that the child says (or tries to say) and add a word, or Make an emphatic or affirmative comment (“**Ooooh, wow, great, you got it, way to go**”).

Then give the turn back to the child to provide an opportunity for more social exchanges. Respond **ONCE** and then **WAIT** for the child to respond themselves.

If child does not respond, talk about what the child is looking at or doing. Try not to ask questions or tell the child what to do.

Coding Manual

Below are the Social Observational Measure Rating Scales for Ages 9-23 Months

In the Baby Toolbox, the social behaviors are observed and rated live during each minute interval. The examiner leaves a behavior unchecked if they did not observe the behavior. Some behaviors are scored only during specific minutes.

Scored during the first 6 intervals

- **Social Attention to Face** is checked when you observe a 2-point gaze shift or 3-point gaze shift. If you observe a 3-point gaze shift, the child also gets credit for 2-point gaze shift.
- **Shared Enjoyment** is checked every minute that you observe the child showing or sharing enjoyment.
- **Shares Interest** is checked when you observe the child use a show, point, and/or comment for a total score of 0-9.

Shares attention

Child directs attention by looking toward the face of the examiner or parent. Children first learn to shift attention from an object or material to a face and to linger briefly, and then to shift attention between an object a face to notice to notice if the person is looking at the same object and to monitor their reaction.

- **Response to name**

Child responds to their name by turning toward or looking at the person. The child's response must be immediate. The child's name must be presented with no other active or significant contextual cues (*e.g., gesture, sound effect, touching the child, leaning in close to the child, other words or instructions following the name*) to be considered an opportunity for response to name. The child cannot be already looking at the person.

- **Follows gaze/point**

Child follows the direction of a look or point across the table or off to the side of the child when the examiner looks at, points to the target, and/or says "**Look**".

- **2-point gaze shift:** When the child shifts their gaze from an object/material to a face OR when the child shifts their gaze from a face to an object/material.
- **3-point gaze shift:** When the child shifts their gaze from an object/material to a face and then back to the object OR when the child shifts their gaze from a face to an object/material and then back to a face.

Shares enjoyment:

Child uses a clear facial expression of pleasure, joy, or excitement (large smiles). These expressions may be on the child's face as they engage in an activity or directed toward a person with eye gaze to express warmth, joy, or enjoyment in order to draw attention to self or share enjoyment.

- **Smiles without look:** Expression on child's face without looking at a person.
- **Smiles with look:** Has expression of please on face and looks at a person.

Shares interests

Child draws another person's attention to an object or picture of interest using a gesture or word directed to another person with gaze to face (immediately before, during, or after a 2-point or 3-point gaze shift) to share their interest.

- **Uses show gesture:** Child holds up an object toward another person to share their interest as if to say: "**Look at this**". The child is not giving the object to the other person but rather wants the other person to look at and notice the object to share their interest.
- **Uses point gesture:** Child points with their index finger to share their interest. The point may be in contact with an object, picture, or may be at a distance to an object near to or out of the child's reach. The index finger needs to be separated from the other fingers, and the three other fingers and thumb may or may not be pulled back.
- **Comments with sounds or words:** Child uses a word or word combination to name or describe an object or picture to share their interest.

- **Play:** Child uses actions with toys or objects in a social context.
- **Explores features of object:** Uses actions to explore the physical features of objects, such as mouths, shakes, drops, bangs, puts in or out, puts on or takes off, pushes, turns over, pats.
- **Uses object functionally:** Uses functional actions with objects that are purposeful or goal-directed, and are the conventional or common use of objects, such as hugs, stirs, scoops, takes a bite, pours from one object to another, wipes or rolls back and forth, opens and closes, covers and uncovers).
- **Pretends toward other (parent, examiner, or doll):** Uses a play action toward another to pretend (*feeds doll with bottle or spoon; hugs doll*)
- **2 Pretend action sequences:** Uses 2 pretend actions in a row, one right after the other (*e.g., scoops and takes a bite; pours from bottle to cup and takes a drink*)
- **3 Pretend action sequences:** Uses 3 or more pretend actions in a logical sequence (*e.g., stirs in bowl, pours onto plate, and takes a bite; jiggles pan, flips with spatula, and serves onto plate.*

Scored during intervals 2 and 4 only

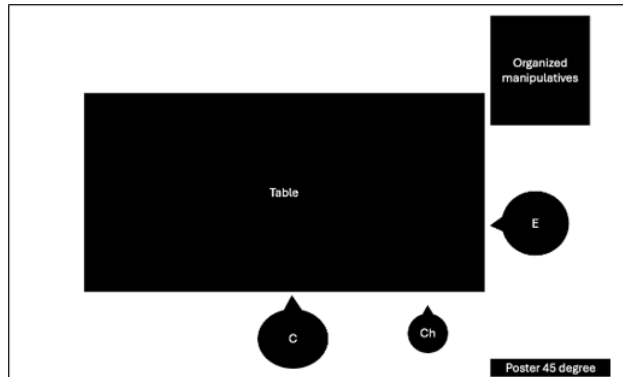
- **Social Probes**—Response to name and Gaze/point follow are presented two times each and checked when you observe the social response for each probe. Total score is 0-4.

Scored during intervals 7-10 only

- **Play actions** are checked when you observe each level of play actions from Explores to 3 Pretend Actions. If you observe 3 pretend actions, the child also gets credit for 2 pretend actions. Additional details are given below:
- **Explores features of object:** Uses actions to explore the physical features of objects, such as mouths, shakes, drops, bangs, puts in or out, puts on or takes off, pushes, turns over, pats
- **Uses object functionally:** Uses functional actions with objects that are purposeful or goal-directed, and are the conventional or common use of objects, such as hugs, stirs, scoops, takes a bite, pours from one object to another, wipes or rolls back and forth, opens and closes, covers and uncovers.
- **Pretends toward other (caregiver, examiner, or doll):** Uses a play action toward another to pretend (*feeds doll with bottle or spoon; hugs doll*)
- **2 Pretend action sequences:** Uses 2 pretend actions in a row, one right after the other (*e.g., scoops and takes a bite; pours from bottle to cup and takes a drink*)
- **3 Pretend action sequences:** Uses 3 or more pretend actions in a logical sequence (*e.g., stirs in bowl, pours onto plate, and takes a bite; jiggles pan, flips with spatula, and serves onto plate.*)

Administration: Instructions

Room Set-up



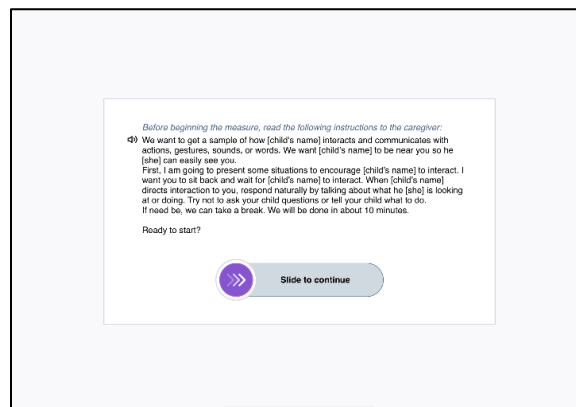
The measure opens with a set of instructions to the caregiver that are read prior to beginning the tasks. These instructions read:

“We want to get a sample of how [child’s name] interacts, responds, and communicates with actions, gestures, sounds, and words. We want [child’s name] to be near you so he [she] can easily see you.

First, I am going to present some situations to encourage [child’s name] to interact. I want you to sit back and wait for [child’s name] to interact. When [child’s name] directs interaction to you, respond naturally by talking about what he [she] is looking at or doing. Try not to ask your child questions or tell your child what to do.

If need be, we can take a break. We will be done in about 10 minutes. Ready to start?”

(Below is a picture of the iPad screen with the Instructions for caregiver/parent)



Interval (Minute) 1: Communicative Temptation #1: Wind-up toy

Toys needed

Wind-up toy

Instructions

- **Step 1: Activate the windup toy to encourage social signals**
Activate wind-up toy and let it move toward the child. Wait 10 seconds for child to share attention, enjoyment, or interest with social signals (show, point, sound, word, 2+ turns).
- **Step 2: Engage in social exchange of turns**
Respond to child's signals with gestures, facial expression, and/or words to encourage back and forth interaction. Then wait for the child to take a turn.
Note: If the child gives you the wind-up toy, skip to Step 4. [pause to code]
- **Step 3: Request wind-up toy back**
Hold out your hand palm up and say, "**Give it to me**". If the child does not respond, gently take the windup toy.
- **Step 4: Activate wind-up toy to encourage social signals**
Activate wind-up toy, and let it move toward the child. Wait 10 seconds for child to share attention, enjoyment, or interests with social signals (show, point, sound, word, 2+ turns).
- **Step 5: Engage in social exchange of turns**
Respond to child's signals with gestures, facial expression, and/or words. Then wait for the child to take a turn.
*Note: If the child gives you the wind-up toy, skip to end of Step 6 to say "**Bye-bye**". [pause to code].*
- **Step 6: Request wind-up toy back**
Hold out your hand palm up to request windup toy, and say: "**Bye-bye, toy, bye-bye**" and wave as you remove the toy.

The iPad screen for this activity has a reminder of the instructions on the left side and on the right side, it has the boxes for scoring the child's actions and reactions. If the examiner wants a reminder of a specific instructional step, they should tap the step number next to the reminder and a detailed instruction will appear. Tap "**Close**" to return to the scoring screen.

Interval 1 Scoring

00:04	Communicative Temptation 1: Wind-up toy	Next >
STEP 1: Activate wind-up toy to encourage social signals.	2-point gaze shift	
STEP 2: Engage in social exchange of turns.	3-point gaze shift	
STEP 3: Request wind-up toy back.	Smiles with looks	
STEP 4: Activate wind-up toy to encourage social signals.	Uses show gesture	
STEP 5: Engage in social exchange of turns.	Uses point gesture	
STEP 6: Request wind-up toy back and say Bye-bye.	Comments with sounds or words	
	Uses social exchange for 2+ turns	

Refer to pages above for detailed descriptions in the section entitled [Coding Manual](#)

Scoring

- “Shares attention”
- “2-point gaze shift”
- “3-point gaze shift”
- “Shares enjoyment”
- ”Smiles without look”
- ”Smiles with look”
- “Shares interests”
- “Uses show gesture”
- “Uses point gesture”
- “Comments with sounds or words”

Once you see a listed behavior, check it. After the behavior is checked, it does not need to be checked again during this 1-minute interval. Refer to Scoring table for the definitions, behaviors that are scored for this minute:

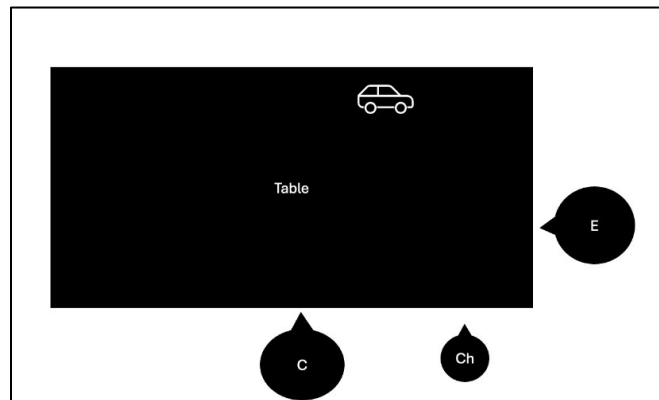
Interval (Minute) 2: Response to Name & Gaze/Point Probe #1

Toys needed

Toy car

Set-up

Toy car needs to be placed before beginning the assessment and in front of the child, off to the side, and within reach of the examiner, as shown below:



If the child becomes distracted by the toy car as soon as it's placed, acknowledge the car **“Yes, there it is”** and then proceed to attract the child's attention.

Instructions

➤ Step 1: Call child's name

When the child is not looking at you, call child's name. Give child 3 seconds to respond. Repeat up to 3 times if needed. Immediately do Step 2 once you have their attention.

- If child never responds to their name, tap child, the table, or clap gently to get their attention before doing step 2 (no credit for Response to Name)

➤ Step 2: Point to car and say “Look”

Give child 3 seconds to look toward car. Repeat up to 3 times if needed.

➤ Step 3: Give child car to play with

- If child looks at the car, say **“You found it”** and hand the car to the child.
- If child does not look at car, try to get child to look in the direction by tapping on the car (but don't give child credit for gaze/point follow) before you hand the car to the child.
[pause to code]

➤ Step 4: Engage in social exchange of turns

Respond to child's signals (e.g., **“Yeah, isn't that a cool car?”**), to encourage back and forth interaction.

➤ Step 5: Request car or gently remove

Hold up hand palm up to request car and say: **“Give it to me”**, and **“Bye-Bye car”** while waving.

The iPad screen for this activity has a reminder of the instructions on the left side and on the right side, it has the boxes for scoring the child's actions and reactions. If the examiner wants a reminder of a specific instructional step, they should tap the step number next to the reminder and a detailed instruction will appear. Tap **“Close”** to return to the scoring screen.

Interval 2 Scoring

01:01 Response to Name & Gaze/Point 1 Next >

SET-UP: Place car in front of child, off to the side, and out of reach.

STEP 1: Call child's name up to three times. Tap child/table if necessary.

STEP 2: Point to car and say "Look!" up to three times. Tap car if necessary.

STEP 3: Give child car to play with.

STEP 4: Engage in social exchange of turns.

STEP 5: Request or gently remove car.

Response to name

Comments with sounds or words

Follows gaze/point

Uses social exchange for 2+ turns

2-point gaze shift

3-point gaze shift

Smiles without look

Smiles with look

Uses show gesture

Uses point gesture

Scoring

(Refer to pages above for detailed descriptions in the section entitled [Coding Manual](#))

- “Shares attention”
- “2-point gaze shift”
- “3-point gaze shift”
- “Responds to name”
- “Follows gaze/point”
- “Shares enjoyment”
- “Smiles without look”
- ”Smiles with look”
- “Shares interests”
- ”Uses show gesture”
- ”Uses point gesture”
- ”Comments with sounds or words”

Once you see a listed behavior, check it. After the behavior is checked, it does not need to be checked again during this 1-minute interval.

Interval (Minute) 3: Communicative Temptation #2

Toys needed

Small figure, stringy ball, and jar

Instructions:

➤ **Step 1: Hand child jar with figure.**

Put the small figure in the jar. Close the lid tightly Hand child jar and wait for child to request help opening jar or up to 10 sec.

➤ **Step 2: Open lid and give jar to child, engage in social exchange of turns.**

Place the open jar, with figure inside in front of child. Wait 10 sec for child to shift gaze, share enjoyment, or use social signals (give, show, point, vocalization) in social exchanges.

- Engage in social exchange of turns. Respond to the child's signals with gestures, facial expression, and/or words (*e.g.*, **"Look what's in there!"**). Then wait for the child to take a turn. [pause to code]

➤ **Step 3: Request jar back**

Hold out your hand palm up to encourage the child to give you the jar and figure. If the child does not respond, gently remove the jar and move on to step 4.

➤ **Step 4: Hand child jar with stringy ball**

Put the stringy ball in the jar. Close the lid tightly. Hand the child the jar and wait for the child to request help opening jar or up to 10 sec.

➤ **Step 5: Open lid and give jar to child, engage in social exchange of turns**

Place the open jar with stringy ball in front of the child. Let the child take the item out of jar. Wait 10 sec for child to shift gaze, share enjoyment, or use social signals (give, show, point, vocalization) in social exchanges.

- Engage in social exchange of turns. Respond to the child's signals with gestures, facial expression, and/or words (*e.g.*, **"Look what's in there!"**). Then wait for the child to take a turn. [pause to code]

➤ **Step 6: Request jar back:** Hold out your hand palm up to encourage child to give you the jar and ball. If the child does not respond, gently remove the jar and ball and say: **"Bye-bye, toy. Bye-bye jar"**

The iPad screen for this activity has a reminder of the instructions on the left side and on the right side, it has the boxes for scoring the child's actions and reactions. If the examiner wants a reminder of a specific instructional step, they should tap the step number next to the reminder and a detailed instruction will appear. Tap **"Close"** to return to the scoring screen.

Interval 3 Scoring

Step	Behavior
STEP 1: Hand child jar with figure.	2-point gaze shift
STEP 2: Open lid and give jar to child, engage in social exchange of turns.	3-point gaze shift
STEP 3: Request jar back.	Smiles without look
STEP 4: Hand child jar with stringy ball.	Smiles with look
STEP 5: Open lid and give jar to child, engage in social exchange of turns.	Uses show gesture
STEP 6: Request jar back and say bye-bye.	Uses point gesture
	Comments with sounds or words
	Uses social exchange for 2+ turns

Scoring

(Refer to pages above for detailed descriptions in the section entitled [Coding Manual](#))

- “Shares attention”
- “2-point gaze shift”
- “3-point gaze shift”
- “Shares enjoyment”
- “Smiles without look”
- “Smiles with look”
- “Shares interests”
- “Uses show gesture”
- “Uses point gesture”
- ”Comments with sounds or words”

Once you see a listed behavior, check it. After the behavior is checked, it does not need to be checked again during this 1-minute interval.

Interval (Minute) 4: Communicative Temptation #3; Probe 2

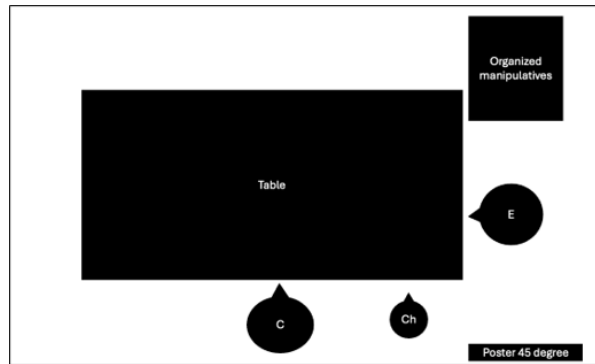
No New Toys Needed

Small figure already behind the child

Physical set up

Before beginning, the object should be placed on a table-height surface behind the child.

This is illustrated below:



Instructions – Communicative Temptation #3 (NOTE: Step 1 has different instructions for ages 9-15 months and ages 16-23 months)

(For children 9 to 15 months)

- **Step 1:** Play “Walk mouse, creep mouse” pausing for 3 seconds between phrases to share enjoyment. Repeat a second time. Then say “Bye-bye mousie” and wave.

(For children 16 to 23 months)

- **Step 1:** Play a game of “Itsy Bitsy Spider” with 3-second pauses between phrases to share enjoyment. Encourage child to copy your hand movements. Then say: “bye-bye spider” and wave [pause to code]

(All Ages: Response to Name and Gaze/Point follow Probe #2)

- **Step 2: Call child’s name:** When child is not looking at you, call child’s name. Give child 3 seconds to respond. Repeat up to 3 times if needed. Immediately do Step 5 once you have their attention.
 - **If child never responds to their name**, tap child, the table, or clap gently to get their attention before doing step 5 (No credit for Response to Name)
- **Step 3: Point to object/picture and say “Look”.** Give child 3 seconds to look toward object/picture. Repeat up to 3 times if needed.
- **Step 4: Label object/picture**
 - If child looks at the object/picture, label the picture or object
 - If child does not look at object/picture, try to get child to look in the direction by tapping on the wall, (but don’t give child credit for gaze/point follow) before you label the picture/object.
- **Step 5: Engage in social exchange of turns** about object/picture to encourage back and forth interaction [pause to code]

The iPad screen for this activity has a reminder of the instructions on the left side and on the right side, it has the boxes for scoring the child’s actions and reactions. If the examiner wants a reminder of a

specific instructional step, they should tap the step number next to the reminder and a detailed instruction will appear. Tap **“Close”** to return to the scoring screen.

Interval 4 Scoring

Step	Instruction	Scoring Category
SET UP:	Small figure should already be positioned behind the child.	Response to name
STEP 1 (If child is 9-15 months old):	Play 'Walk mouse creep mouse'. Repeat.	Comments with sounds or words
STEP 1 (If child is 16-23 months old):	Play 'Itsy-bitsy spider'.	Follows gaze/point
STEP 2:	Call child's name (up to 3 times). Tap the child or table if necessary.	Uses social exchange for 2+ turns
STEP 3:	Point to the object or picture and say 'Look' up to 3 times. Tap the wall if necessary.	2-point gaze shift
STEP 4:	Label object/picture.	3-point gaze shift
STEP 5:	Engage in social exchange of turns.	Smiles without look
		Smiles with look
		Uses show gesture
		Uses point gesture

Scoring

(Refer to pages above for detailed descriptions in the section entitled [Coding Manual](#))

- **“Shares attention”**
- **“2-point gaze shift”**
- **“3-point gaze shift”**
- **“Responds to name”**
- **“Follows gaze/point”**
- **“Shares enjoyment”**
- **“Smiles without look”**
- **“Smiles with look”**
- **“Shares interests”**
- **“Uses show gesture”**
- **“Uses point gesture”**
- **“Comments with sounds or words”**

Interval (Minute) 5: Sharing Books Part 1

Toys needed

Two books

Instructions:

- **Step 1: Allow child to select one of two books.**
Show the child two books and encourage the child to select one. Remove the book if the child does not select or give the child one book.
- **Step 2: Encourage social interaction by looking through the book with the child.**
Help the child turn pages, pausing on each page for up to 10 seconds to give the child opportunities to point, comment, or look at images.
- **Step 3: Point, name, or describe a picture the child is looking at if the child is not engaging.**
Look through four 2-page spreads. [pause to code]
- **Step 4: Remove first book: "Bye-bye book"**

The iPad screen for this activity has a reminder of the instructions on the left side and on the right side, it has the boxes for scoring the child's actions and reactions. If the examiner wants a reminder of a specific instructional step, they should tap the step number next to the reminder and a detailed instruction will appear. Tap **"Close"** to return to the scoring screen.

Interval 5 Scoring

Instructional Step	Scoring Action
STEP 1: Allow child to select one of two books.	2-point gaze shift
STEP 2: Encourage social interaction by looking through book with child.	3-point gaze shift
STEP 3: Point, name, or describe a picture to child if child is not engaging.	Smiles without look
STEP 4: Remove first book.	Smiles with look
	Uses show gesture
	Uses point gesture
	Comments with sounds or words
	Uses social exchanges for 2+ turns

Scoring

(Refer to pages above for detailed descriptions in the section entitled [Coding Manual](#))

- “Shares attention”
- “2-point gaze shift”
- “3-point gaze shift”
- “Shares enjoyment”
- “Smiles without look”

- “Smiles with look”
- “Shares interests”
- “Uses show gesture
- “Uses point gesture
- “Comments with sounds or words

Interval (Minute) 6: Sharing Books Pt. 2

Toys needed

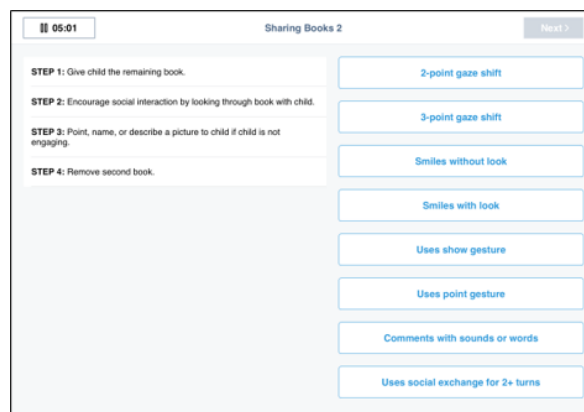
Two books

Instructions

- **Step 1: Give child the remaining book.**
- **Step 2: Encourage social interaction by looking through book with the child.** Help the child turn pages, pausing on each page for up to 10 seconds to give the child opportunities to point, comment, or look at images.
- **Step 3: Point, name, or describe a picture that the child is looking at if the child is not engaging.** Look through four 2-page spreads. [pause to code]
- **Step 4: Remove books and say, "Bye-bye books"**

The iPad screen for this activity has a reminder of the instructions on the left side and on the right side, it has the boxes for scoring the child’s actions and reactions. If the examiner wants a reminder of a specific instructional step, they should tap the step number next to the reminder and a detailed instruction will appear. Tap “Close” to return to the scoring screen.

Interval 6 Scoring



Scoring

(Refer to pages above for detailed descriptions in the section entitled [Coding Manual](#))

- “Shares attention”
- “2-point gaze shift”
- “3-point gaze shift”
- “Responds to name”
- “Follows gaze/point”
- “Shares enjoyment”
- “Smiles without look”
- “Smiles with look”
- “Shares interests”
- “Uses show gesture”
- “Uses point gesture”
- “Comments with sounds or words”

Intervals 7-10 of the measure

Before beginning, review the categories for coding the child’s behaviors; these are summarized below. For these intervals, all the codes involve **PLAY**. (Refer to pages above for detailed descriptions in the section entitled [Coding Manual](#)).

Play:

- **Explores features of object:** Uses actions to explore the physical features of objects, such as mouths, shakes, drops, bangs, puts in or out, puts on or takes off, pushes, turns over, pats
- **Uses object functionally:** Uses functional actions with objects that are purposeful or goal-directed, and are the conventional or common use of objects, such as hugs, stirs, scoops, takes a bite, pours from one object to another, wipes or rolls back and forth, opens and closes, covers and uncovers.
- **Pretends toward other (caregiver, examiner, or doll):** Uses a play action toward another to pretend (feeds doll with bottle or spoon; hugs doll)
- **2 Pretend action sequences:** Uses 2 pretend actions in a row, one right after the other (e.g., scoops and takes a bite; pours from bottle to cup and takes a drink)

- **3 Pretend action sequences:** Uses 3 or more pretend actions in a logical sequence (e.g., *stirs in bowl, pours onto plate, and takes a bite; jiggles pan, flips with spatula, and serves onto plate.*)

Interval (Minute) 7: Caregiver-child Play 1

Toys needed

Feeding Playset

Instructions

- **Step 1: Explain play activity to caregiver.**
Say: “Now I want you to move closer to your child. I will present the toys and want you to first watch your child play. After a minute, I will give you matching toys and tell you when to join in playing. Remember, don’t tell your child what to do.”
- **Step 2: Bring out Feeding Playset**
Bring out cup, then 1 small spoon, then doll and name each item as you place them in front of the child. Ask caregiver to help the doll to sit up.
- **Step 3: Encourage play**
Say: “The baby is hungry. Can you feed the baby?” or comment on the child feeding themselves [pause to code]
- **Step 4: Bring out small bowl and plate and continue to encourage play**
Place 1 small bowl and 1 plate close to child. Say “Baby is hungry, can you feed the baby?” to encourage pretend play.
- **Step 5: Engage with child - name actions or objects child is touching.**
Engage in social exchange of turns and encourage further pretend action sequences. [pause to code]

The iPad screen for this activity has a reminder of the instructions on the left side and on the right side, it has the boxes for scoring the child’s actions and reactions. If the examiner wants a reminder of a specific instructional step, they should tap the step number next to the reminder and a detailed instruction will appear. Tap “Close” to return to the scoring screen (minute 7).

Interval 7 Scoring

The screenshot shows a coding manual page titled "Caregiver-Child Play 2". At the top left, there is a timer icon and the text "07:37". At the top right, there is a "Next >" button. The page is divided into two columns. The left column contains four steps:

- STEP 1: Give feeding playset to the caregiver.
- STEP 2: Ask the caregiver to demonstrate pretend play (feeding).
- STEP 3: Bring out pan, lid and spatula from cooking playset.
- STEP 4: Ask the caregiver to encourage child to play.

The right column contains five blue buttons with white text, each corresponding to a step:

- Explores features of object
- 1 functional action with object towards self
- 1 pretend action towards other
- 2 pretend actions with 1 action towards other
- 3 pretend actions with 1 action towards other

Play

(Refer to pages above for detailed descriptions in the section entitled [Coding Manual](#)).

- **Explores features of object**
- **1 action with object toward self (functional actions)**
- **1 pretend action toward other (caregiver, examiner or doll)**
- **2 pretend actions with 1 action toward other**
- **3 pretend actions with 1 toward other.**

Interval (Minute) 8: Caregiver-child play 2

Toys needed

Feeding playset - matching items for caregiver, cooking playset

Instructions

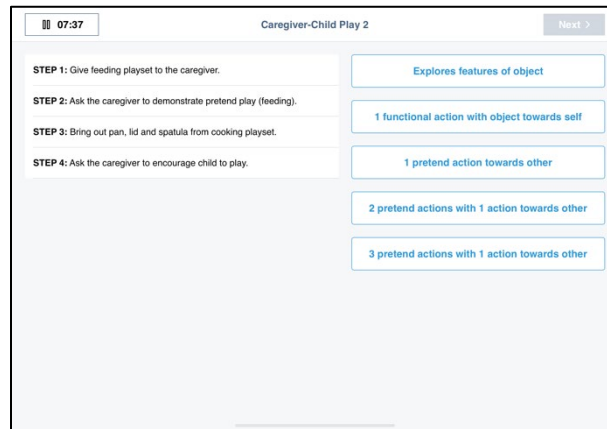
- **Step 1: Give feeding playset to caregiver.**
Place matching items from Feeding Playset (cup, small spoon, small bowl, plate) in front of caregiver.
- **Step 2: Ask caregiver to demonstrate pretend play (feeding).**
Say to caregiver, “Now I want you to show your child how to pretend with your toys and encourage your child to pretend to feed the baby.” Wait 20 seconds. [pause to code]
- **Step 3: Bring out pan, lid and spatula from cooking playset and place between caregiver and child**

➤ **Step 4: Ask caregiver to encourage child to play.**

Say to caregiver, “**I want you to keep feeding the baby and see what your child will do with these new toys but don’t show them yet. Just encourage your child to pretend to feed the baby.**” [pause to code]

The iPad screen for this activity has a reminder of the instructions on the left side and on the right side, it has the boxes for scoring the child’s actions and reactions. If the examiner wants a reminder of a specific instructional step, they should tap the step number next to the reminder and a detailed instruction will appear. Tap “**Close**” to return to the scoring screen (minute 8).

Interval 8 Scoring



Play

(Refer to pages above for detailed descriptions in the section entitled [Coding Manual](#)).

- “Explores features of object
- “1 action with object toward self” (functional actions)
- “1 pretend action toward other” (caregiver, examiner or doll)
- “2 pretend actions with 1 action toward other”
- “3 pretend actions with 1 toward other”.

Interval (Minute) 9: Caregiver-child Play 3

Toys needed

Cooking playset

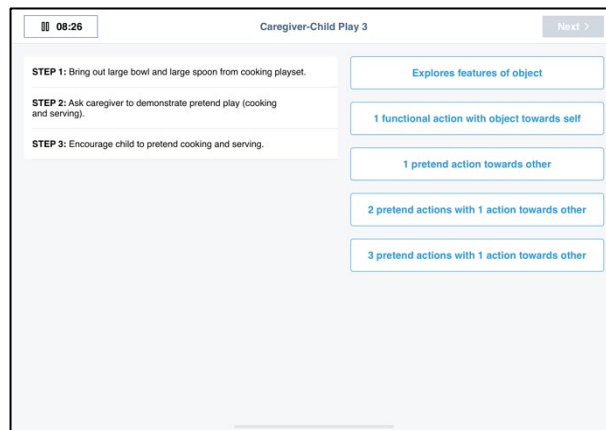
Instructions:

- **Step 1: Bring out large bowl and large spoon from cooking playset and place between caregiver and child.**

- **Step 2: Ask caregiver to demonstrate pretend play (cooking and serving)**
Say to caregiver, “**Now I want you to show your child how to pretend to cook and serve food.**” Wait 20 seconds.
- **Step 3: Encourage child to pretend cooking and serving:**
Say “**Make food for baby. Stir, stir**” or “**Pour, pour**” or other encouraging words. Wait for child to play with these toys and name actions you see child doing. [pause to code]

The iPad screen for this activity has a reminder of the instructions on the left side and on the right side, it has the boxes for scoring the child’s actions and reactions. If the examiner wants a reminder of a specific instructional step, they should tap the step number next to the reminder and a detailed instruction will appear. Tap “**Close**” to return to the scoring screen (minute 9).

Interval 9 Scoring



Play

(Refer to pages above for detailed descriptions in the section entitled [Coding Manual](#)).

- “**Explores features of object**”
- “**1 action with object toward self**” (functional actions)
- “**1 pretend action toward other**” (caregiver, examiner or doll)
- “**2 pretend actions with 1 action toward other**”
- “**3 pretend actions with 1 toward other**”

Interval (Minute) 10: Caregiver-child Play 4

Toys needed

Four toys

Instructions

- **Step 1: Offer one of the other toys from Minutes 1-4 for child to incorporate into play.**
Introduce other items (the stringy ball, a small figure, windup toy, vehicle), one at a time to the child to find a toy the child is interested in.
- **Step 2: Ask caregiver to demonstrate pretend play (cooking and serving):**
Say to caregiver, “**Keep showing your child how to pretend to prepare and serve food and encourage your child to pretend.**”
- **Step 3: Encourage child to pretend:**
Encourage the child to explore different toys and pretend at a higher level. At 15 seconds before the end, start collecting the toys and say “**What fun. We are all done. Time to say bye-bye to the toys and get ready to go.**”

The iPad screen for this activity has a reminder of the instructions on the left side and on the right side, it has the boxes for scoring the child’s actions and reactions. If the examiner wants a reminder of a specific instructional step, they should tap the step number next to the reminder and a detailed instruction will appear. Tap “**Close**” to return to the scoring screen (minute 10).

Interval 10 Scoring

Step	Instruction	Scoring
STEP 1	Offer one of the other toys from Minutes 1-4 for child to incorporate into play.	Explores features of object
STEP 2	Ask caregiver to demonstrate pretend play (cooking and serving).	1 functional action with object towards self
STEP 3	Encourage child to pretend.	1 pretend action towards other
		2 pretend actions with 1 action towards other
		3 pretend actions with 1 action towards other

Play

(Refer to pages above for detailed descriptions in the section entitled [Coding Manual](#)).

- **Explores features of object**
- **1 functional action with object toward self (functional actions)**
- **1 pretend action toward other (caregiver, examiner or doll)**
- **2 pretend actions with 1 action toward other**
- **3 pretend actions with 1 toward other.**

Pausing and Stopping

If you need to pause the test for any reason, use the three-finger slide from right to left ([administrative gesture](#)).

If you need to pause or stop during the social observation measures, know that you will start again at the same interval where you paused. Pausing will bring you back to the same time where you left off, but stopping and resuming later will bring you back to the start of the interval. It is advisable to only pause between intervals so as not to interfere with the timing.

Social Observation Measure Older (24-42 months)

For more details and video examples, see the training videos: “SOM Older Part 1” and “SOM Older Part 2”

Preparation for administration

There are several parts of this procedure that are important to practice, and ideally, to automate in your mind.

First, practice scoring with the iPad independent of administering the procedures. You want to be sufficiently well-practiced that you can use your peripheral vision to find items to score on the app. Think about this like you would driving; when one is driving, one is typically able to adjust the car temperature, radio volume, etc. via their peripheral vision. Another way of putting this is that you want to be able to score children’s performance while maintaining the social interaction as your central area of focus.

Second, practice bringing out and cleaning up the toys for each segment of the administration. While this may not intuitively seem like something that needs to be intensely practiced, it is, because struggling to bring items out and clean them up can take up valuable time. You should be sufficiently practiced that taking out toys and cleaning them should take up no more than 5 seconds each. Ideally you will pull out the toys for a given section all at once and move them off the table by “sweeping” them into a cardboard box or similar container.

Third, you should think about the things you say to the child as lines in a play. In other words, these should be memorized, and you should be able to recite them clearly and articulately without referring to the instructions. Be aware that it perturbs the natural flow of the social interaction if you are consistently having to visually refer to the instructions. We want the interaction to feel natural to the child; reading things from the instructions on the iPad gives the interaction a stilted feel.

During administration:

Remember to stay “on script”; don’t introduce novel lines, actions, etc. into the procedure. The best way to ensure this is to practice as much as possible, such that the procedure is automatic and memorized.

Stick to the wording in the instructions; we have carefully developed the wording to provide appropriate social prompts to children and to standardize the procedure. Veering from the wording makes the procedure invalid.

Do not repeat lines **UNLESS** the child clearly did not hear them or was clearly distracted. A child’s failure to produce a target behavior is not a reason to repeat a line; we are trying to provide children with a standard context to see how they react, not coach them on producing a particular reaction.

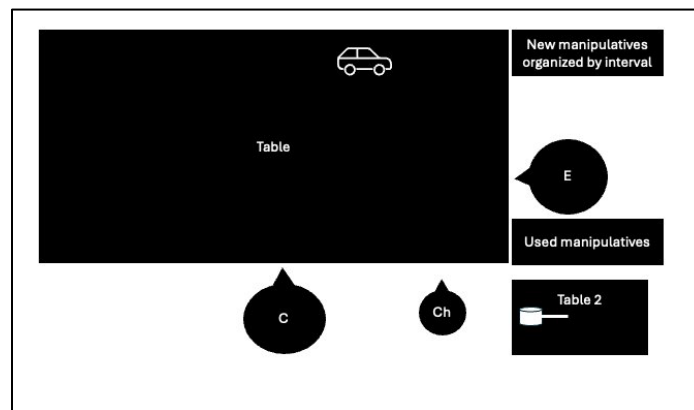
Scoring

Try to score each behavior as you see it; if you are not able to score as behaviors unfold you can save scoring to the end of each section. However, be aware that this approach runs the risk of forgetting to record a child’s behavior. In essence, use whichever approach, a. allows you to score accurately, and b. is least disruptive to the natural flow of the interaction. It is very important to practice scoring, so you know exactly where each option to be checked is (as above).

Setup:

- **Child:** Make sure that the child is sitting at an appropriate height at the table. The table should sit between bottom of the child's ribs and bellybutton with child's stomach right up against table or with a finger's gap. Adjust the child's seat, or the height of the table as necessary.
- **Examiner:** Sitting 90 degrees from the child with materials (organized by minute) on one side and a container for used materials on the other side
- **Parent:** Ideally the parent should be to the child's left, four feet back. The child should not feel like their parent is part of the interaction. Ideally, the parent could be busy completing parent-report measures at this time. The parent's chair should not be on the same side as the cooking pot in minute one.

Table 2: A second table (or chair or shelf) should be positioned near the child. In Minute one, you will need to place a cooking pot within reach of the child.



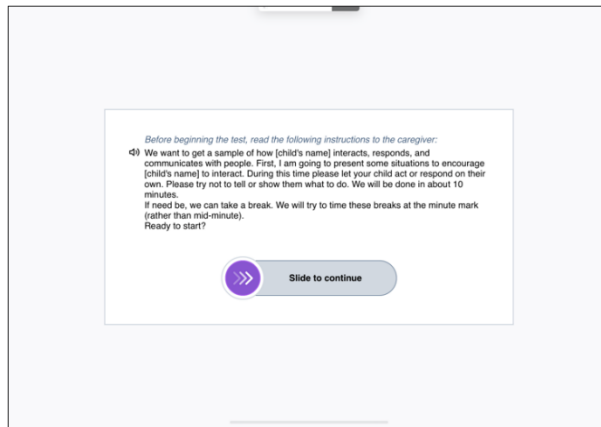
Recommended toy organization

- **Bin or bag 1: Interval 1 (Minute 1):** Cooking set, including pot with lid and toy inside
- **Bin or bag 2: Interval 2 (Minutes 2-3):** 2 doll options
- **Bin or bag 3: Interval 3 (Minutes 4-5):** Blocks in 2 bags and Interval 4 (Minutes 6-7): Clear child-proof container with elephant pieces
- **Bin or bag 4: Interval 5: (Minutes 8-10):** I Spy book

Instructions

The test is divided into two parts to make administration less cumbersome: Part 1 includes intervals 1-4 and Part 2 includes Interval 5.

The measure opens with a set of Instructions to be read aloud to the caregiver prior to beginning the tasks. This instructional screen is shown below:



These instructions read

“We want to get a sample of how [child’s name] interacts, responds, and communicates with people. First, I am going to present some situations to encourage [child’s name] to interact. During this time, please let your child act or respond on their own. Try not to tell or show them what to do. We will be done in about 10 minutes. If need be, we can take a break. We will try to time these breaks at the minute mark (rather than mid-minute) Ready to start?”

Once the instructions are read to the caretaker, the examiner begins the test by moving the slide to the right.

Interval (Minute 1): Joint attention

Toys needed

Cookware set plus jungle animal (in cooking pot)

Physical set up

Before beginning, the cooking pot should be placed on a table-height surface behind the child. The cooking pot needs to be in a place where the child can reach it (suggested 1.5 feet behind and 1.5 feet to the left of the child, although this depends on the height of the child). It needs to be within reach, but not so within reach that they can discover it accidentally.

**Give the child a warmup toy to play with so that you can surreptitiously place the pot before the task begins. If the child happens to turn around as the administrator is placing the pot, do not draw attention to the pot. Ignore the pot and draw the child’s attention back to the warmup toy as you place the pot into position.

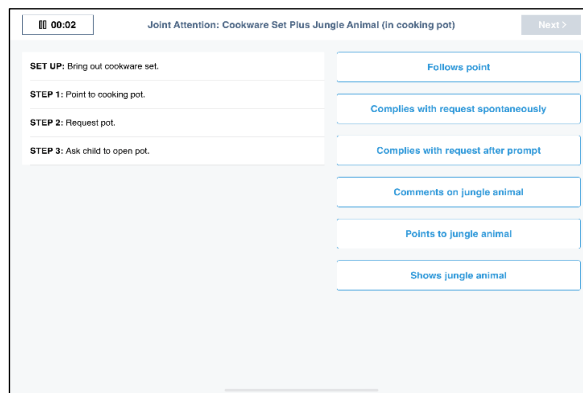
Instructions

Set-up:

Say to child **“Hey [child’s name], I’ve got something to show you. We can play with these toys”**, while pulling out the cookware set from under the table.

- **Step 1:** While child is looking at cookware set, say, **“Oh no, I’m missing my cooking pot”**, and start to look around.
Then, point to cooking pot (which is out of child’s line of sight) while saying, **“Oh there it is.”**
- **Step 2:** After ~20 seconds, if child has not already brought the pot to the table, ask him to do so.
- **Step 3:** After another ~20 seconds, if child has not opened the pot, ask him to do so.

The iPad screen for this activity has a reminder of the instructions on the left side and on the right side, it has the boxes for scoring the child’s actions and reactions. If the examiner wants a reminder of a specific instructional step, they should tap the step number next to the reminder and a detailed instruction will appear. Tap **“Close”** to return to the scoring screen (minute 1).



Scoring:

- **“Following point”**: When the child looks or attempts to look at what the administrator has pointed to. This would typically involve the child turning her head (and potentially body) to look at the pot that the administrator is pointing at. Most important is that this behavior occurs in reaction to the administrator’s point as opposed to the child randomly looking around the room.
- **“Complies with request spontaneously”**: When the child picks up the pot and brings it to the table. This would typically happen when the administrator says, **“Oh there it is”**; but it is possible that the child will do this behavior before that statement.
- **“Complies with request after prompt”**: Same behavior as above but only performed after the administrator explicitly requests the pot.
- **“Comments on jungle animal”**: Once the child opens the pot, does he or she spontaneously comment on the animal inside. This could consist of the child labeling the object, or simply remarking on the object (*i.e.*, **“Look”**, **“Wow”**). Any type of vocalization/verbalization can count (provided it appears linked to the jungle animal).
- **“Points to jungle animal”**: Once the child opens the pot, does he or she point at the animal in the pot. This behavior may occur with an accompanying comment (or not). Here we are just concerned with whether they point to the object.

- **“Shows jungle animal”:** This behavior could take a range of forms.
 - It could simply involve the child holding the pot “up” to the administrator (but not necessarily at a useful visual angle) while making eye contact with the administrator
 - Alternately, the child may tilt the pot toward the administrator so that the administrator can see the animal inside.
 - It is possible that the child may remove the animal from the pot and place it in their (*i.e., the child’s palm*), or physically hold the animal toward the administrator.
 - Finally, it may be the case that the child gives the animal to the examiner (which for scoring purposes can be counted as a show). Here, these behaviors are introduced from more basic to more sophisticated, but any of these behaviors would count as evidence of showing. Critically, what is important is the ***intention*** to show the animal to the administrator, not whether the administrator actually ***sees*** the animal. If the behavior doesn’t seem to involve the examiner at all (*i.e., no attempt to make eye contact with examiner, no moving object toward her, etc.*) it does not count as a show.

Interval 2 (Minutes 2 & 3) Pretend Play

Toys needed

Baby doll and action figures; cookware remains on the table

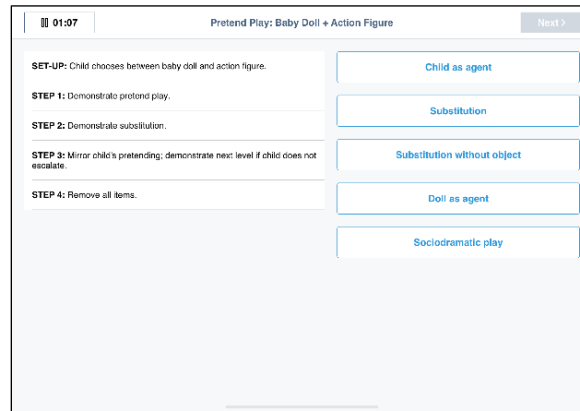
Instructions

Set-up

Child chooses between baby doll and action figure. Cookware is still on the table.

- **Step 1: Demonstrate pretend play**
Say **"I think I'm going to pretend to give my doll/toy a drink"** and demonstrate. If the child does not initiate pretend play within 10-15 seconds, say **“Do you want to pretend?”** Follows child’s lead and mirror level of pretense they produce. Give child time to escalate (30 sec)
- **Step 2: Demonstrate Substitution**
If the child has not escalated in pretend play (*i.e., moved beyond the first level*), then demonstrate a **substitution** (*i.e., put bowl on doll’s head, say "I'm going to pretend this is a hat"*).
- **Step 3: Mirror child’s pretend; demonstrate next level if child does not escalate:** For the remaining time, engage in pretend play with the child, mirroring their level of pretense. If, after one minute the child does not escalate to the next level of pretend play, demonstrate. Repeat the demonstration again, if necessary, after another 30 seconds.
- **Step 4: Remove all items**

NOTE: Examiners should use language to give context to the pretense, not to model language for the child.



Interval 2 Scoring

- **“Child-as-agent”**

In which the child extends familiar activities to the doll figures. For example, the child feeds a doll using a spoon, gives the doll a drink using the cup, pours tea to cup from tea pot, etc.

- **“Substitution”**

In which the child uses one object to stand in for another object. For example, the child pretends that a knife is a drumstick, pretends that a plate or cup is a hat, etc.

- **“Substitution without object”**

In which the child pretends to use something that is not there. For example, the child pretends to shake an invisible saltshaker, talks on an invisible telephone etc.

- **“Dolls as agent”**

In which the child moves the doll figures as if they were capable of action. For example, the child uses the doll's arms to pick up a spoon, such that the doll is feeding itself, use the doll arms to pick up the cup to give the doll a drink.

- **“Socio-dramatic play”**

In which the child and the doll take on various roles to pretend to carry out familiar play themes. For example, the child pretends to be the doll's parent and alternates between acting as the parent and animating the doll to act as the child.

Interval 3 (Minutes 4-5) Prosocial behavior

Toys needed

Wooden blocks + bags (or some other way of sorting the blocks into two sets)

Instructions

Set-up

Dump out two bags of blocks: **"Let's build a block tower. These ones are for you, and these are for me"**.

- **Step 1: Indicate discrepancy to encourage sharing**
Point out the discrepancy between the blocks: **"Oh look, you got more than me."** Say this with a sad tone and expression so that it's clear that you're unhappy about the discrepancy. Give child time to share (20 sec)
- **Step 2: Take turns building tower**
Place one block and say **"Let's start the tower. Now's it's your turn"**. If the child does not take a turn within 5 seconds, take their turn for them. Continue taking turns.
- **Step 3: Accidentally knock over tower**
Once tower is built, "accidentally" knock it over toward child. Say: **"Oh no, the tower fell. The blocks are all over."** Give the child the opportunity to pick up blocks or repair the tower.
- **Step 4: Express disappointment**
10-15 seconds after tower falls say: **"I'm so sad I feel so bad"** and look disappointed. Give child time to express concern/comfort (30 sec)
- **Step 5: Start cleaning; request help**
Say: **"I'm starting to feel better now. I'm going to clean up the blocks"**. If child does nothing, put away 2 blocks and say: **"Can you help me clean up?"**

04:36	Prosocial Behavior: Wooden Blocks	Next >
SET-UP: Dump 5 blocks in front of child and 3 in front of you.	Shares his/her blocks	
STEP 1: Indicate discrepancy to encourage sharing.	Takes turns building tower	
STEP 2: Take turns building tower.	Picks up fallen blocks or repairs tower	
STEP 3: Accidentally knock over tower.	Concerned facial expressions	
STEP 4: Express disappointment.	Verbal or Physical concern/comforting	
STEP 5: Start cleaning and request help.	Helps clean up spontaneously	
	Helps clean up after prompt	

Interval 3 Scoring

- **“Shares his/her blocks”**

When the child offers the administrator one or more of her blocks, by pushing a block toward the administrator, handing her a block, verbally offering a block etc. This will most likely occur after the administrator says **“You got more than me”**.

- **“Takes turns building tower”**

Once the administrator starts building the tower, does the child take their turn adding a block to the tower. What is important here is that they try to take a turn, not that they are successful (*i.e., if the child can't balance the block or the block falls that is ok*). Sometimes kids will build a tower on their own before the administrator initiates the tower building activity; this should **NOT** count (the code is meant to capture turn taking during a joint activity).

- **“Picks up fallen blocks or repairs tower”**

Does the child attempt to pick up the fallen blocks, and/or repair tower. There needs to be some evidence that they are trying to “remedy” the situation in some way rather than simply picking up a block to play with. Typically, good evidence of “remedying” is picking up the blocks that have fallen (versus blocks that did not fall).

- **“Concerned facial expression”**

As the administrator starts to say she is so sad (or shortly after) does the child give any evidence of either looking concerned or otherwise paying attention to this information. This could manifest as a visible concerned expression, a change from positive to more neutral, and/or a sudden look up. You are looking for evidence that the child notices the administrator’s sadness/upset and is moved by it to some degree.

- **“Verbal concern/comforting”**

Does the child say something that indicates concern (such as **“Oh no”** or **“I’m sorry”**) or attempt to make the administrator feel better via verbal means (such as **“It’s ok”** or **“don’t be sad”**)? Children should also receive credit for any comment that is perceived to alleviate administrator’s concern. For example, saying **“I builded it”**, after administrator says she’s so sad that she knocked over her tower.

- **“Physical comforting”**

Any form of physical comforting – patting on shoulder, kisses, etc. that appears aimed to make the administrator feel better. Be aware that this may occur on its own, or in the presence of verbal concern/comforting.

- **“Helps clean up spontaneously”**

As or after the administrator starts to put the blocks in the bag, does the child begin to hand her the blocks, push them toward her or the bag, or actually put them in the bag?

- **“Helps clean up after prompt”**

Same as above, but only after being prompted.

Interval 4 (Minutes 6-7) Social Communication 1

Toys needed

Duplo Lego Set in plastic jar

Physical set up

The Duplo Lego set should be disassembled when brought out

Instructions

Set-up

Bring out plastic container containing disassembled elephant blocks:

“Oh, look, I have some different blocks. Let me show you what we can do with them.”

➤ **Step 1: Take out blocks and assemble elephant**

Demo 4-step sequence that culminates in elephant Duplo toy.

This should be done in a very pedagogical manner. Say **“First this goes here”, “Then this goes here”, “Then this goes here”** etc. You want to emphasize that this is the **“correct”** way to do it.

1. Pull out curved bridge-like base;
2. Place light blue piece;
3. Place dark blue head;
4. Place back;
5. Place trunk; and then the flower on top



➤ **Step 2: Disassemble elephant, place back in container and hand to child**

Say **“Can you build it like I did?”** Child should have a container with blocks by the 30 second mark

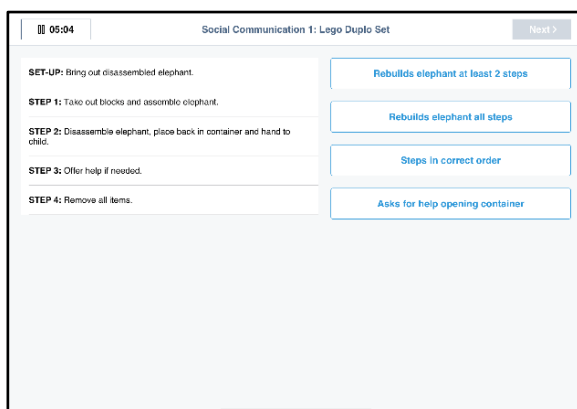
➤ **Step 3: Offer help if needed**

Give child time to open container (20 sec) and then offer help if needed. Give child time to rebuild elephant (1 minute)

➤ **Step 4: Remove all items**

Just before 2 minutes, the admin says, **“I’m going to put these toys away and see what we have next”**

If child did not correctly put the elephant together, you can help them (they do not get credit, but they may enjoy seeing it together)

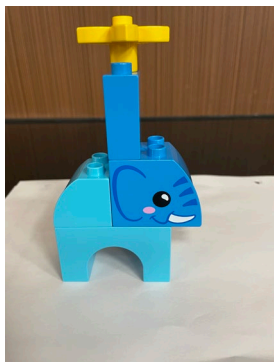
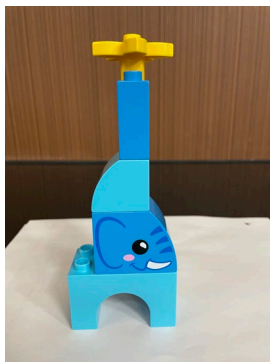


Interval 4 Scoring

- **“Rebuilds elephant at least 2 steps”**

Does the child reproduce at least two steps that the administrator demonstrated? Note that the child needs to put the pieces in the correct location or needs to have tried to put it in the correct location. Score the intention, not the motor skills; here are photo examples of what does and does not count:

Examples of at least 2 steps:



Example of no credit for “at least 2 steps”:

- **“Rebuilds elephant all steps”**

Does the child reproduce all the steps the administrator demonstrated? Note, that this means not only that they put all the pieces together but that the pieces are in the right location.

- **“Steps in correct order”**

Did the child reproduce the steps in the same order as the administrator? Note child can only receive credit for this if they reproduced ALL the steps.

- **“Asks for help opening container”**

Does the child request assistance in opening the container? This could include

- a) verbal requests
- b) gestures to administrator that appear to seek assistance, or
- c) handing the container to administrator.

Just saying “I can’t open it” does not count (that’s more like running commentary). But saying “I can’t open it” while looking toward the administrator does count (if it seems like it is directed to the examiner)

(Can also get credit if the child asks for help building the elephant. Same criteria apply)

Interval 5 (Minutes 8-10) Social Communication

Toys needed

“I spy” book

Instructions

Set-up

Introduce book: Hold up I Spy book and say **"Look I have a really neat book to show you"**

➤ **Step 1: Open book to invite conversation**

Open book to first page, **“Do you see anything on here that you recognize (that looks familiar)?”** Give child time to respond (20 sec)

➤ **Step 2: Mention hat, then butterfly to encourage conversation and turn taking**

If the child does not start the conversation, point to the hat and say, **“What can you tell me about hats?”** Give the child time to initiate conversation (20 sec). If no initiation, point to butterfly and say, **“What can you tell me about butterflies?”** After the child initiates conversation, take a conversational turn, and give the child an opportunity for another turn. For the admin, conversational turns should invite conversation by the child. Try to avoid yes or no questions (i.e., **“Do you like butterflies?”**) and instead use language that the child can build upon for a conversational turn (i.e., **“What can you tell me about your favorite butterfly?”**)

➤ **Step 3: Point to another object to shift conversation.**

At about the 1-minute mark, point to another object on the page to shift the conversation.

➤ **Step 4: Turn page and mislabel book as “dog”.**

Say, **"Let's turn the page together"**. On the next page, point to the book and say, **"Oh look, it's a dog"**. Give child time to correct mislabeling (15 sec)

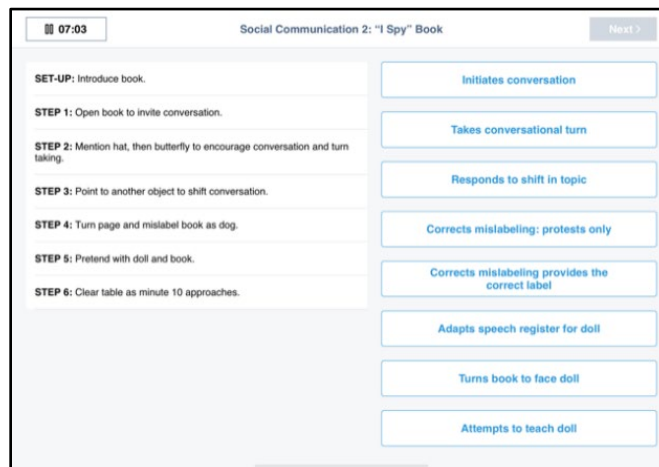
➤ **Step 5: Pretend with doll and book.**

Bring out doll and says, “Oh look, the baby doll wants to play with us too. This baby doll loves to hear. Do you want to show her some things in the book? Remember, she is a baby, and she doesn’t know about a lot of things.” Prop doll to face child and hand child book. Prop the doll up and then do not hold the doll. The doll should be sitting by themselves. It is okay if the child picks up the doll. If the child does not attempt to teach the doll say, “Do you want the teach the baby anything?”

➤ **Step 6: Clear table as minute 10 approaches.**

Remember

- For this part, it is very important that you **DO NOT** ask the child to label the object. We are trying to encourage the child to initiate a conversation; asking the child to label the object turns this part into a labeling game.
- Please carefully follow the time structure



Interval 5 Scoring

• **“Initiates /responds to conversation”**

Child should receive credit if they either: a) introduce a topic of conversation, or b) respond to administrator’s introduction of topic of conversation (e.g., **A: “What can you tell me about elephants? C: I love elephants”**). Responses cannot also include nonverbals (points, nods, miming gestures).

• **“Takes conversational turn”**

Does the child take a turn in the conversation? A child can only receive credit for conversational turns after initiating a conversation. An example: **“A: What can you tell me about elephants? C: I love elephants, A: Have you ever seen an elephant before? C: Yes, at the zoo”**. For this exchange the child would be given credit for initiating the conversation (“I love elephant”) and for taking one conversational turn (“Yes, at the zoo”). Conversational turns must be on-

topic. Off-topics comments do not count (e.g., **A: What can you tell me about elephants? C: Tomorrow is my brother's birthday**) Points, noises, and miming gestures also count.

- **“Responds to shift in topic”**
After the administrator shifts the topic of conversation, does the child respond by making a comment that is consistent with the new topic. The child must start to talk about the new topic rather than not saying anything or going back to the prior topic to receive credit for the response to shift in topic option
- **“Corrects mislabeling, protests only”**
When the administrator mislabels the image, does the child protest in some way – such as saying **“No”**, **“you’re wrong,”** etc., or shakes head, wags finger etc.
- **“Corrects mislabeling, provides the correct label”**
When the administrator mislabels the image, does the child provide the correct label spontaneously?
- **“Adapts speech register for doll”**
Does the child alter their voice in speed (i.e., speak more slowly), tone (higher pitch, greater enunciation), or content (use simpler words than previously)?
- **“Turns book to face doll”**
Does the child attempt to align the doll with the book so the doll can “see” the book? Typically, the child will do this by turning the book to face the doll, but they may alternately turn the doll to face the book. It’s important that the alignment appears to be an attempt for the doll to see the book, as opposed to happening accidentally as a function of the child doing something else with the doll or book.
- **“Attempts to teach doll”**
Is there any evidence that the child is trying to teach or instruct the doll? This may manifest by explaining things (**“Do you know what an umbrella is for? It keeps the rain off your head”**), or by instructing the doll to pay attention.

Intro to Parent Report Measures

For more details and video examples, see the training video: “Intro to Parent Report Measures”.

Overview

These measures ask parent/caregivers to complete a set of questionnaires on a separate iPad. Overall, there are 15 measures, each identified by a letter-number code in the instruction manual. The specific number of measures to which a caregiver/parent responds is dependent on the age of the child being tested. Overall, the parent report measures are the easiest of the tasks the examiner administers.

Procedure

The examiner gives the caregiver/parent a separate iPad with these measures and the caregiver completes them during or after their child is being tested. Examiners are not expected to interpret the questions for caregivers who ask for clarification. Rather, they should tell the caregiver/parent to “**Give their best guess**” and/or “**If you want, you can skip any item that is unclear.**”

Below are brief descriptions of each measure:

- **Cognition Domain**
 - **MacArthur Bates CDI-CAT Comprehension** - Assesses a child’s receptive vocabulary or what words a child can understand.
 - **MacArthur Bates CDI-CAT Production Scale** - Assesses a child’s expressive vocabulary or what words a child can say.

- **Social Emotional Functioning Domain**
 - **Caregiver Checklist Younger** - Consists of a subset of seven short questionnaires, tailored to children ages 9- 23 months. These questionnaires ask about a variety of a child’s interactions with their environment: human, verbal, objects, activities, feelings, etc.
 - **Caregiver Checklist Older_-** Consists of a subset of seven short questionnaires, tailored to children ages 24-42 months. These questionnaires ask about a variety of a child’s interactions with their environment: human, verbal, objects, activities, feelings, etc.
 - **Rothbart Children (ages 37-42 months) Behavior Questionnaire Very Short Form_-** Assesses three subdomains of temperament: effortful control, negative affectivity, and surgency (high activity, intense pleasure seeking, and impulsivity).
 - **Rothbart Early Childhood (ages 13-36 months) Behavior Questionnaire Very Short Form** - Assesses three subdomains of temperament: effortful control, negative affectivity, and surgency (high activity, intense pleasure seeking, and impulsivity).

- **Infant (3-12 months) Behavior Questionnaire Very Short Forms** – Assesses three subdomains of temperament: effortful control, negative affectivity, and surgency (high activity, intense pleasure seeking, and impulsivity).
- **PROMIS EC Anger/Irritability** – Assesses symptoms of anger/irritability, angry moods and behaviors such as grouchiness and tantrums, as well as efforts to manage anger in children 11 months and older
- **PROMIS EC Anxiety** – Assesses symptoms of anxiety (fear, panic, tension and nervousness, social or separation anxiety) in children 11 months and older
- **PROMIS EC Depressive Symptoms** – Assesses depressive symptoms in children 11 months and older. These symptoms include sadness/withdrawal, anhedonia, and lack of enjoyment
- **PROMIS EC Positive Affect** – Assesses feelings and moods associated with momentary experiences of contentment, happiness, and joy in children 11 months or older
- **PROMIS EC Frustration Tolerance** – Assesses recognition and regulation of emotions and behaviors in children ages 11 months or older
- **PROMIS EC Flexibility** — Assesses the ability of a child 11 months or older to adapt to environmental demands, changes, and expectations
- **PROMIS EC Child-caregiver Interactions** - Assesses interactions between caregivers and their children
- **PROMIS EC Peer Relations** - Assesses positive peer interactions and empathetic behaviors

(Examiners might find it helpful to read through the PR measures at least once on the app before they begin testing children. Additionally, detailed descriptions and instructions for each measure are in this manual.)

Caregiver Checklist Younger & Caregiver Checklist Older

Overview

There are two Caregiver Checklists, each consisting of 10-16 item questionnaires, tailored to a specific age.

Caregiver Checklist Younger consists of questionnaires for parents with children ages 6-11 months, 12-17 months, 18-23 months. The Caregiver Checklist Older consists of questionnaires for parents of children ages 24-29 months, 30-34 months, 36-41 months, and 42 months.

All seven questionnaires ask about aspects of the child's interaction with his environment. Specifically, the questionnaires ask about a child's responses: to other people; to verbal requests including responding to their name; to objects and toys that may or may not involve pretend play; to learning new activities; and to verbalizing feelings and desires.

All the questionnaires are formatted in the same way. The iPad automatically presents the questionnaire that matches the age of the child, and the caregiver only answers the questions that are relevant to the particular age. If the caregiver chooses to skip an item, there is a warning screen asking the caregiver to confirm that they do not want to respond to that item. Then the caregiver indicates that they either want to skip the item or they make a response choice.

Type of Administration

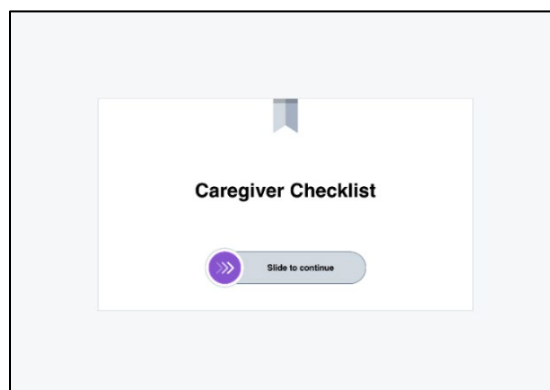
Parent Report

Administration

Set-up and Materials

iPad loaded with questionnaires; place for caretaker to sit and complete the set of age-appropriate questionnaires

Starting the Measure



If this is the first measure, the examiner hands the iPad to the caregiver and demonstrates how to start the measure, saying:

“To start the measure, slide the purple circle under the name of the measure: Caregiver Checklist to the right.”

Instructional Screen

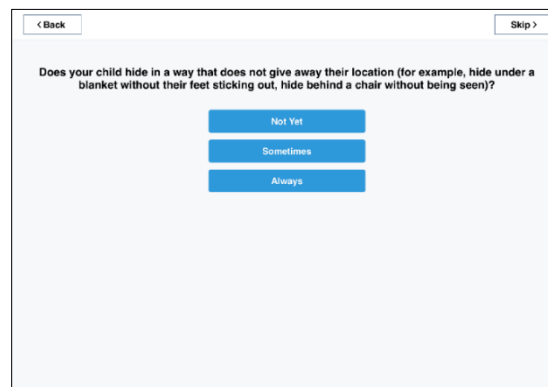
The instructional screen is shown below reads,

“On the next screen, you will see questions about your child’s behavior. Read each question carefully and answer as best you can. Please consider each question by itself and choose an answer that you believe honestly shows how your child acts. Select an answer by touching your answer choice on screen. After you make your choice, the app will automatically go on to the next question. If you want to change your answer, tap the Back button to return to the question, then touch a different choice.”

After the caregiver reads the screen, he or she should slide the purple circle to right to continue:

The Questionnaire

For each age group, the questionnaire has the same format. The instructions are followed by a set of items. Each of the 10 items is presented on its own screen. After the caregiver responds, the App moves to the next item and screen automatically. If the caregiver wants to go back and change the previous item, s/he can tap the **“BACK”** button. If s/he wants to skip an item, s/he can tap the **“SKIP”** button. Below are two sample items:



< Back

Skip >

Does your child hide in a way that does not give away their location (for example, hide under a blanket without their feet sticking out, hide behind a chair without being seen)?

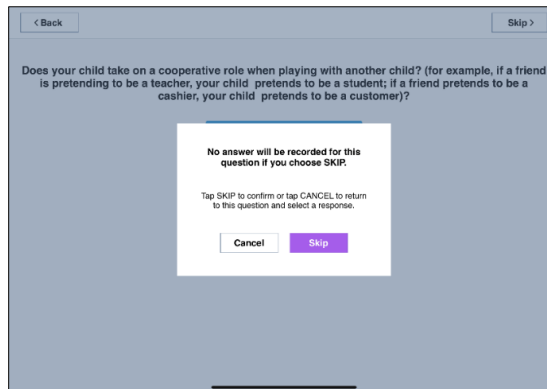
Not Yet

Sometimes

Always

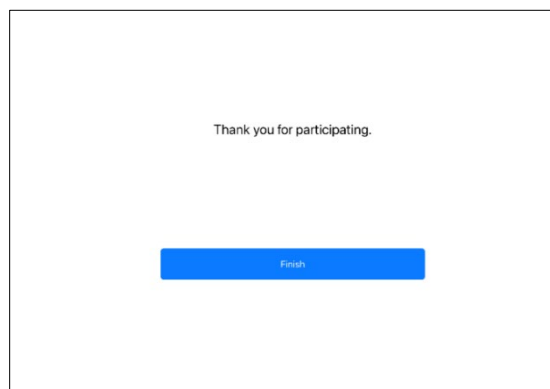


If the caregiver chooses to skip a question and not answer, the following screen appears. It asks the caregiver to confirm that they would like to skip that particular item. An example of this screen is shown below:



Completing the measure

When the items are answered, either a new questionnaire will begin, or a closing screen will appear. If the closing screen below appears, you know that there are no more questions, and that the caregiver has completed the parent report measures.



Rothbart Infant Behavior Questionnaire - Revised (IBQ-R)
- Very Short Form

Rothbart Early Childhood Behavior Questionnaire (ECBQ)
- Very Short Form

Rothbart Children's Behavior Questionnaire (CBQ)
- Very Short Form

Overview

The infant and child temperament questionnaires used here consist of three caregiver report measures, each tailored to a specific age. The Infant Behavior Questionnaire – Revised (IBQ-R) is for caregivers of infants, ages 3-12 months. The Early Childhood Behavior Questionnaire (ECBQ) is for caregivers of toddlers, ages 13-35 months. The third measure, the Children's Behavior Questionnaire (CBQ), is for caregivers of children ages 36-60 months.

All three questionnaires assess three subdomains of temperament: effortful control, negative affectivity, and surgency (high activity level, intense pleasure seeking, impulsivity). All three scales follow the same format. For that reason, the instructions are presented together below. All three ask caregivers to complete the relevant questionnaire, presented on the iPad.

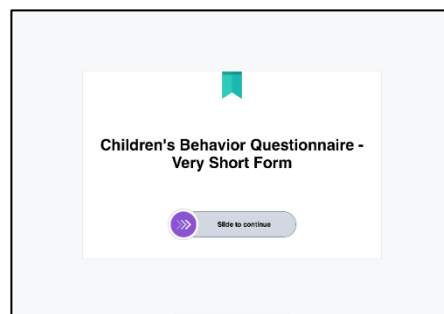
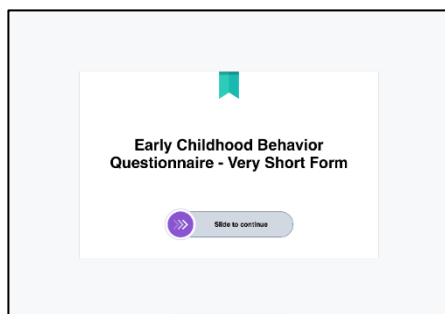
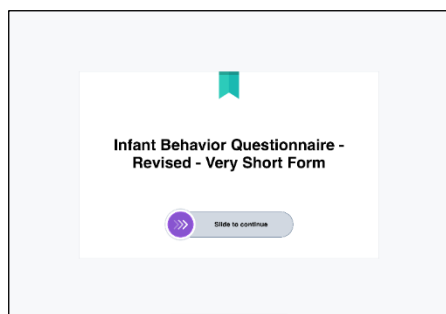
Administration

Set-up and Materials

iPad loaded with questionnaires; place for caregiver to sit comfortably and complete the set of age-appropriate questionnaires.

Starting the Measures

Like the other Baby Toolbox measures, these measures open with a title screen with the name of the age-appropriate set of questions. The three versions are shown below:

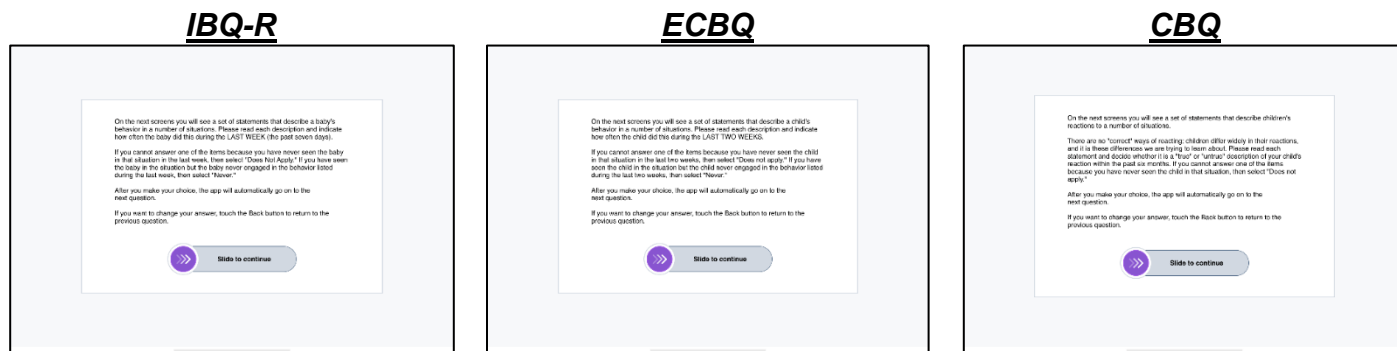


If these are the first measures in the set, the examiner hands the iPad to the caregiver and demonstrates how to start the measure, saying:

“To start the measure, slide the purple circle under the name of the measure (Infant Behavior Questionnaire – Revised – Very Short Form; Early Childhood Behavior Questionnaire – Very Short Form; Children’s Behavior Questionnaire – Very Short Form) to the right.”

Instructional Screen

For each age group, the instructions vary slightly. The examiners should familiarize themselves with the differences in case a parent has a question. The instructional screens are shown below. After the caregiver reads the screen, they should slide the purple circle to right to continue

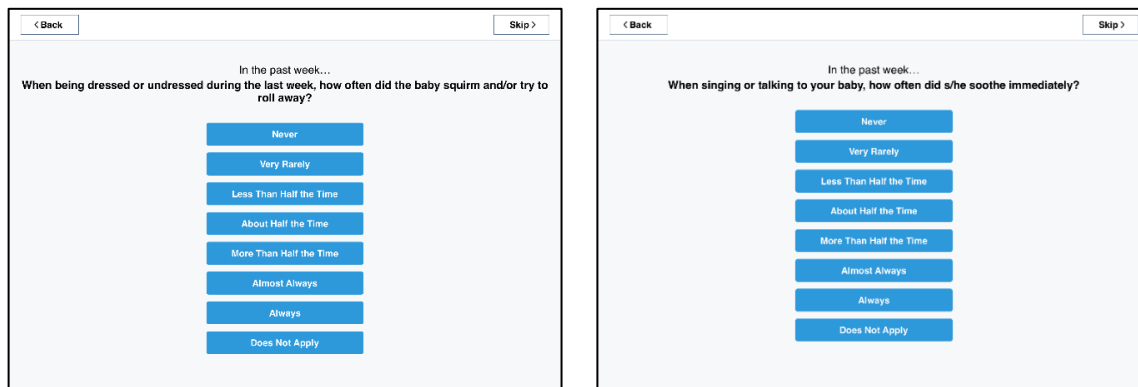


The Questionnaires

The questionnaires all have the same format. The instructions are followed by a set of items. Each item is presented on its own screen. After the caregiver responds, the App moves to the next item and screen automatically. If the caregiver wants to go back and change the previous item, they can tap the **“BACK”** button. If they want to skip an item, they can tap the **“SKIP”** button.

The **IBQ-R** has 37 items; the **ECBQ** and the **CBQ** each have 36 items. Below are two sample items for each of the three questionnaires.

IBQ-R sample items



ECBQ sample items

< Back Skip >

In the past 2 weeks...

When approached by an unfamiliar person in a public place (for example, the grocery store), how often did your child cling to a parent?

Never

Very Rarely

Less Than Half the Time

About Half the Time

More Than Half the Time

Almost Always

Always

Does Not Apply

< Back Skip >

In the past 2 weeks...

While playing indoors, how often did your child like rough and rowdy games?

Never

Very Rarely

Less Than Half the Time

About Half the Time

More Than Half the Time

Almost Always

Always

Does Not Apply

CBQ sample items

< Back Skip >

In the past 6 months...

My child seems always in a big hurry to get from one place to another.

Extremely Untrue

Quite Untrue

Slightly Untrue

Neither True nor False

Slightly True

Quite True

Extremely True

Does Not Apply

< Back Skip >

In the past 6 months...

My child prefers quiet activities to active games.

Extremely Untrue

Quite Untrue

Slightly Untrue

Neither True nor False

Slightly True

Quite True

Extremely True

Does Not Apply

If the caregiver chooses to skip a question, the following screen appears. It asks the caregiver to confirm their choice. Specifically, it asks the caregiver to choose if they want to skip the item or makes a response choice. An example of such a screen is shown below:

< Back Skip >

In the past 6 months...

My child seems always in a big hurry to get from one place to another.

Extremely Untrue

No answer will be recorded for this question if you choose SKIP.

Tap SKIP to confirm or tap CANCEL to return to this question and select a response.

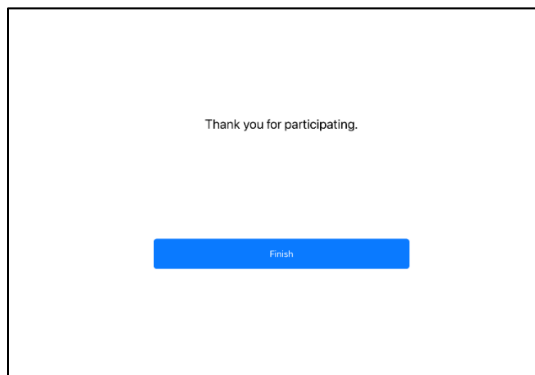
Cancel Skip

Extremely True

Does Not Apply

Completing the measure

When all items with the form are answered, either a new questionnaire will begin, or a closing screen will appear. If the closing screen below appears, there are no more questions, and the caregiver has completed all the parent report measures.



PROMIS Early Childhood Parent Report Anger/Irritability

Overview

This is a caregiver report questionnaire measuring symptoms of anger/irritability (angry mood and behavior such as grouchiness and tantrums, and efforts to manage anger) in children ages 11 months and older. The measure is administered as a **Computer Adaptive Test (CAT)**, a specialized type of computer-based testing that enables administration of items based on individuals' responses, with minimal burden on participants and precise evaluation at the individual level. The caregiver's responses determine the number of items administered and which question comes next until an estimated score is obtained.

Each item has five identical text response options. The caregiver responds to each item. If the caregiver chooses to skip an item, there is a warning screen that asks the caregiver to confirm that they want to skip that item. Then the caregiver either indicates that they want to skip the item or makes a response choice.

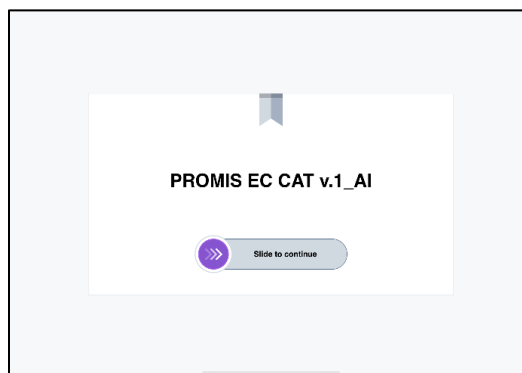
Administration

Set-up and Materials

iPad loaded with questionnaires; a place for the caregiver to sit and complete the set of age-appropriate questionnaires.

Starting the Measure

Like the other Baby Toolbox measures, this questionnaire opens with a title screen with an abbreviated name of the set of questions, as shown below.

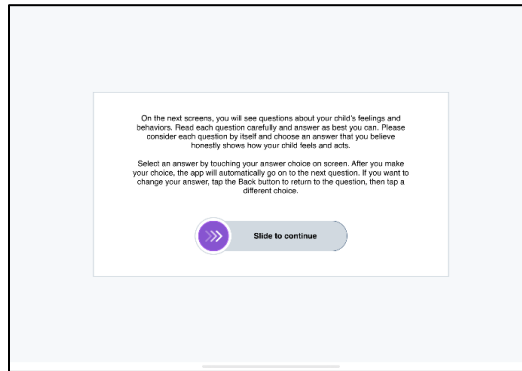


If this is the first measure in the set, the examiner hands the iPad to the caregiver and demonstrates how to start the measure, saying:

“To start the measure, slide the purple circle under the name of the measure: PROMIS EC CAT v.1 AI to the right.”

Instructional Screen

The instructional screen is shown below.



This instructional screen reads: “On the next screens, you will see questions about your child’s feelings and behaviors. Read each question carefully and answer as best you can. Please consider each question by itself and choose an answer that you believe honestly shows how your child feels and acts.”

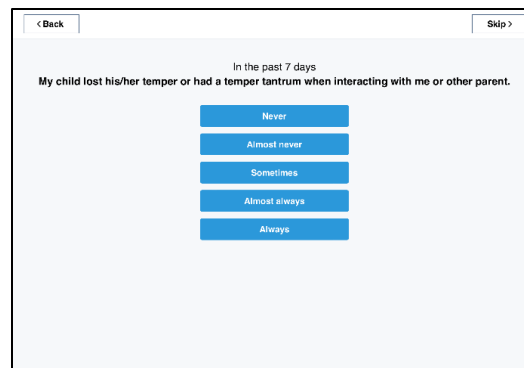
“Select an answer by touching your answer choice on screen. After you make your choice, the app will automatically go on to the next question. If you want to change your answer, tap the **Back** button to return to the question, then tap a different choice.”

After the caregiver reads the screen, they should slide the purple circle to right to continue:

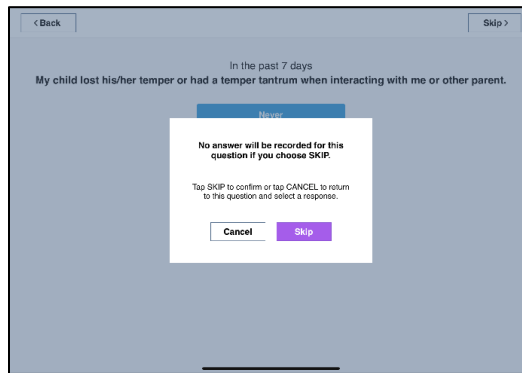
The Questionnaire

For each age group, the questionnaire has the same format. The instructions are followed by a set of items. Each item is presented on its own screen. After the caregiver responds, the App moves to the next item and screen automatically.

If the caregiver wants to go back and change the previous item, they can tap the “**BACK**” button. If they want to skip an item, they can tap the “**SKIP**” button. Below is a sample item:

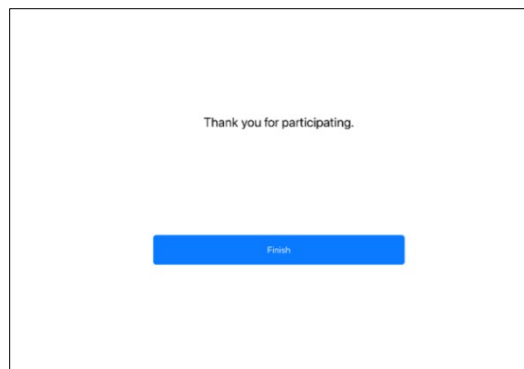


If the caregiver chooses to skip a question, the following screen appears. It asks the caregiver to confirm their choice. Specifically, it asks the caregiver to choose if they want to skip the item or make a response choice. An example of such a screen is shown below:



Completing the measure

When all items within the form are answered, either a new questionnaire will begin, or a closing screen will appear. If the closing screen appears, there are no more questions, and the caregiver has completed the parent report measures.



PROMIS Early Childhood Parent Report Anxiety

Overview

This is a caregiver report questionnaire to assess symptoms of anxiety (fear; panic; tension and nervousness; social or separation anxiety) in children ages 11 months and older. The measure is administered as a **Computer Adaptive Test (CAT)**, a specialized type of computer-based testing that enables administration of items based on individuals' responses, with minimal burden on participants and precise evaluation at the individual level. The caregiver's responses determine the number of items administered and which question comes next until an estimated score is obtained.

Each item has five identical text response options. The caregiver responds to each item. If the caregiver chooses to skip an item, there is a warning screen that asks the caregiver to confirm that they want to skip that item. Then the caregiver either indicates that they want to skip the item or makes a response choice.

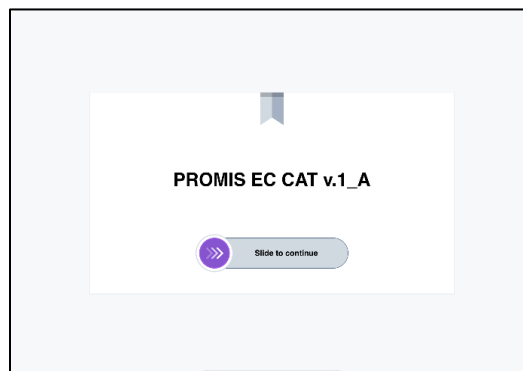
Administration

Set-up and Materials

iPad loaded with questionnaires; place for the caregiver to sit and complete the set of age-appropriate questionnaires.

Starting the Measure

Like the other Baby Toolbox measures, this questionnaire opens with a title screen with an abbreviated name of the set of questions, as shown below.

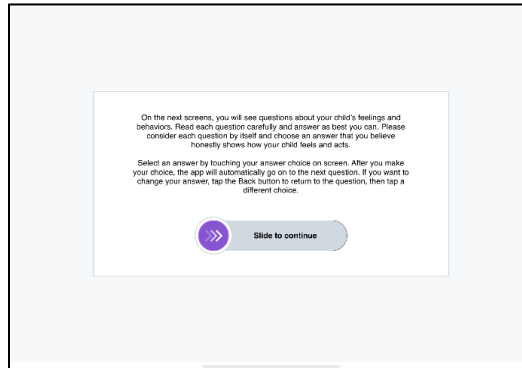


If this is the first measure in the set, the examiner hands the iPad to the caregiver and demonstrates how to start the measure, saying:

“To start the measure, slide the purple circle under the name of the measure: PROMIS EC CAT v.1 A to the right.”

Instructional Screen

The instructional screen is shown below.



This instructional screen reads:

“On the next screens, you will see questions about your child’s feelings and behaviors. Read each question carefully and answer as best you can. Please consider each question by itself and choose an answer that you believe honestly shows how your child feels and acts.”

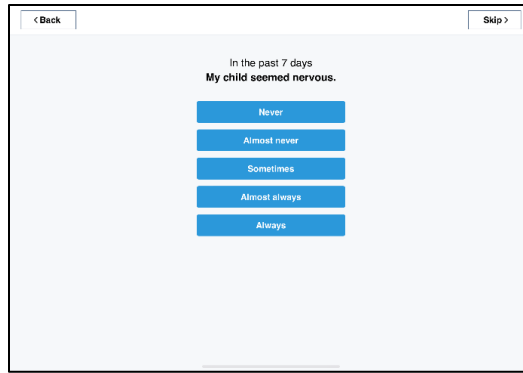
“Select an answer by touching your answer choice on screen. After you make your choice, the app will automatically go on to the next question. If you want to change your answer, tap the Back button to return to the question, then tap a different choice.”

After the caregiver reads the screen, they should slide the purple circle to right to continue:

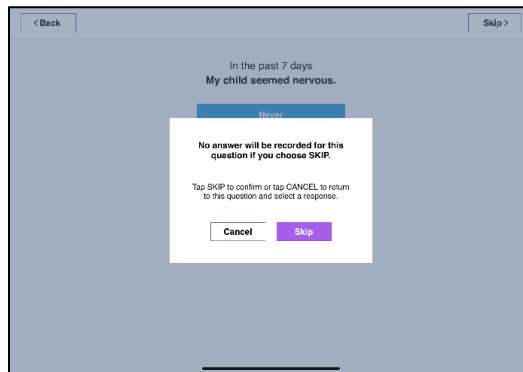
The Questionnaire

For each age group, the questionnaire has the same format. The instructions are followed by a set of items. Each item is presented on its own screen. After the caregiver responds, the App moves to the next item and screen automatically.

If the caregiver wants to go back and change the previous item, they can tap the **“BACK”** button. If they want to skip an item, they can tap the **“SKIP”** button. Below is a sample item:

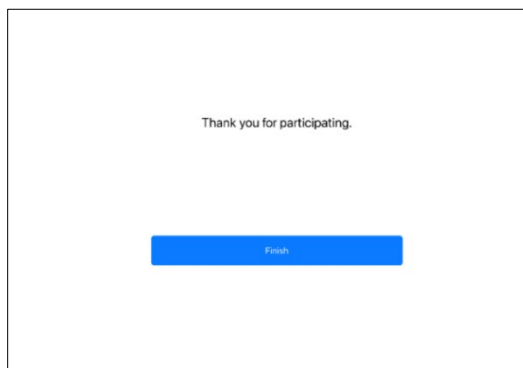


If the caregiver chooses to skip a question, the following screen appears. It asks the caregiver to confirm their choice. Specifically, it asks 'the caregiver to choose if they want to skip the item or makes a response choice'. An example of such a screen is shown below:



Completing the measure

When all items within the form are answered, either a new questionnaire will begin, or a closing screen will appear (shown below). If the closing screen appears, there are no more questions, and the caregiver has completed the parent report measures.



PROMIS Early Childhood Parent Report Depressive Symptoms

Overview

This is a caregiver report questionnaire measuring depressive symptoms (sadness/withdrawal; anhedonia; lack of enjoyment) in children ages 11 months and older. The measure is administered as a **Computer Adaptive Test (CAT)**, a specialized type of computer-based testing that enables administration of items based on individuals' responses, with minimal burden on participants and precise evaluation at the individual level. The caregiver's responses determine the number of items administered and which question comes next until an estimated score is obtained.

Each item has five identical text response options. The caregiver responds to each item. If the caregiver chooses to skip an item, there is a warning screen that asks the caregiver to confirm that they want to skip that item. Then the caregiver either indicates that they want to skip the item or makes a response choice.

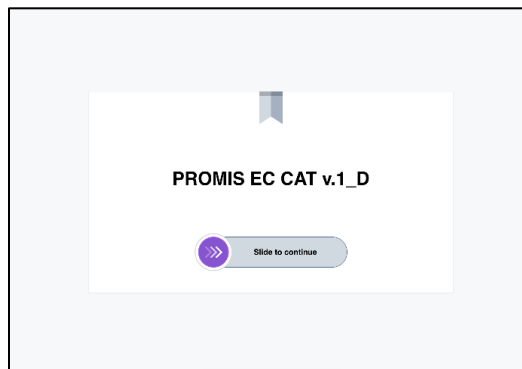
Administration

Set-up and Materials

iPad loaded with questionnaires; place for the caregiver to sit and complete the set of age-appropriate questionnaires.

Starting the Measure

Like the other Baby Toolbox measures, this questionnaire opens with a title screen with an abbreviated name of the set of questions, as shown below.

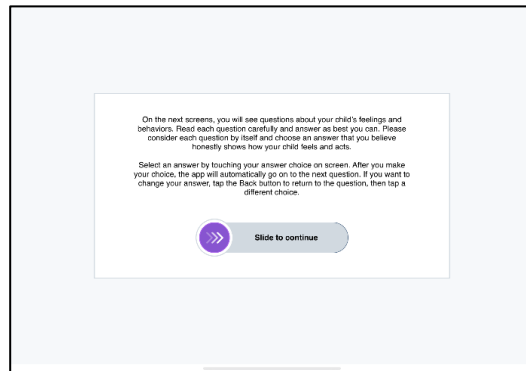


If this is the first measure in the set, the examiner hands the iPad to the caregiver and demonstrates how to start the measure, saying:

“To start the measure, slide the purple circle under the name of the measure: PROMIS EC CAT v.1 D to the right.”

Instructional Screen

The instructional screen is shown below.



This instructional screen reads:

“On the next screens, you will see questions about your child’s feelings and behaviors. Read each question carefully and answer as best you can. Please consider each question by itself and choose an answer that you believe honestly shows how your child feels and acts.”

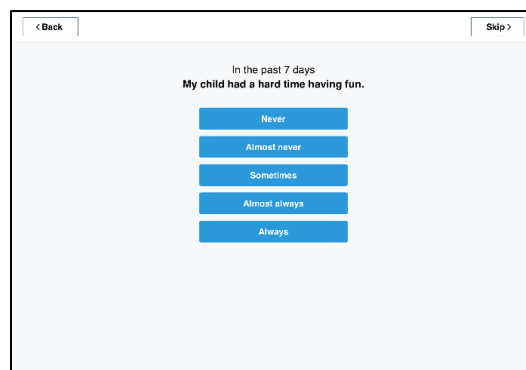
“Select an answer by touching your answer choice on screen. After you make your choice, the app will automatically go on to the next question. If you want to change your answer, tap the Back button to return to the question, then tap a different choice.”

After the caregiver reads the screen, they should slide the purple circle to right to continue

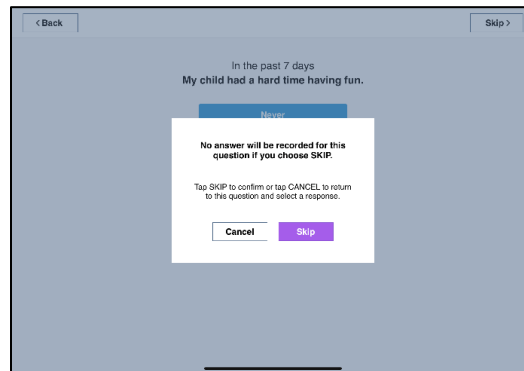
The Questionnaire

For each age group, the questionnaire has the same format. The instructions are followed by a set of items. Each item is presented on its own screen. After the caregiver responds, the App moves to the next item and screen automatically.

If the caregiver wants to go back and change the previous item, they can tap the **“BACK”** button. If they want to skip an item, they can tap the **“SKIP”** button. Below is a sample item:

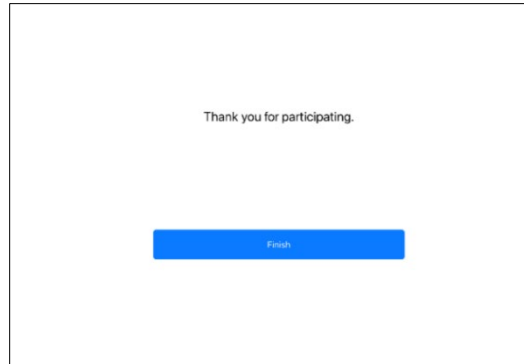


If the caregiver chooses to skip a question, the following screen appears. It asks the caregiver to confirm their choice. Specifically, it asks the caregiver to 'choose if they want to skip the item or makes a response choice'. An example of such a screen is shown below:



Completing the measure

When all items within the form are answered, either a new questionnaire will begin, or a closing screen will appear (shown below). If the closing screen appears, there are no more questions, and the caregiver has completed the parent report measures.



PROMIS Early Childhood Parent Report Positive Affect

Overview

This is a caregiver report questionnaire measuring feelings and moods associated with momentary experiences of contentment, happiness, and joy (“positive affect”) in children ages 11 months and older. The measure is administered as a **Computer Adaptive Test (CAT)**, a specialized type of computer-based testing that enables administration of items based on individuals’ responses, with minimal burden on participants and precise evaluation at the individual level. The caregiver’s responses determine the number of items administered and which question comes next until an estimated score is obtained.

Each item has five identical text response options. The caregiver responds to each item. If the caregiver chooses to skip an item, there is a warning screen that asks the caregiver ‘to confirm they want to skip that item.’ Then the caregiver either indicates that they want to skip the item or makes a response choice.

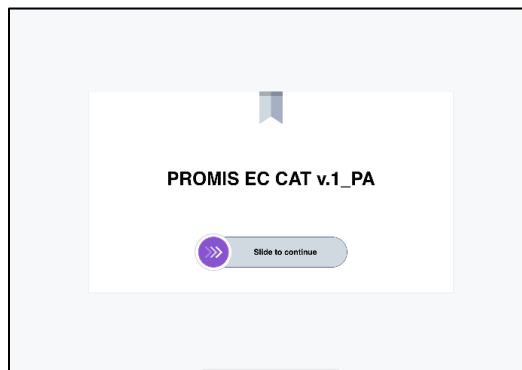
Administration

Set-up and Materials

iPad loaded with questionnaires; a place for the caregiver to sit and complete the set of age-appropriate questionnaires.

Starting the Measure

Like the other Baby Toolbox measures, this questionnaire opens with a title screen with an abbreviated name of the set of questions, as shown below.

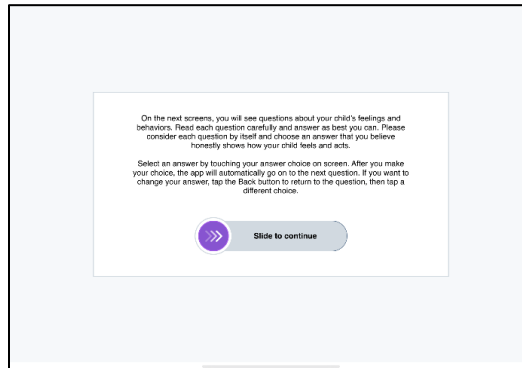


If this is the first measure in the set, the examiner hands the iPad to the caregiver and demonstrates how to start the measure, saying:

“To start the measure, slide the purple circle under the name of the measure: PROMIS EC -CAT v.1 PA to the right.”

Instructional Screen

The instructional screen is shown below.



The instructional screen reads:

On the next screens, you will see questions about your child's feelings and behaviors. Read each question carefully and answer as best you can. Please consider each question by itself and choose an answer that you believe honestly shows how your child feels and acts.

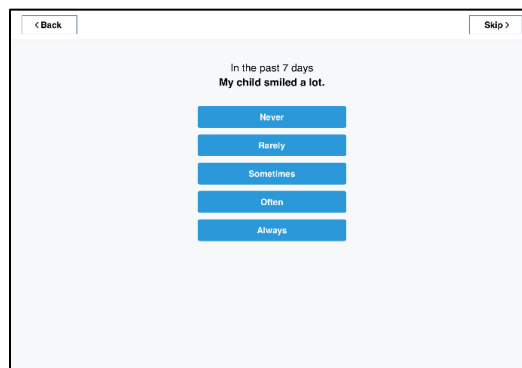
Select an answer by touching your answer choice on screen. After you make your choice, the app will automatically go on to the next question. If you want to change your answer, tap the Back button to return to the question, then tap a different choice.

After the caregiver reads the screen, they should slide the purple circle to right to continue:

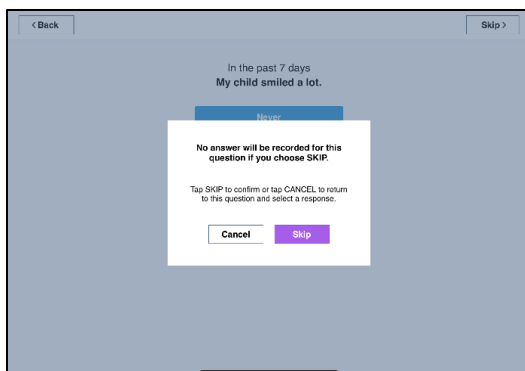
The Questionnaire

For each age group, the questionnaire has the same format. The instructions are followed by a set of items. Each item is presented on its own screen. After the caregiver responds, the App moves to the next item and screen automatically.

If the caregiver wants to go back and change the previous item, they can tap the **"BACK"** button. If they want to skip an item, they can tap the **"SKIP"** button. Below is a sample item:

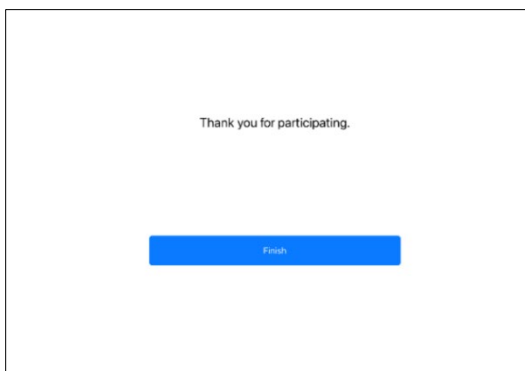


If the caregiver chooses to skip a question, the following screen appears. It asks the caregiver to confirm their choice. Specifically, it asks the caregiver to choose if they want to skip the item or makes a response choice. An example of such a screen is shown below:



Completing the measure

When all items within the form are answered, either a new questionnaire will begin, or a closing screen will appear (shown below). If the closing screen appears, there are no more questions, and the caregiver has completed the parent report measures.



PROMIS EC Frustration Tolerance

Overview

This is a caregiver report questionnaire measuring recognition and regulation of emotions and behaviors in children aged 11+ months. There is one form for all ages. This form has 6 items, each presented on its own screen, and each item has five identical text response options.

The iPad automatically presents the six items one after the other and the caregiver responds to each item. If the caregiver chooses to skip an item, there is a warning screen that asks the caregiver to confirm that they want to skip that item. Then the caregiver either indicates that they want to skip the item or makes a response choice. In either case, the next item is presented or after 6 items, the test is completed and the next measure or the ending screen appears.

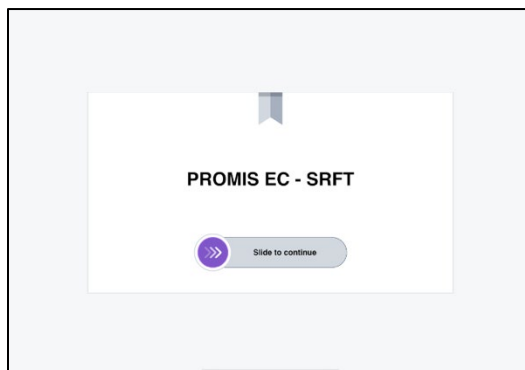
Administration

Set-up and Materials

iPad loaded with questionnaires; a place for the caregiver to sit and complete the set of age-appropriate questionnaires.

Starting the Measure

Like the other Baby Toolbox measures, this questionnaire opens with a title screen with an abbreviated name of the set of questions, as shown below.

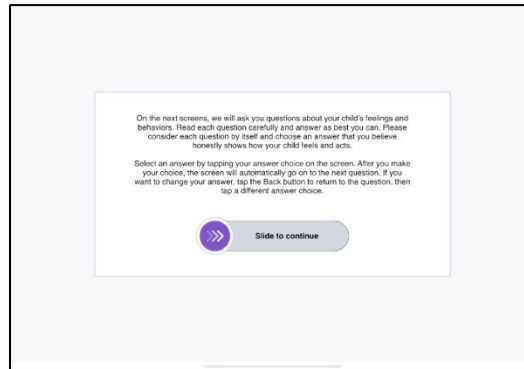


If this is the first measure in the set, the examiner hands the iPad to the caregiver and demonstrates how to start the measure, saying:

“To start the measure, slide the purple button under the name of the measure: PROMIS EC -PR to the right.”

Instructional Screen

The instructional screen is shown below:



This instructional screen reads:

“On the next screens, you will see questions about your child’s feelings and behaviors. Read each question carefully and answer as best you can. Please consider each question by itself and choose an answer that you believe honestly shows how your child feels and acts.

Select an answer by touching your answer choice on screen. After you make your choice, the app will automatically go on to the next question. If you want to change your answer, tap the Back button to return to the question, then tap a different choice.”

After the caregiver reads the screen, they should slide the purple button to right to continue:

The Questionnaire

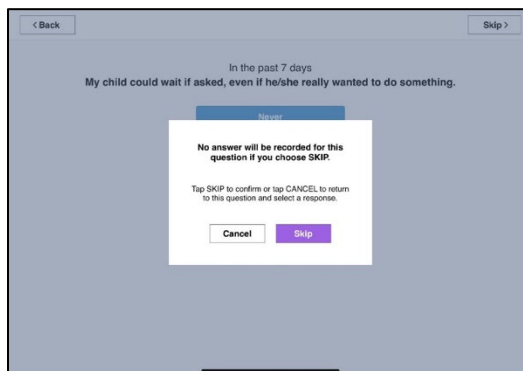
For each age group, the questionnaire has the same format. The instructions are followed by a set of items. Each item is presented on its own screen. After the caregiver responds, the App moves to the next item and screen automatically.

If the caregiver wants to go back and change the previous item, they can tap the **“BACK”** button. If they want to skip an item, they can tap the **“SKIP”** button.

Below is a sample item:

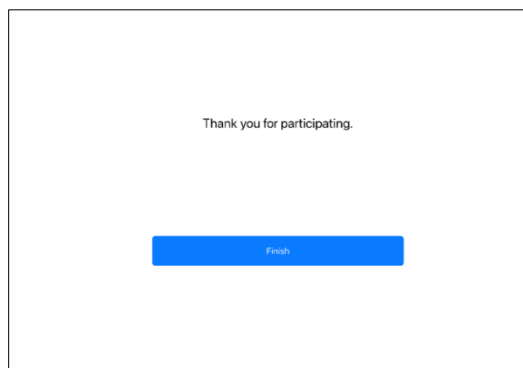


If the caregiver chooses to skip a question, the following screen appears. It asks the caregiver to confirm their choice. Specifically, it asks the caregiver to choose if they want to skip the item or make a response choice. An example of such a screen is shown below:



Completing the measure

When the items within the form are answered, either a new questionnaire will begin, or a closing screen will appear (shown below). If the closing screen below appears, there are no more questions, and the caregiver has completed the parent report measures.



PROMIS Early Childhood Parent Report Flexibility

Overview

This is a caregiver report questionnaire measuring children’s ability to adapt to environmental demands, changes and expectations. There is one form for all ages 11 months and older. This form has four items, each presented on its own screen, and each item has five identical text response options.

The iPad automatically presents the five items one after the other and the caregiver responds to each item. If the caregiver chooses to skip an item, there is a warning screen that asks the caregiver to confirm they want to skip that item. Then the caregiver either indicates that they want to skip the item or makes a response choice. In either case, the next item is presented or after five items, the test is completed and the next measure or the ending screen appears.

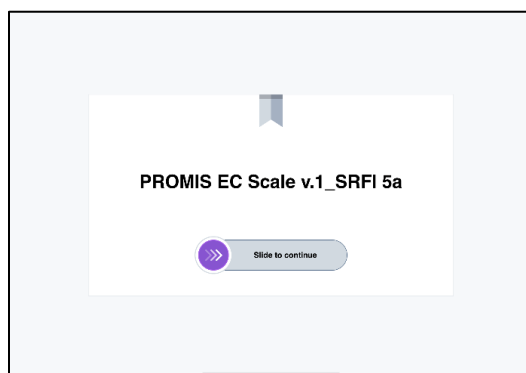
Administration

Set-up and Materials

iPad loaded with questionnaires; a place for the caregiver to sit and complete the set of age-appropriate questionnaires.

Starting the Measure

Like the other Baby Toolbox measures, this questionnaire opens with a title screen with an abbreviated name of the set of questions, as shown below.

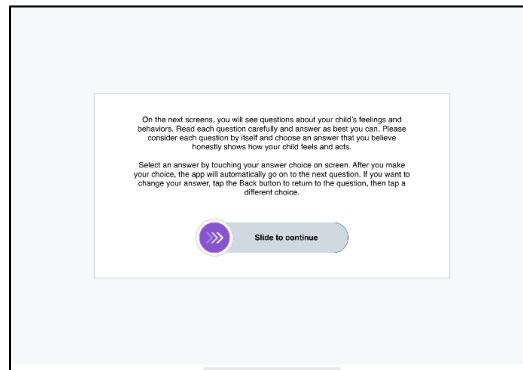


If this is the first measure in the set, the examiner hands the iPad to the caregiver and demonstrates how to start the measure, saying:

“To start the measure, slide the purple circle under the name of the measure: PROMIS EC Scale v.1 SRFL 5a to the right.”

Instructional Screen

The instructional screen is shown below.



This instructional screen reads: “On the next screens, you will see questions about your child’s feelings and behaviors. Read each question carefully and answer as best you can. Please consider each question by itself and choose an answer that you believe honestly shows how your child feels and acts.”

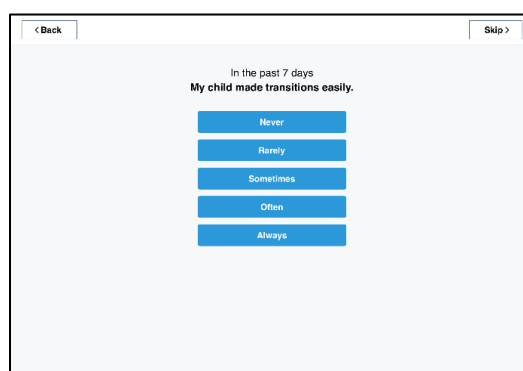
“Select an answer by touching your answer choice on screen. After you make your choice, the app will automatically go on to the next question. If you want to change your answer, tap the **Back** button to return to the question, then tap a different choice.”

After the caregiver reads the screen, they should slide the purple circle to right to continue:

The Questionnaire

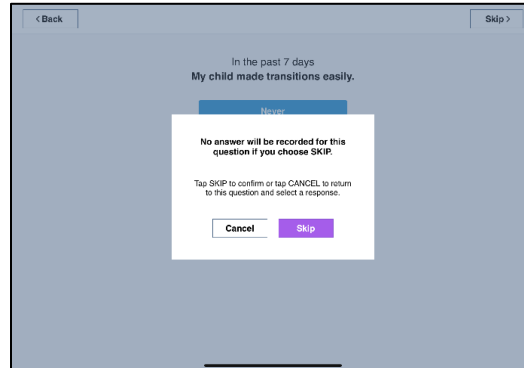
For each age group, the questionnaire has the same format. The instructions are followed by a set of items. Each item is presented on its own screen. After the caregiver responds, the App moves to the next item and screen automatically.

If the caregiver wants to go back and change the previous item, they can tap the **“BACK”** button. If they want to skip an item, they can tap the **“SKIP”** button. Below is a sample item:



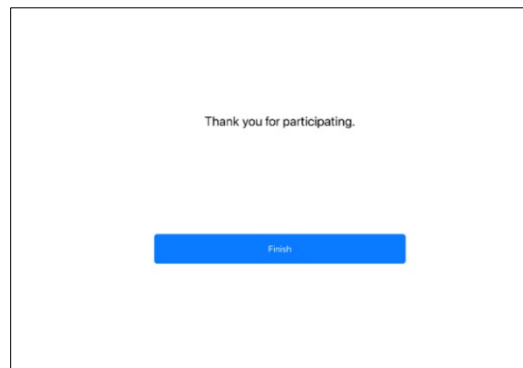
If the caregiver chooses to skip a question, the following screen appears. It asks the caregiver to confirm their choice. Specifically, it asks the caregiver 'to choose if they want to skip the item or makes a response choice.'

An example of such a screen is shown below:



Completing the measure

When all items within the form are answered, either a new questionnaire will begin, or a closing screen will appear (shown below). If the closing screen appears, there are no more questions, and the caregiver has completed the parent report measures.



PROMIS Early Childhood Parent Report Social-Relationships Child-Caregiver Interactions (CCI)

Overview

This is a parent report questionnaire measuring interactions between caregivers and their children aged 11 months and older. There is one form for all ages. This form has five items, each presented on its own screen, and each item has five identical text response options. The iPad automatically presents the five items one after the other and the caregiver responds to each item.

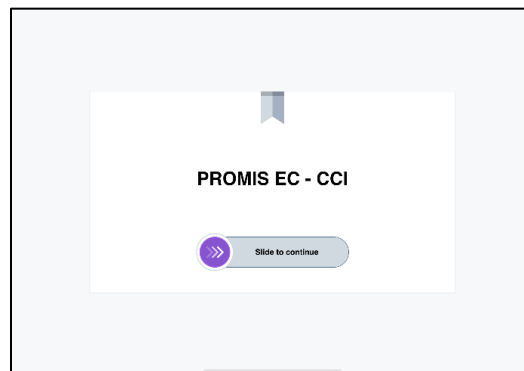
Administration

Set-up and Materials

iPad loaded with questionnaires; a place for the caregiver to sit and complete the set of age-appropriate questionnaires.

Starting the Measure

Like the other Baby Toolbox measures, this questionnaire opens with a title screen with an abbreviated name for the measure, as shown below.

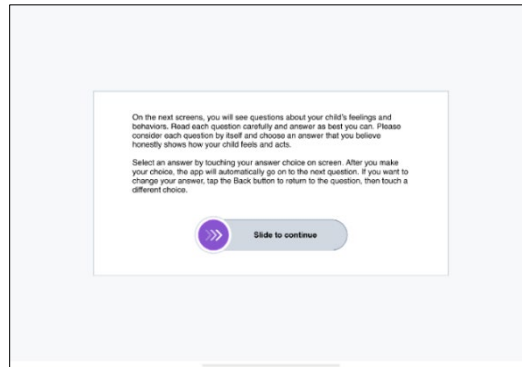


If this is the first measure in the set, the examiner hands the iPad to the caregiver and demonstrates how to start the measure, saying:

“To start the measure, slide the purple circle under the name of the measure: PROMIS EC -CCI to the right.”

Instructional Screen

The instructional screen is shown below.



This instructional screen reads:

“On the next screens, you will see questions about your child’s feelings and behaviors. Read each question carefully and answer as best you can. Please consider each question by itself and choose an answer that you believe honestly shows how your child feels and acts.”

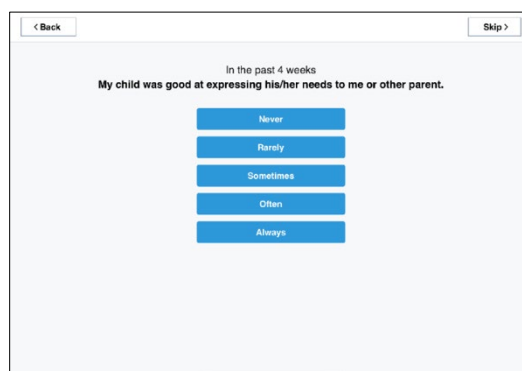
“Select an answer by touching your answer choice on screen. After you make your choice, the app will automatically go on to the next question. If you want to change your answer, tap the **Back button to return to the question, then tap a different choice.”**

After the caregiver reads the screen, they should slide the purple circle to right to continue

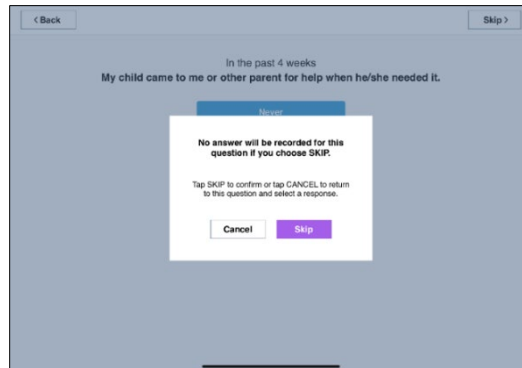
The Questionnaire

For each age group, the questionnaire has the same format. The instructions are followed by a set of items. Each item is presented on its own screen. After the caregiver responds, the App moves to the next item and screen automatically.

If the caregiver wants to go back and change the previous item, they can tap the **“BACK”** button. If they want to skip an item, they can tap the **“SKIP”** button. Below is a sample item:

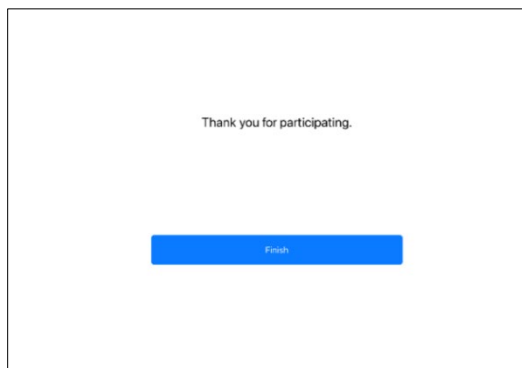


If the caregiver chooses to skip a question, the following screen appears. It asks the caregiver to confirm their choice. Specifically, it asks the caregiver to 'choose if they want to skip the item or make a response choice.' An example of such a screen is shown below:



Completing the measure

When all items within the form are answered, either a new questionnaire will begin, or a closing screen will appear (shown below). If the closing screen appears, there are no more questions, and the caregiver has completed the parent report measures.



PROMIS Early Childhood Parent Report Social-Relationships Peer-Relationships

Overview

This is a parent-report questionnaire measuring positive peer interactions and empathic behaviors in children aged 11 months and older. There is one form for all ages. This form has 4 items, each presented on its own screen, and each item has 5 identical text response options. The iPad automatically presents the 4 items one after the other and the caregiver responds to each item.

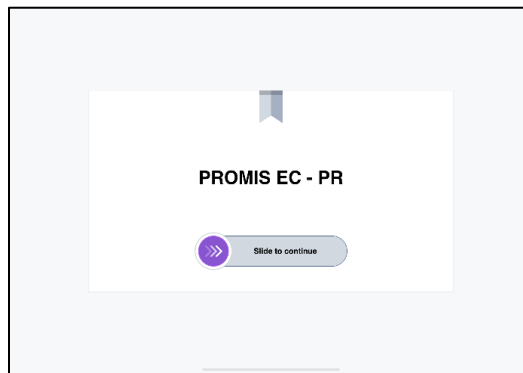
Administration

Set-up and Materials

iPad loaded with questionnaires; a place for the caregiver to sit and complete the set of age-appropriate questionnaires.

Starting the Measure

Like the other Baby Toolbox measures, this questionnaire opens with a title screen with an abbreviated name for the measure, as shown below.

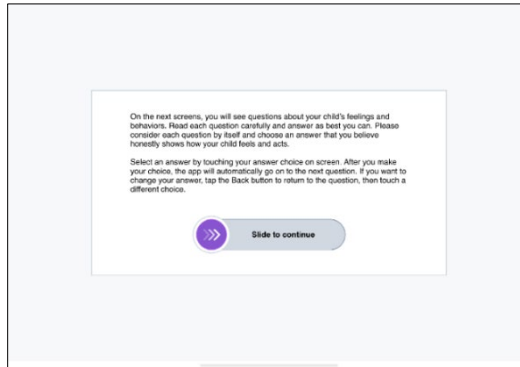


If this is the first measure in the set, the examiner hands the iPad to the caregiver and demonstrates how to start the measure, saying:

“To start the measure, slide the purple circle under the name of the measure: PROMIS EC -PR to the right.”

Instructional Screen

The instructional screen is shown below.



This instructional screen reads:

“On the next screens, you will see questions about your child’s feelings and behaviors. Read each question carefully and answer as best you can. Please consider each question by itself and choose an answer that you believe honestly shows how your child feels and acts.”

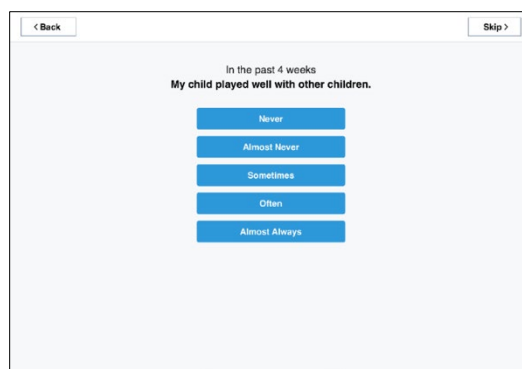
“Select an answer by touching your answer choice on screen. After you make your choice, the app will automatically go on to the next question. If you want to change your answer, tap the Back button to return to the question, then tap a different choice.”

After the caregiver reads the screen, he or she should slide the purple circle to right to continue.

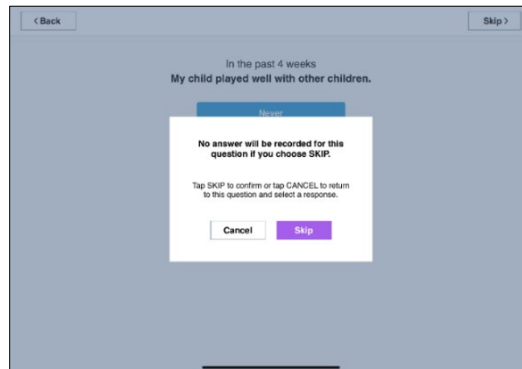
The Questionnaire

For each age group, the questionnaire has the same format. The instructions are followed by a set of items. Each item is presented on its own screen. After the caregiver responds, the App moves to the next item and screen automatically.

If the caregiver wants to go back and change the previous item, they can tap the **“BACK”** button. If they want to skip an item, they can tap the **“SKIP”** button. Below is a sample item:

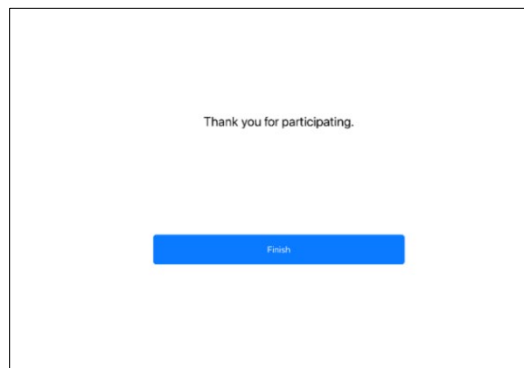


If the caregiver chooses to skip a question, the following screen appears. It asks the caregiver to confirm their choice. Specifically, it asks the caregiver to 'choose if they want to skip the item or make a response choice.' An example of such a screen is shown below:



Completing the measure

When all items within the form are answered, either a new questionnaire will begin, or a closing screen will appear (shown below). If the closing screen below appears, there are no more questions, and the caregiver has completed the parent report measures.



Appendix 1 – Recommended Supplies and Materials

In many cases when using the NIH Baby Toolbox® app, an iPad is all that is needed to administer the tests. However, there are some additional supplies needed for some tests as outlined below. More detail, including suggested vendors, can be found at <https://nihtoolbox.zendesk.com/hc/en-us/articles/25267276682644-What-supplies-are-needed>. When purchasing additional supplies, keep the following in mind:

- Unless recommended otherwise, all materials and equipment can be purchased from any vendor of your choosing.
- Adhere to the minimum requirements for the materials and equipment where applicable.
- Some materials and equipment can be reused for multiple tests.
- Vendors may provide discounts for educational institutions, non-profits, etc.

All NIH Baby Toolbox tests require an iPad. Users who need to administer tests that employ eye tracking (Looking While Listening and Familiarization) require an 11” iPad Pro. Other tests may be administered using less expensive iPad on the list of supported devices.

The most up to date list of supported iPads can be found at <https://nihtoolbox.zendesk.com/hc/en-us/articles/33149622572564-Hardware-Requirements-for-Baby-Toolbox>

A highchair required for most of the NIH Baby Toolbox tests.

Cognition: Additional Recommended Supplies and Materials:

Test	Equipment and Materials
Familiarization	iPad stand for gaze measures
	Face cover for the caregiver (if required)
Looking While Listening	iPad stand for gaze measures
	Face cover for the caregiver (if required)
Touch Screen Tutorial	iPad stand for touch measures
Memory Task Learning	iPad stand for touch measures
Memory Task	iPad stand for touch measures
Visual Delayed Response	iPad stand for touch measures
Picture Vocabulary	iPad stand for touch measures
Counting	iPad stand for touch measures
Subitizing	iPad stand for touch measures
Who Has More	iPad stand for touch measures
Verbal Arithmetic	iPad stand for touch measures
Mullen Visual Reception	iPad stand for touch measures
	Metal spoon
	Colorful plastic ring
	2 Identical washcloths
	Plastic cup
	Hairbrush
	Toy car
	Red ball
	Big Red Barn book
	Plastic teddy bear
Large nesting cup	

Mullen Language Scale - Receptive	iPad stand for touch measures
	Metal can with lid, 3 x wooden blocks
	Familiar toys
	Wooden block
	Toy car
	Red ball, colorful box with cover
	2 x cups
	Toy table
	Teddy bear
Mullen Language Scale – Expressive Prompted	iPad stand for touch measures
	Ball
	Book
	Car
	Key
	Knife
Mullen Language Scale – Expressive Observational	iPad stand for touch measures
MacArthur Bates CDI-CAT Comprehension	iPad stand for touch measures
MacArthur Bates CDI-CAT Production	iPad stand for touch measures

Motor: Additional Recommended Supplies and Materials:

Test	Equipment and Materials
Get Up & Go	iPad stand for gaze measures
	36 × 36 × 6-inch box
	Masking/painters tape
	Measuring tape
	Carpet, foam mat, or other soft, clean floor covering (recommended but not required)
	Appealing toy/snack
Reach To Eat	iPad stand for gaze measures
	1-cup measuring cup with a flat base, diameter of approximately 8.25 cm (3.25 in), and a flat handle attached to the bowl of the cup
	Formula spoon with a flat base, diameter of approximately 2.5 cm (1 in), and a flat handle attached to the bowl of the spoon
	Approximately 10 cheerios per participant or similarly sized dry cereal or puff snack child likes (must be a snack that “melts” in child’s mouth to prevent choking)
	1-inch (2.5 cm) wooden cube

	1 spoon (approximately 6.2 inches (15.75 cm long) with a 1.25 in (3.18-cm) diameter bowl
	Tissues to dry off spoon
	Hand sanitizer (to clean child's hands before they eat food and before you touch food that they will eat)

Social-Emotional: Additional Recommended Supplies and Materials:

Test	Equipment and Materials
Social Observation Measure Younger (9-23 months)	iPad stand for touch measures
	Wind-up toy
	Car
	Jar
	Figure
	Koosh ball
	Board books
	Baby and Feeding set #1
	Feeding set #2, pot with lid, spatula
	Large bowl and serving spoon
Social Observation Measure Older (24-42 months)	iPad stand for touch measures
	Cooking set, including a pot with a lid and a toy inside
	2 dolls
	Wooden blocks in 2 bags
	Clear child-proof container with elephant "Lego" pieces
	I Spy book
Caregiver Checklist (Younger & Older)	iPad stand for touch measures
Rothbart (all tests)	iPad stand for touch measures
PROMIS (all tests)	iPad stand for touch measures

Appendix 2 - Mullen Expressive Language Observational Scale Log

Check all the behaviors that you observed during administration as YES	YES
EL2 Vocalizes (any throaty sounds)	
EL3 Smiles and Makes Happy Sounds	
EL4 Coos, Chuckles, or Laughs (makes 2 of 3 sounds)	
EL5 Make Vocalizations (uses 2 or more sounds, like “ <i>ah, eh, m</i> ”); Can ask parent	
EL6 Plays with Sounds (such as “ <i>o, u, a-a-a, ah-goo</i> ”); Can ask parent	
EL8 Produces 3 Consonant Sounds (such as “ <i>p, d, k, g, m</i> ”)	
EL12 Jabbers with Inflection (changes in inflection; different tones or pitch)	
EL13 Combines Jargon/Gestures (jargon + gestures, touching or looking)	
EL14 Combines Words/Gestures (word approximations with pointing or gesturing); Can ask parent	
EL17 Uses 2-Word Phrases	
EL19 Uses Pronouns (such as “ <i>my</i> ”, “ <i>mine</i> ”, “ <i>you</i> ” or “ <i>me</i> ”)	
EL22 Uses 3 to 4 Word Sentences	