

Documentation - MBEMA tablet version for preschoolers

<https://peretzlab.ca/online-test-material/material/mbema-young-children>

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About the test

The MBEMA on tablet is a shortened adaptation of the original Montreal Battery of Evaluation of Musical Abilities (MBEMA; “A novel tool for evaluating children’s musical abilities across age and culture”, Peretz et al., 2013; <https://peretzlab.ca/online-test-material/material/mbema/>).

This tablet-based version—implemented on an Android device—was developed to assess musical abilities in children aged 4–6 years, and can serve as a preliminary screening tool for identifying children with amusia. It includes 3 tests:

- Melody
- Rhythm
- Memory

To contextualize this battery vs other versions of the MBEMA:

The full MBEMA was created to assess musical abilities in young children, since the Montreal Battery of Evaluation of Amusia (MBEA) for adults is too complex for participants under 10 years old. It includes five subtests—contour, interval, scale, rhythm, and memory—each with 20 trials, requiring about 40 minutes to complete. The melodies are shortened versions of those used in the adult MBEA.

A short MBEMA version was later developed for children aged 6–8 years. It includes three subtests (melody, rhythm, memory) with 60 trials and takes about 20 minutes to complete.

The most recent tablet version of the MBEMA is designed for even younger children (4–6 years old). It includes three subtests, 36 trials, and takes approximately 15 minutes to administer.

Installation

The task is provided as an apk file. The apk file needs to be transferred to the tablet (e.g. via USB) and installed (e.g. via the Files app). It may be necessary to change the Android settings on the tablet to allow installation (e.g. Settings > Apps > Special App Access > Install Unknown Apps).

Administering the test

Testing conditions

- The test should be carried out in a quiet place
- Make sure the tablet battery is sufficiently charged.
- The tablet is placed on the table facing the child. The experimenter is seated next to the child.

Starting the session

- Start the app
- Fill in the participant ID code (if it is left blank, the value “EMPTY_ID” will be used in the saved data).
- Choose the test language
- (Note that this screen shows the app version at the bottom of the screen, in case you ever need to verify it)
- Press “OK”
- When the loading is complete, the test’s welcome graphic will be displayed

General instructions

- If the participant will be using headphones, a splitter cable or adapter may be used to permit the researcher and participant to both listen through headphones.
- During the testing, the experimenter manipulates the tablet and reads the instructions to the child at the beginning and before each block; the child presses the flowers, planets, and houses to start the trials, and taps on the graphic to select their response (or the experimenter may do this if preferred).
- Each of the 3 tests is preceded by an instruction screen. The instructions should be clearly explained to the participant before continuing to the test. A suggested instruction script is provided later in this document ([English instruction script](#)).

The 3 tests

- The order of the tests is:
 - 1 - Melody task (2 practice + 12 test trials) - Flower items - Two melodies, “same”/”different” judgment
 - 2 - Rhythm task (2 practice + 12 test trials) - Planet items - Two melodies, “same”/”different” judgment
 - 3 - Memory task (2 practice + 12 test trials) - House items - One melody, “already heard”/”new” judgment

- The main screen of each test contains an arrangement of items (flowers, houses or planets). Tap on an item to start a trial. The order of trials will be the same regardless of which items are chosen first.
- The **first two trials** in each test are the **practice trials**, which means
 - 1) You can choose to repeat the stimuli (look for the arrow icon in the middle of the screen).
 - 2) There is feedback provided (correct/incorrect) after the response.
 - 3) These trials are not included in the main score.
- Please note that for the non-practice trials, no feedback should be provided to the participant.
- At the end of the last test, there will be a final screen confirming that the testing is complete. Tapping the screen again will close the app.
- The full session takes approximately 15 minutes.

Exiting the test

- While the app is open, the bottom Android control buttons (back, home, recents) are hidden. They may be revealed by swiping up from the bottom screen edge.
- However, to avoid accidentally closing the app, during testing the back button is disabled. If it is necessary to close the app while it is the middle of the game, you'll need to open the "recents" view and then swipe away the game's window so the app is closed by the Android OS.
- At the end of the game, there will be a final screen confirming that the testing is complete. Tapping the screen again will close the app.

Retrieving data

- All data are saved in the app's default directory provided by the Android OS. This is normally: **Android/data/ca.peretzlab.mbema_cordova_psychojs/files**
- Please be aware that the data files MIGHT NOT be visible in the tablet's own Files app. **For this reason, a computer should be used to access the data files via USB connection.** There may be a prompt displayed on the tablet to approve access before the files become visible on the computer.
- The easiest method is to connect the tablet to a Windows computer via USB cable. The tablet will appear as a device in the Windows File Explorer, and you can navigate to the correct folder on the device to find the files.
- Alternatively, the 'adb' command line tool can be used to transfer files on Windows, MacOS and Linux. It is available in the Android SDK Platform Tools package provided by Google: <https://developer.android.com/tools/adb>
- Each session's data are saved in two files, one with a name ending in "scores.csv" and the other ending in "trials.csv". The "scores" file is used for analysis. The columns in the scores file are:
 - **id** — The ID that was entered for the participant, or "EMPTY_ID" if it was left blank.

- **timestamp** — The timestamp of the start of the session, in UTC timezone, according to the tablet's clock.
 - **task_version** — Version of the app
 - **language_code** — The language in which the task was completed, e.g. "en" or "fr"
 - **complete** — "TRUE" if the testing was complete (all trials of all tests were completed), or "FALSE" if testing stopped before the end of the task.
 - **melody_total** — Number of trials in the test (note that the per-test scores are only written to the file at the end of each test)
 - **melody_correct** — Number of correct responses in the test
 - **melody_percent** — Percent of correct responses in the test
 - **rhythm_total, rhythm_correct, rhythm_percent** — scores for the rhythm test (see melody description)
 - **memory_total, memory_correct, memory_percent** — scores for the memory test (see melody description)
 - The full filename consists of the participant ID, a timestamp (in UTC, not local time), and the "scores" or "trials" suffix.
 - If no participant ID was entered on the initial screen before the task, a default "EMPTY_ID" value will be used in the session's data files.
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English instruction script

1- Melodic perception (14 items) 2 with assistance, 12 alone.

We're going to do the **flower game**.

Before the child touches the screen say: we are going to listen to two little melodies, and you have to tell me if these melodies are the same or not the same. You know what it means the same or not the same (explain if needed).

First, I will help you a little, but afterwards you can do it on your own. I will stay to accompany you.

Are you ready to start?

Look, you are going to press on a flower and listen to the two melodies.

See, there are two bees and a bee and a ladybug that have just appeared. If both melodies you heard were the same, press the two bees. If the melodies weren't the same, press the bee and the ladybug.

For the first two items, tell the child the correct answer if he or she does not choose the correct one. Just explain the answer. For example, the first melody was ... and the second was...

So, it's not the same. You had to choose the bee and the ladybug.

After the first two items: now, you will continue on your own, since you know the game of the bee. You will listen to the two little melodies and say if the melodies are the same or not the same.

From the 3rd item, stop intervening, but always encourage the child to continue. If the child asks if his/ her answer is correct, just say: "You are doing a good job, we continue!"

2- Rhythmic perception (14 items) 2 with assistance, 12 alone.

Now, we're going to play the **planets game**.

Before the child touches the screen say: the same as the last game, you will listen to two little melodies, and you have to say if these melodies are the same or not the same.

First, I will help you a little, but afterwards you can do it on your own. I will stay to accompany you.

Are you ready to start?

Look, you are going to press a planet and listen to the melodies.

See, there are two rockets and a rocket and an airplane that just appeared. If the the two melodies you heard are the same, press the two rockets. If they are not the same, press the rocket and the plane.

For the first two items, tell the child the correct answer if he/she didn't choose the correct one.

Just explain the answer. For example, the first melody was ... and the second was..... So it's not the same. You had to choose the rocket and airplane...

After the first two items: now, you will continue on your own, since you know the game of the

rocket. You will listen to the two little melodies and say if they are the same or not the same.

From the 3rd item, stop intervening, but always encourage the child to continue. If the child asks if his/ her answer is correct, just say: "You are doing a good job, we continue!"

3- Auditory memory (14 items) 2 with assistance, 12 alone.

Now, we are going to do the **house game**.

This time you will tell me if you've already heard the melody in the flower or planet games before or if it's a new melody that you are hearing for the first time.

First, I will help you a little, but afterwards you can do it on your own. I will stay to accompany you.

Are you ready to start?

Look, you're going to tap a house and listen to the melody.

See, there's a bear cub and a frog that just appeared. We already knew the bear cub. If you have heard the melody in the other games before, press the bear. If it's a new melody that you hear for the first time, press the frog.

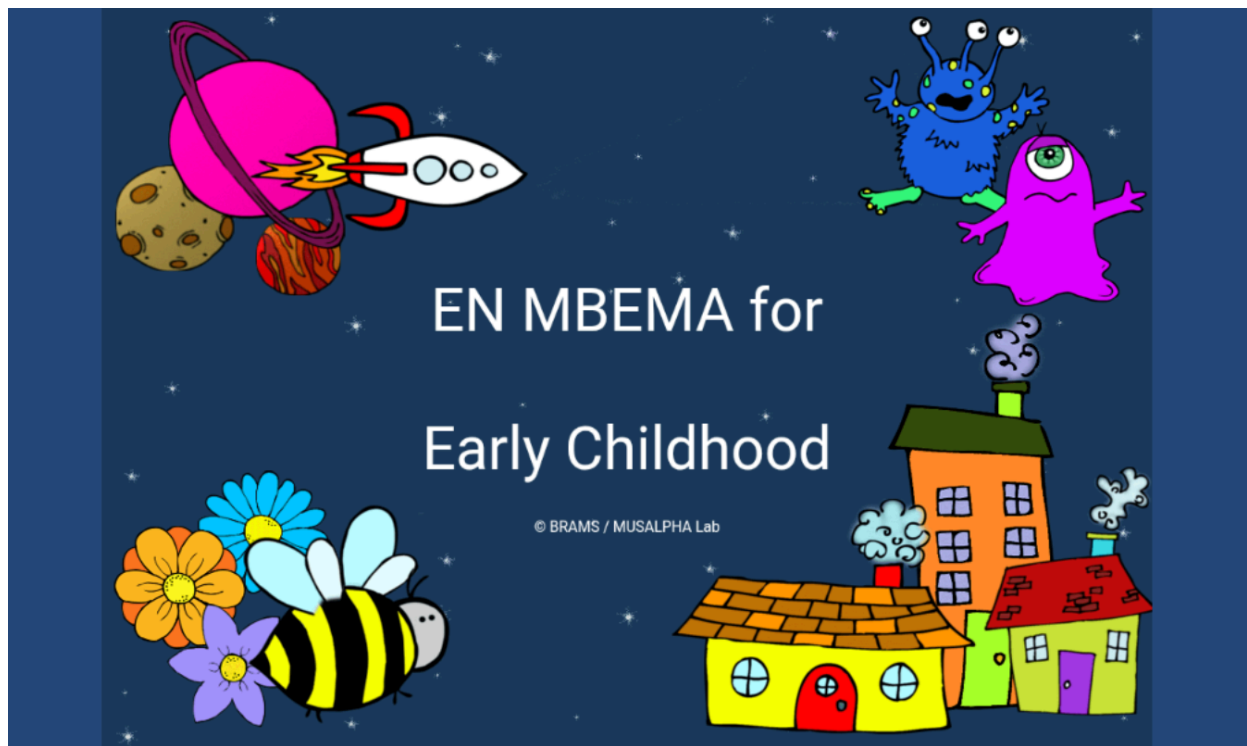
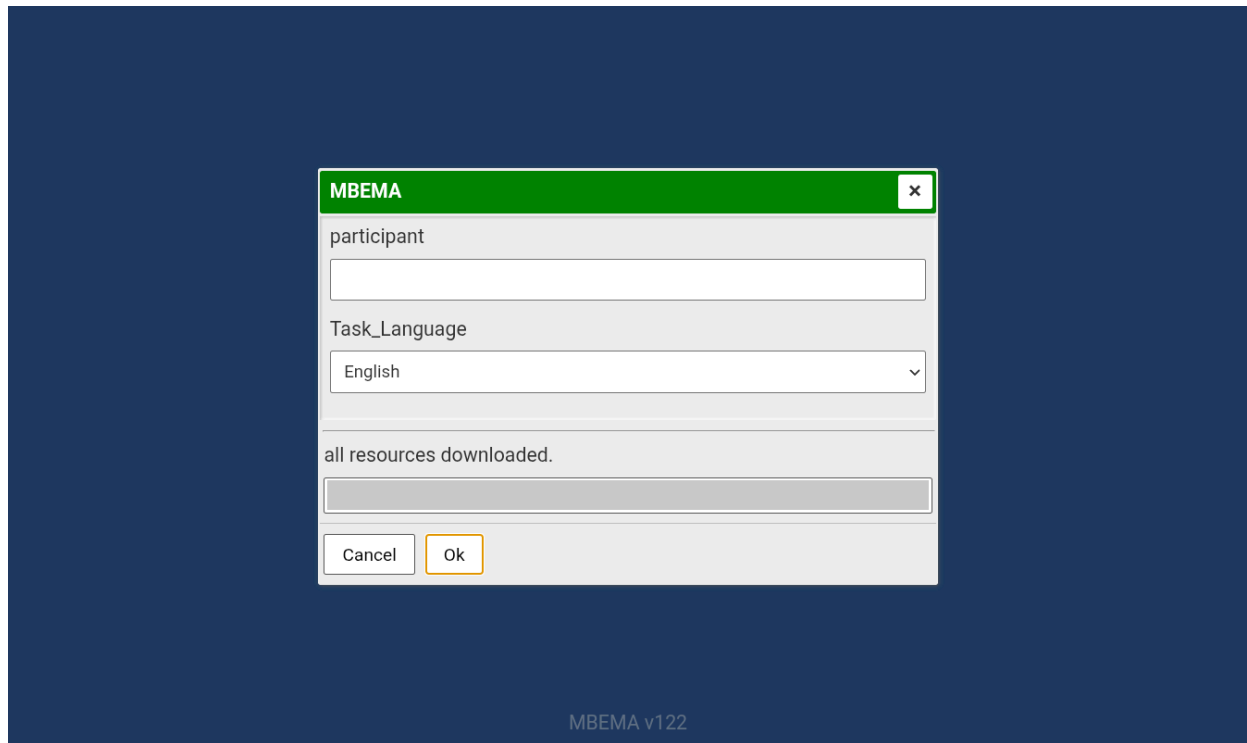
For the first two items, tell the child the correct answer if he or she didn't choose the correct one. Just explain the answer.

After the first two items: now, you will continue on your own, since you know the house game. You will listen to the melody and tell me if you know it.

From the 3rd item, stop intervening, but always encourage the child to continue. If the child asks if his/her answer is correct, just say: "You are doing a good job, we continue!"

Screenshots

Start



“Flower game” (melody)



Melodic Task





Practice trials: (with the option to repeat the sounds)



Same





Different

Correct

Incorrect

Main trials:



Same



Different



Rhythmic Task





Repeat



Same



Different

Correct

Incorrect



Same



Different