



# OpenEar

For macOS und Windows

Version 2.0

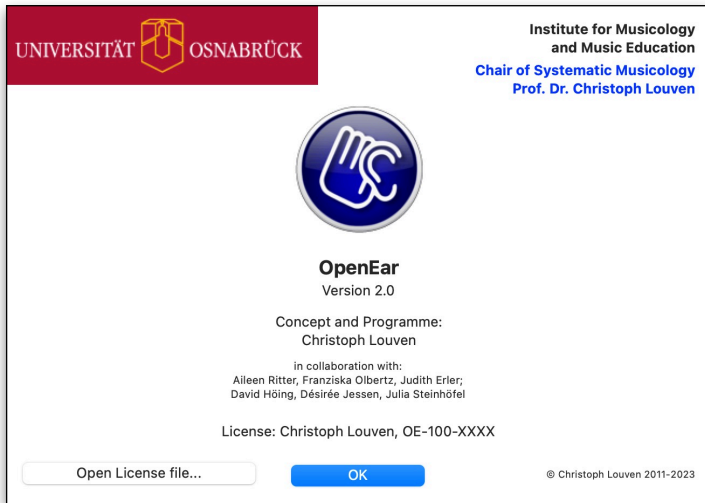
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## I. Description



*OpenEar* is a software for presenting computer-aided sounding questionnaires that was designed at the University of Osnabrück. The programme can both collect the voluntary listening duration and the preference ratings of each user and calculate/determine the value of the *open-earedness index* (OOI). The music examples can be chosen ad lib while the programme sequence can be regulated flexibly using multifarious adjustable parameters. Hence, *OpenEar* can also be utilized as universal tool for sounding questionnaires within in the framework of music psychology and music pedagogics.

## **I.1. Changes since version 2.0**

- New licence management. The licence file for OpenEar can now be loaded in the info dialogue at the start of the programme. Manual installation at special locations is no longer necessary. .
- Completely new project management. An OpenEar project with all settings will be saved in a single \*.OE2 file in future. These project files can be loaded and saved during the programme run, so that different configurations can be managed very easily. Only the audio files and the output files remain in separate folders.
- Basic separation of the programme file from the licence and project files. This makes a much simpler and more flexible handling of the project files possible.
- New settings dialogue with simplified management of the folder structure and music database.
- The IDs of the music samples can be re-sorted to avoid unnecessary blanks in the output files.
- In newer macOS versions, access permission to the document folder is requested and checked when the programme is started. OpenEar cannot be run without this authorisation.

## 2. Installation

*OpenEar 2.0* runs on the following systems:

- Mac OS X 10.14 or later;
- Windows 10 or later (32 and 64 bit)

Version 1.1.1 of *Openear* is still available on older computers. This runs under the systems

- Mac OS X 10.10.5 or later;
- Windows 7 SP 1 or later (32 und 64 bit);

To install *OpenEar*, unzip the downloaded ZIP file (for macOS or Windows) and copy the complete contents to any directory on your hard disk. An executable test version is then immediately available. However, it makes sense to move the folders to the following locations:

- To the programme directory:
  - Complete folder 'OpenEar': This contains the programme file and necessary additional files, depending on the system:
    - macOS: OpenEar.app
    - Windows: OpenEar.exe; Folders 'OpenEar Libs' and 'OpenEar Resources'
- To the Document directory:
  - Complete Folder 'OpenEar Data'
 

This contains folders for the documentation, for the audio files (with examples), for the output files and an example file.

### 2.1. License file

You can request a personalised licence file `license.lic` for *OpenEar* free of charge at [clouven@uos.de](mailto:clouven@uos.de). If this file is missing, the programme is limited to a maximum of three music examples of 30 seconds each.

Activate the `license.lic` file via the corresponding button in the welcome dialogue (see title page).

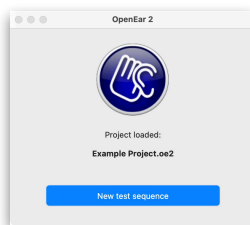
## **2.2. Converting an *OpenEar* 1 configuration**

If an *OpenEar* 1 configuration file is already found on your computer, this configuration can be saved in the new *OpenEar* 2 file format and used with *OpenEar* 2. The *OpenEar* 1 configuration remains unchanged and can still be used with *OpenEar* 1.

When *OpenEar* 2 is started for the first time, a search for an existing configuration is automatically carried out and, if necessary, saving in the new format is offered. This search is no longer carried out automatically when the programme is started in the future. However, you can reactivate the search later in the programme settings. Then the next time *OpenEar* 2 is started, the search is carried out in the same way as when it was first started.

### 3. Sequence of the Programme

At the beginning of an *OpenEar* session and after the end of each trial, a start window appears with the name of the loaded project. At this time, access to the project administration and to the project settings in the menu bar is also possible. During a running trial, the menu bar is hidden so that the subjects do not accidentally change the trial settings.



An *OpenEar* trial consists of a questionnaire at the beginning and one or two rounds of listening to and/or rating the music samples:

#### A. Questionnaire

Four different variants of the questionnaire can be selected in the experiment settings. In the simplest case, only the subject ID must be entered.

The most detailed questionnaire includes extensive demographic

information. If the execution is controlled by the investigator, the 'Continue' button is deactivated for the subjects. In this case, the questionnaire can be exited by Alt-clicking.

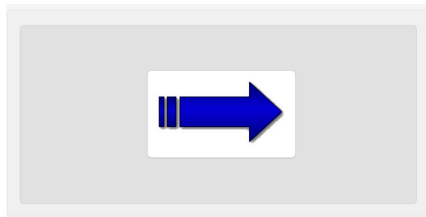
#### B. Listening and/or rating sections

*OpenEar* can capture the subjects' reaction to the music examples with regard to two aspects:

- voluntary listening durations: how long does the user voluntarily listen to a music example if he/she can click through to the next example at any given time?
- Preference and familiarity rating: How much did the subject like the music example? Was he familiar with the example before the test? How familiar is he with the style of music? Did the rating change in course of the test?

These two aspects can be measured both conjointly in one cycle or separately in two cycles of the music examples:

- In the first part (free listening) during the separate assessment, only the large next-button is visible initially. Thus, the free listening is not yet influenced by the rating assignment.

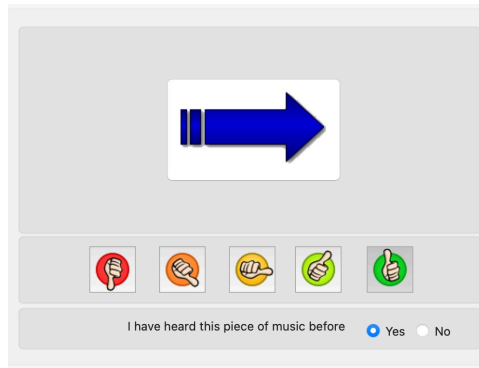


If no rating is required the session ends after this part. If a rating should be carried out, a second cycle of the music examples follows. The subjects must first listen to the examples for a definable amount of time (that is they cannot be interrupted ahead of that time) before the rating has to be delivered.

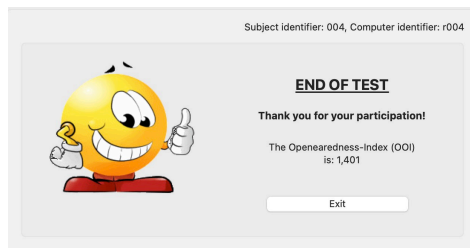
- In the conjoined cycle the user can first listen to a music example as long as he wants. In that process only the large next-button is active initially. When this button is clicked, the music stops and the user must first rate the example before the next click on the next-button starts a new music example. The evaluation is done on a



five-point scale with either a verbal description or different types of picture symbols.



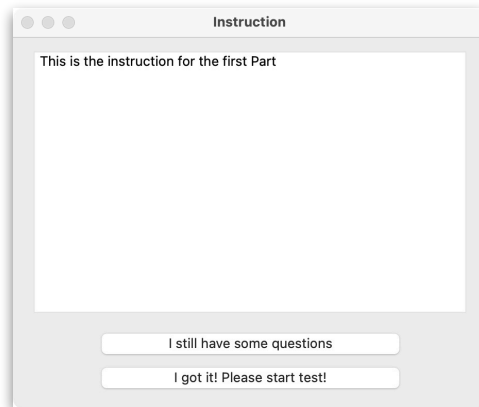
After completing the runs through the music examples, *OpenEar* displays a configurable completion window in which, among other things, the value for the OOI of the subject can also be displayed.



When controlled by the experimenter, the 'Exit' button is not visible. The window can then be exited with a configurable keyboard shortcut.

The entire sequence of the programme can

- a. vbe operated single-handedly by the user. Then, the test instructions occur as screen orders. The text of these instructions can be edited ad lib in the program preferences.



- b. Should the instruction be carried out by the test leader; an intermediary screen displaying a stop sign fades in inbetween the listening and the rating part of the separate cycles which can only be quit using a special key combination that can be configured individually.



## 4. Programme Settings

The sequence of the programme can be adapted to different research designs through numerous settings. The settings can only be accessed during the start window via the menu bar. Access is not possible during a running trial.

The screenshot shows the 'Sequence' tab of the OpenEarl configuration window. The window title is 'file:///Users/clou/Documents/Openearl/Example%20Project.oe2'. The 'Questionnaire' dropdown is set to 'Complete, adult version'. Under 'Music examples', 'Number of items' is set to 1, and 'Random' is selected. The 'Listening part' section shows 'Duration of items' as 10 s and 'Max duration listening part' as 10 min. The 'Rate music examples' section has 'In separate 2nd part' selected with a duration of 2 s. The 'Preference rating' section has 'Thumbs' selected. There are checkboxes for 'Piece heard before?' (checked), 'Familiar with kind of music?', and 'Rating changed by listening?'. At the bottom, there is a checkbox for 'Offer conversion of the OpenEarl configuration when starting the programme.' and 'Cancel' and 'Save and proceed' buttons.

The settings are divided into the four tabs "Sequence", "Instructions", "Display and Output" and "Music examples".

### a. Sequence

- questionnaire: here, four different versions of the introductory questionnaire can be chosen:
  - number of test subject only: the test subject does not have to enter any additional information
  - only basic data (age, gender, form/class)
  - complete, adult version
  - complete, simplified version for children

- Music Examples:

How many music examples are offered during the cycle? This number can be smaller than the total number of music examples in the data base; it can, however, not be larger since one example cannot be presented meaningfully more than once.

The order of the examples can both be randomized or follow the order of the data base. If the rating is separated from the free listening part, the examples are randomized again before the rating cycle begins.

- Schedule listening part:

The “duration of the music examples” defines the maximum duration of the free listening time for a piece of music. Should the subject listen to a piece for as long as this tab defines, the music is stopped automatically and this is noted in the protocol. Should the music end prematurely because the duration of the audio file is shorter than the defined time, this is noted in the protocol as well.

“Further activate after”: During the free listening part, the “next”-button is deactivated when a new music example starts. Only after the set duration does it become possible to click this button again. Thus, the subject is prevented from accidentally clicking the next button too early. Additionally, a minimum listening duration for the pieces can be defined. The logged free listening duration of a example starts after the re-activation of the button and ends with the next click on “next”.

“Maximum duration”: The set value defines the maximal total duration of the first part of the test (free listening or listening plus subsequent rating). When the time is exceeded, no new music is played and the first part ends.

However, a music example that has already been started will not be aborted.

- Rating the music examples:

Should a rating be carried out and should this be done in a separate part of the test or directly after listening to the examples? “Duration of the music examples” defines, how long a music examples has to be listened to before it can be rated.

Which scala should be used for the rating: none (if only the addition questions shall be asked), smileys, thumbs, weather symbols or verbal?

Which questions are asked in addition to the rating?

## b. Instructions

file:///Users/clou/Documents/Openear/Example%20Project.oe2

Sequence Instructions Display and Output Music examples

☒ Subjects get text instructions and control the test themselves

Listening part

Children: Instructions Listening Part Children ...

Adults: Instructions Listening Part Adults ...

Rating part

Children: Instructions Rating Part Children ...

Adults: Instructions Rating Part Adults ...

Combined listening and rating

Children: Instructions Combined Part Children ...

Adults: Instructions Combined Part Adults ...

1 When controlled by the experimenter:  
key to exit the intermediate window and the closing window.  
(The questionnaire can be exited with Alt-click).

Cancel Save and proceed

- Subjects get text instructions:

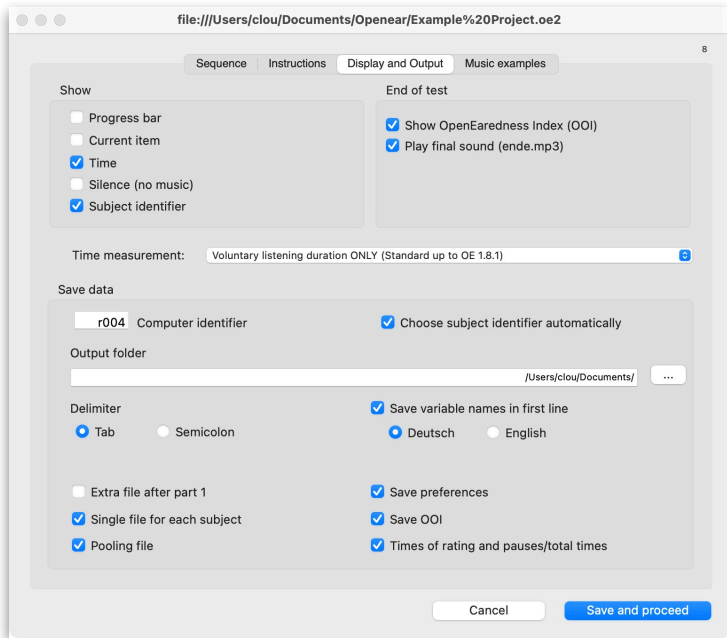
When activated, the user can control the entire test sequence single-handed and independent from the test leader. This is especially advantageous when the test is carried out on different computers and the subjects do not begin simultaneously.

The instructions for the three modes of the test can be edited freely for both children (age < 18) and adults at the end of the text field by clicking the editing button. Additionally, the editing window allows for the setting of font size and window size.

When the text instructions are deactivated, an intermediary screen displaying a stop-sign is shown between the first and the second part of the test. This can only be left with the key that can be specified here. This is especially useful for a test with groups of children working on several computers who are to receive verbal instructions together.

During the test procedure, the operator has to Alt-Click to activate the button "Begin Experiment". This ensures that subjects cannot accidentally start the experiment before the operator has finished the instructions.

### c. Display and Output



- **Display:**  
The first three options show the current state of the experiment re: the lapse of time during the cycles of playing music in the upper left corner of the window.  
Silence: here, an unobtrusive and small “Stop”-sign is shown when the test subject is currently not listening to music.  
Subject identifier: shows identification of test subject and computer in the upper right corner.
- **End of test:**  
Display of OOI: If the option is chosen, the index of open-earedness (OOI) is determined using the collected voluntary listening durations and ratings of the user. More information on the OOI can be found on our homepage.  
Optionally, and if located in the audio folder, the file named ‘ende.mp3’ can be played at the end of the test.

- Time Measurement

Two modes can be chosen:

- ONLY the voluntary listening durations will be measured from activating the 'proceed' button until the example ends. If a short example ends before the button is activated a voluntary listening duration of 1 ms is recorded.

This is the standard mode of all previous OpenEar versions.

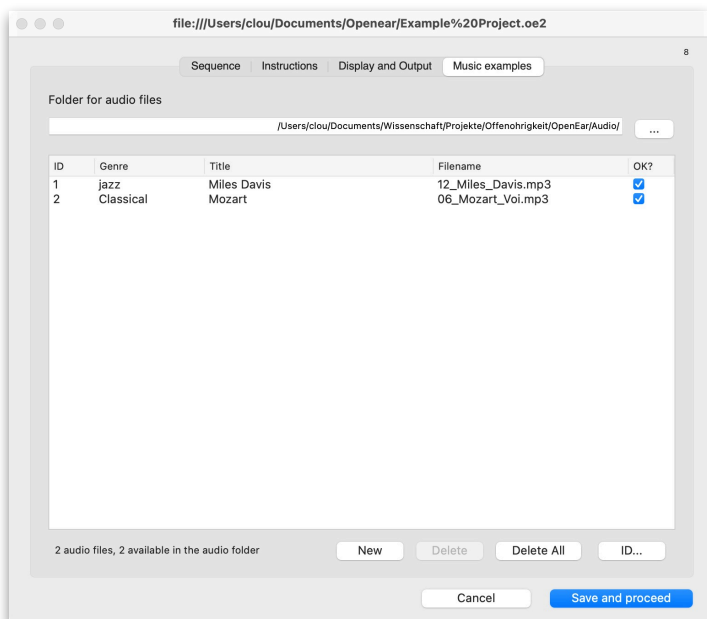
- The WHOLE listening duration is measured from start to end of an example.

- Werte speichern

Here, the computer identifier can be assigned, which individually identifies each individual computer of an experiment. In addition, it can be selected whether the test person number is to be assigned automatically or manually (e.g. in order to align it with predefined identification numbers).

The output files generated by OpenEar are stored in the specified directory, which must not be write-protected. In addition, the output files can be specified in more detail. More information on the output files can be found in chapter 5.

#### d. Music examples



- Folder for the audio files

- Folder for audio files: All audio files used by OpenEar have to be located in one folder which can be chosen here.
- Each music sample to be used by OpenEar must be listed in the music sample database. The database can be edited in the lower section. For each music sample, an ID, the genre, a title and the storage space in the audio directory are recorded. The genre and title are optional and not necessary for the function of the programme, but can facilitate orientation in the database. In the last column, a check mark under "OK?" indicates whether the file could be found successfully in the specified audio directory. The total number of files contained and found in the audio folder is also indicated in the line below the editor.

Click in the relevant line to change an example.

New music examples can be entered and individual or all music examples can be deleted from the database.

In the output files, each music example is identified by an ID. This ID must not be duplicated, nor should there be gaps in the consecutive ID number of the examples. If this should still happen due to deleting and creating new examples, the IDs can be continuously reassigned via 'ID...'. Caution:

Afterwards, future output files are no longer directly comparable with previous output files.

All settings are only finally applied after clicking on "Save and proceed" and can be cancelled by clicking on "Cancel".



## 5. Output files

The names of all output files are composed of the computer tag RRR and the subject tag VVV. The computer tag is allocated by hand in the test settings (the most reasonable setting is to allocate a different tag for each computer used in the test cycle); the VP-tag can either be user-defined or it is assigned automatically with ascending numbers.

For each subject, up to three output files are exported. These can be chosen in the OpenEar settings:

- RRR\_VVV.txt : Single file with the results of a single subject
- RRR\_VVV\_T1.txt: Single file with the results of part I only
- RRR\_Sammel.txt: assembled file that contains the results of all subjects allocated to this computer tag. If the computer tag is changed (because another test sequence is conducted, for example), a new assembled file is created as well.

Each subject has an individual output line in the output file. Additionally, variable names can be displayed in the first line. This simplifies both the checking of the output and the import to statistics programmes a lot.

The respective variables are separated by a delimiter symbol. This can be a semicolon or a tab. Outputs that are separated by a tab can easily be exported to for instance Excel by simply dragging the txt-file onto the Excel symbol.

The output contains the following data (variable names in German or English; all time specifications in ms)

#### I. Demographic data

**If the user does not make a selection for a question, no value is output in each case from version 2.0 (field remains empty).**

German	English	
vpnr	subjnr	number of subject
klasse	class	grade re. year of study
geschl	sex	sex (w/f, m)
musikausb	musiceduc	special musical education (grammar school with focus on music, university, etc) (True/False)
vp_instr	subj_instr	subject plays a musical instrument (True/False)
musmotiv	musmotiv	In mainly listen to music 0.not specified, 1.for relaxation, 2.in the background, 3.as encouragement, 4. because I particularly like a piece of music, 5. so that I don't feel so lonely, 6.to become acquainted with a piece of music, 7. other
v_bildung	f_educ	educational degree of the father: 0 not specified, 1.no degree, 2. high school, 3. O Levels or equivalent, 4.A-levels, 5. university degree, 6. doctorate/ PhD or equivalent
v_instr	f_instr	father plays a musical instrument (True/False)
m_bildung	m_educ	educational degree of the mother (see above)
m_instr	m_instr	mother plays a musical instrument (True/False)
gesch_instr	sibl_instr	siblings play musical instruments (True/False)
mus_gem	mus_togeth	At home, we regularly make music together (True/False)

## 2. Test settings (output can be turned off)

German	English	
OE_version	OE_version	Version of OpenEar
itemzahl	itemcnt	number of examples to be listened to /rated
bewertung	rating	0: no rating; 1: directly after the music; 2: in separate part of the test
bew_art	r_kind	rated with 1 = verbal; 2 = Smileys; 3 = weather icons; 4 = thumbs
rnd_algo	rnd_algo	order of items determined 2 = randomly without doubles; 3 = arranged as in the data base
t_aktiv	t_active	Time until the button to click next is activated during the free listening part (subjects are „forced“ to listen that long)
t_teil1	t_part1	Maximum total time for the free listening part. After this time, no new example will be played; however, a running example will not be interrupted.
t_item_t1	t_item_p1	Maximum playing time for the item in the free listening part. After this time, the example will be interrupted.
t_item_t2	t_item_p2	Playing time during the rating. After this time, the rating will be unlocked.
abl_selb	subj_ctrl	Course of events independent and with text instructions for subject (true) or instructions and regulation by test supervisor (false)
zeitmess	t_measure	0: Voluntary Listening Duration ONLY 1: WHOLE listening duration

### 3. Results per music example

The following block is displayed for all music examples in the data base. The tag number XX represents the number of the example in the data base.

German	English	
z_XX	t_XX	Time the example was listened to
e_XX	e_XX	was the example automatically interrupted because of a timeout or was it played until the end (true/false)?
n_XX	n_XX	position of the piece of music in the chronology of the examples
b_XX	p_XX	preference rating of the example (1 = very good to 5 = very poor)
bek_XX	know_XX	was the example known before (true/false)
ver_XX	fam_XX	familiarity with the kind of music (1 = "completely new" to 5 = "very familiar")
uge_XX	pchg_XX	Rating of the music has changed during the test (1 = very negative, 5 = very positive)
zb_XX	trat_XX	time needed for the rating (between the activation of the rating and the last click in the rating) (Output can be turned off)
zp_XX	tpaus_XX	Time of break after the rating (between the last click in the rating and the beginning of the next example) (Output can be turned off)

#### 4. Total times (Output can be turned off)

German	English	
z_teil1	t_part1	time needed for part 1 of test
z_teil2	t_part2	time needed for part 2 of test
z_ges	t_all	total time for the test

#### 5. Open-Earedness Index (OOI) (can be turned off)

German	English	
n_g_pos	n_h_pos	number of items freely listened to and rated positively (b_XX <= 3) Items
s_z_pos	s_t_pos	- sum of listening times
m_z_pos	m_t_pos	- average listening duration
n_g_neg	n_h_neg	number of items freely listened to and rated negatively (b_XX >= 3) Items
s_z_neg	s_t_neg	- sum of listening times
m_z_neg	m_t_neg	- average listening duration
n_g_all	n_h_all	number of all items freely listened to
s_z_all	s_t_all	- sum of listening times
m_z_all	m_t_all	- average listening duration
OOI	OOI	<p>Osnabrück Open-Earedness Index</p> $OOI = m\_z\_neg / m\_z\_all$ <p><i>(Caution: Until Version 1.7:</i>  <math display="block">OOI = m\_z\_neg / m\_z\_pos)</math></p> <p><i>Due to the definition of listener tolerance the OOI is only calculated when at least one example has negative preference ratings (<math>m\_z\_neg &gt; 0</math>).</i></p>

