OpenEar
for MacOS und Windows
Version 1.10.1

Concept & Programme:
Christoph Louven, Aileen Ritter

in collaboration with:
Franziska Olbertz, Judith Erler;
David Höing, Désirée Jessen, Julia Steinhöfel

English Translation: Nadja Hekal

© Christoph Louven 2011-2016
Contents

1. Description 3

1.1. Changes since version 1.2 4

2. Installation 8

3. Sequence of the Programme 9

4. Programme Settings 12

4.1. Database editor 17

5. Output files 19
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 index of open-earedness (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 musico-psychological and musico-pedagogical tasks.
1.1. Changes since version 1.2

1.2.1
• A simplified version of the questionnaire for primary school children can be chosen in the programme settings.

1.2.2
• Output format changed to avoid the output of exponential numbers. These led to problems when imported to Excel.
• All decimal numbers are now displayed consistently with a system decimal separator (comma or point).
• The displayed subject number is now composed of computer identifier and the number of the subject. Thus, each subject number is univocal, even when the output files of different computers are assembled.

1.2.3.
• Questionnaire: the checkboxes for yes/no were changed into more comprehensible radio buttons.
• Windows-Version: bug fix; the settings menu was shown when programme was started but with faulty settings it was closed automatically.

1.3.
• Introduced additional evaluation of familiarity with music (output variable ver_XX for each music example)
• The menu of the final screen now allows for a start of a new test (Cmd-N, re: STRG-N).
• With Windows the path name of the audiofiles is checked for special characters since these can lead to problems with the audio playback!

1.3.1
• Variable names of the output index calculation are more consistent
• Bugfix: VPN-No. could not be entered manually anymore.
1.5

• The instruction texts for each individual instruction can now completely be edited in the settings. Also, the window- and fontsize of the respective instructions can be adjusted.

• The question whether the rating of the music has changed during the text was added to the evaluation.

• The four evaluation criteria (preference rating, publicity of the example, familiarity with the style, rating changed) can be chosen individually in the settings menu. This way single ratings can be surveyed so that for instance only the familiarity rating can be collected. The categories that have not been surveyed receive the value -1 in the output files.

• The names of the variables that have (optionally) been saved in the first line of the output files can be displayed in German or English.

1.6

• Orientation of rating scales were unified. The negative rating is always on the left side, the positive rating always on the right side.

• Added english localisation. If OpenEar runs on an english operating system the programme will be completely in English.

1.7 - no public version -

1.8

• The smiley and weather icons have been significantly improved. When clickable, the icons are now coloured, when deactivated they are grey. This way, it’s easier – especially for children – to understand when the icons can be clicked on.

• The large arrow on the main screen is now blue when it can be clicked on.

• The introductory questionnaire can be shown in four different versions:
  • only number of test subject. Here, the subject does not have to enter any personal information.
  • only basic information (age, gender, form/year)
  • complete, version for adults
  • complete, simplified version for children

• 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.
• More status information can be shown on the main screen
  • test subject number and computer number
  • silence-indicator. Here, a small “stop”-square is shown when the
    subject is currently not listening to music.
• Output and calculation of the Osnabrück Openearedness Index was
  changed to the revised calculation mode. Now, the average listening time
  of the samples that have been assessed negatively is divided through the
  average listening time of all samples (before: only positively assessed
  samples). Since the average listening time of positively assessed samples
  is still given as interim value, the “old” OOI can still be calculated.
• Major bug fix: in older versions the program had to be closed between
  cycles because otherwise (when choosing “New sequence” in the menu),
  data from the former cycles had been transferred to the next cycle. The
  protocol files show the faulty data when the voluntary listening duration
  and the position numbers in the order of the samples are exactly the
  same.
• In MacOS, OpenEar is now a fully normalized “Cocoa”-application. This
  offers – apart from a more modern appearance – the possibility to use the
  spell checker of the OS when entering instruction texts.
• OpenEar now comes with a full Spanish localization.

1.8.1
• Another major bug fixed that caused wrong OOI calculations.
1.9
- If the time to activate the 'proceed'-button exceeded the duration of an example some silence would occur that could not be ended by the subject. This works correct now.
- Major change: Now two modes of time measurements can be chosen in the 'Display and Output'-Preferences:
  - 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.
- In the output files two additional test preferences are recorded: The OpenEar Version number and the mode of time measurement.
- In previous versions it could happen that changing the test preferences caused the format of the output files to change, causing a mixture of different formats in the same pooling file. This could cause problems when importing the pooling file to other programs. Now a note pops up that remembers you to change the computer identifier to avoid this problem.
- Revised Stop-Icon in the combined listening and rating mode

1.9.1
- Corrected some issues in the Spanish localization

1.10.0
- Since version 1.10.0 it’s no longer necessary to install Apple’s 'Quicktime' on Windows systems to run OpenEar. Quicktime may be removed from the machines but however makes no problem if it remains installed.
- A new graphic rating scale with colored thumb symbols may be used.

1.10.1.
- minor changes with modal windows
2. Installation

OpenEar runs on following systems:

• Mac OS X 10.7.5 or later (10.9.5. or later recommended);
• Windows 7 SP 1 or later;

OpenEar will probably not run on older system versions (e.g. OS X 10.6.; Win XP). Since version 1.10.0 it’s no longer necessary to install Apple’s ‘Quicktime‘ on Windows machines to run OpenEar.

The programme can be installed anywhere on the computer. The following files are needed to run the programme:

• in the programme folder:
  • OpenEar (MacOS) re: OpenEar.exe (Windows)
  • Windows only: directories ‘OpenEar Libs‘ and ,OpenEar Resources’
  • license.lic (a personalized licence file which can be ordered free of charge. Without this file, the programme is restricted to three music examples of 30 seconds each.)
• anywhere on the computer:
  • directory for all audio files used in the test (presetting: ’Audio‘ in the OpenEar-directory)
  • directory for the output files produced during the test (presetting: ‘Output‘ in the OpenEar directory)
  • Database file with information about the music examples used in the test (presetting: ‘OpenEarDB.rsd‘ in the OpenEar directory)
• The presets of the programme are saved in the file OpenEarPref.XML. This file is created in the user’s presettings directory when the programme is run for the first time (MacOS: :Users:user:Library:Preferences: ; Win: ‘user\AppData\Roaming\’ )
• Should such a file also be located in the OpenEar directory, this one takes priority over the file in the presettings directory. This way, it is possible to transfer a complete OpenEar-installation including all presets to another computer through simple copying.

To install OpenEar just extract the downloaded ZIP file (for MacOS X or Windows) and copy the complete content to any folder on your hard disc. Therewith, you immediately have an executable test version at hand. If you have received a license file licence.lic, please copy this into the OpenEar directory as well.
3. Sequence of the Programme

An OpenEar session consists of a demographic questionnaire at the beginning and one or two rounds in which the subject listens and/or rates the music examples:

a. Questionnaire:

In the experiment settings, four different variations can be chosen. In the most simple version, only the identifier of the test subject must be entered. The most elaborate questionnaire contains comprehensive demographic information.

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 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.

- 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.
The entire sequence of the programme can

a. be 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 programme sequence can be adjusted to different exercise designs with numerous settings. These settings are only available through the menu when the demographic questionnaire is running. During the cycles for listening and rating, it is no longer possible to access the sequence settings.

The settings are arranged in three tabs: „Sequence“, „Index and Output“ and „Paths“.

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

![Sequence settings screenshot](image)
• 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 tab “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 listending 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 (smileys, thumbs, weather symbols or verbal)? Which questions are asked in addition to the rating?
• Subject receives 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.

• **Save data:**
  Here, the output files can be specified. More information on the output files can be found in chapter 5.

**d. Paths and Database**

- **Folder for the audio files**
  All audio files used by OpenEar have to be located in one folder which can be chosen here. Additionally, the audio files have to be enlisted in the programme data base; they also have to be endowed with additional information (see below) in order to be used by the programme.

- **Folder for output files**
  The output files that OpenEar creates are saved in the specified folder. The folder must not be write-protected.
• Database
The OpenEar data base contains the tag-number, the style attribute, the title and the name with which it is saved for each audio file. The data base can either be created newly or chosen from the existing data bases. Additionally, the data base that is currently selected can be edited.

The settings are only applied after clicking on “save and next” and can be revoked by clicking on “cancel”. This does not apply to changes in the data base if the data base editor has been left with “save” before.

4.1. Database editor

The button „Edit ...“ in the tab „Paths and database“ in the settings leads to the editor with which the database can be edited. Each music example that is to be used by Open Ear must be listed in the data base. It is not sufficient to simply copy the file to the audio folder!

For each music example, a tag number, the genre, a title as well as the memory capacity is collected in the audio folder. A check mark
under “OK?” in the last column shows whether the file could be found in the specified audio folder.

Click the respective line to change a example. New music examples can be included, existing files can be deleted and the data base can be emptied completely.

All changes are only finalized after clicking on “Save and proceed”.
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 1 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)

1. Demographic data

If the user does not select an answer in one question, the value „=“ re. „Indet“ appears.

<table>
<thead>
<tr>
<th>German</th>
<th>English</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>vpnr</td>
<td>subjnr</td>
<td>number of subject</td>
</tr>
<tr>
<td>klasse</td>
<td>class</td>
<td>grade re. year of study</td>
</tr>
<tr>
<td>geschl</td>
<td>sex</td>
<td>sex (w/f, m, Indet)</td>
</tr>
<tr>
<td>musikausb</td>
<td>musiceduc</td>
<td>special musical education (grammar school with focus on music, university, etc) (True/False/Indet)</td>
</tr>
<tr>
<td>vp_instr</td>
<td>subj_instr</td>
<td>subject plays a musical instrument (True/False/Indet)</td>
</tr>
<tr>
<td>musmotiv</td>
<td>musmotiv</td>
<td>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</td>
</tr>
<tr>
<td>v_bildung</td>
<td>feduc</td>
<td>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</td>
</tr>
<tr>
<td>v_instr</td>
<td>f_instr</td>
<td>father plays a musical instrument (True/False/Indet)</td>
</tr>
<tr>
<td>m_bildung</td>
<td>m_educ</td>
<td>educational degree of the mother (see above)</td>
</tr>
<tr>
<td>m_instr</td>
<td>m_instr</td>
<td>mother plays a musical instrument (True/False/Indet)</td>
</tr>
<tr>
<td>gesch_instr</td>
<td>sibl_instr</td>
<td>siblings play musical instruments (True/False/Indet)</td>
</tr>
<tr>
<td>mus_gem</td>
<td>mus_togeth</td>
<td>At home, we regularly make music together (True/False/Indet)</td>
</tr>
</tbody>
</table>
### 2. Test settings (output can be turned off)

<table>
<thead>
<tr>
<th>German</th>
<th>English</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OE_version</td>
<td>OE_version</td>
<td>Version von OpenEar</td>
</tr>
<tr>
<td>itemzahl</td>
<td>itemcnt</td>
<td>number of examples to be listened to / rated</td>
</tr>
<tr>
<td>bewertung</td>
<td>rating</td>
<td>0: no rating; 1: directly after the music; 2: in separate part of the test</td>
</tr>
<tr>
<td>bew_art</td>
<td>r_kind</td>
<td>rated with 1 = verbal; 2 = Smileys; 3 = weather icons; 4 = thumbs</td>
</tr>
<tr>
<td>rnd_algo</td>
<td>rnd_algo</td>
<td>order of items determined; 2 = randomly without doubles; 3 = arranged as in the database</td>
</tr>
<tr>
<td>t_aktiv</td>
<td>t_active</td>
<td>Time until the button to click next is activated during the free listening part. (subjects are „forced“ to listen that long)</td>
</tr>
<tr>
<td>t_teil1</td>
<td>t_part1</td>
<td>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.</td>
</tr>
<tr>
<td>t_item_t1</td>
<td>t_item_p1</td>
<td>Maximum playing time for the item in the free listening part. After this time, the example will be interrupted.</td>
</tr>
<tr>
<td>t_item_t2</td>
<td>t_item_p2</td>
<td>Playing time during the rating. After this time, the rating will be unlocked.</td>
</tr>
<tr>
<td>abl_selb</td>
<td>subj_ctrl</td>
<td>Course of events independent and with text instructions for subject (true) or instructions and regulation by test supervisor (false)</td>
</tr>
<tr>
<td>zeitmess</td>
<td>t_measure</td>
<td>0: Voluntary Listening Duration ONLY 1: WHOLE listening duration</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>German</th>
<th>English</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>z_XX</td>
<td>t_XX</td>
<td>Time the example was listened to</td>
</tr>
<tr>
<td>e_XX</td>
<td>e_XX</td>
<td>was the example automatically interrupted because of a timeout or was it played until the end (true/false)?</td>
</tr>
<tr>
<td>n_XX</td>
<td>n_XX</td>
<td>position of the piece of music in the chronology of the examples</td>
</tr>
<tr>
<td>b_XX</td>
<td>p_XX</td>
<td>preference rating of the example (1 = very good to 5 = very poor)</td>
</tr>
<tr>
<td>bek_XX</td>
<td>know_XX</td>
<td>was the example known before (true/false)</td>
</tr>
<tr>
<td>ver_XX</td>
<td>fam_XX</td>
<td>familiarity with the kind of music (1 = “completely new” to 5 = &quot;very familiar&quot;)</td>
</tr>
<tr>
<td>uge_XX</td>
<td>pchg_XX</td>
<td>Rating of the music has changed during the test (1 = very negative, 5 = very positive)</td>
</tr>
<tr>
<td>zb_XX</td>
<td>trat_XX</td>
<td>time needed for the rating (between the activation of the rating and the last click in the rating) (Output can be turned off)</td>
</tr>
<tr>
<td>zp_XX</td>
<td>tpaus_XX</td>
<td>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)</td>
</tr>
</tbody>
</table>
4. Total times (Output can be turned off)

<table>
<thead>
<tr>
<th>German</th>
<th>English</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>z_teil1</td>
<td>t_part1</td>
<td>time needed for part 1 of test</td>
</tr>
<tr>
<td>z_teil2</td>
<td>t_part2</td>
<td>time needed for part 2 of test</td>
</tr>
<tr>
<td>z_ges</td>
<td>t_all</td>
<td>total time for the test</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>German</th>
<th>English</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>n_g_pos</td>
<td>n_h_pos</td>
<td>number of items freely listened to and rated positively (b_XX &lt;= 3) Items</td>
</tr>
<tr>
<td>s_z_pos</td>
<td>s_t_pos</td>
<td>- sum of listening times</td>
</tr>
<tr>
<td>m_z_pos</td>
<td>m_t_pos</td>
<td>- average listening duration</td>
</tr>
<tr>
<td>n_g_neg</td>
<td>n_h_neg</td>
<td>number of items freely listened to and rated negatively (b_XX &gt;= 3) Items</td>
</tr>
<tr>
<td>s_z_neg</td>
<td>s_t_neg</td>
<td>- sum of listening times</td>
</tr>
<tr>
<td>m_z_neg</td>
<td>m_t_neg</td>
<td>- average listening duration</td>
</tr>
<tr>
<td>n_g_all</td>
<td>n_h_all</td>
<td>number of all items freely listened to</td>
</tr>
<tr>
<td>s_z_all</td>
<td>s_t_all</td>
<td>- sum of listening times</td>
</tr>
<tr>
<td>m_z_all</td>
<td>m_t_all</td>
<td>- average listening duration</td>
</tr>
<tr>
<td>OOI</td>
<td>OOI</td>
<td>Osnabrück Open-Earedness Index</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[ OOI = \frac{m_z_{neg}}{m_z_{all}} ]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Caution: Unil Version 1.7: [ OOI = \frac{m_z_{neg}}{m_z_{pos}} ])</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Due to the definition of listener tolerance the OOI is only calculated when at least one example has negative preference ratings (m_z_neg &gt; 0).</td>
</tr>
</tbody>
</table>