



OpenEar

for MacOS und Windows

Version 1.11

Concept & Programme:
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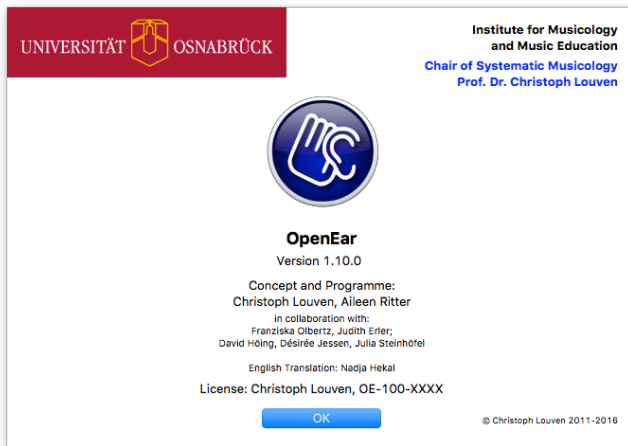
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1. Description



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 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 1.3

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 reminds 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

1.11

- From this version on, OpenEar for macOS is a 64-bit application and thus executable from MacOS 10.10.5 'Yosemite' or newer (also macOS 10.15.x 'Catalina')
- Support of high-resolution 4K and 5K display resolutions
- Correction of a bug in the database editor that prevented individual music samples from being deleted from the database.
- General code optimization

2. Installation

OpenEar runs on following systems:

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

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 presettings 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:

Subject identifier: 009 Computer identifier: test

Class/Year of study Sex ☐ ☐

Age

I play a musical instrument ☐ Yes ☐ No ☒ n/a

I attend a grammar school with a particular emphasis on music / I study music at college/university ☐ Yes ☐ No ☒ n/a

I mainly listen to music...

Highest educational achievement of the father

My father plays a musical instrument ☐ Yes ☐ No ☒ n/a

Highest educational achievement of the mother

My mother plays a musical instrument ☐ Yes ☐ No ☒ n/a

I have brothers and sisters who play an musical instrument ☐ Yes ☐ No ☒ n/a

We frequently play/played music together at home ☐ Yes ☐ No ☒ n/a

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.

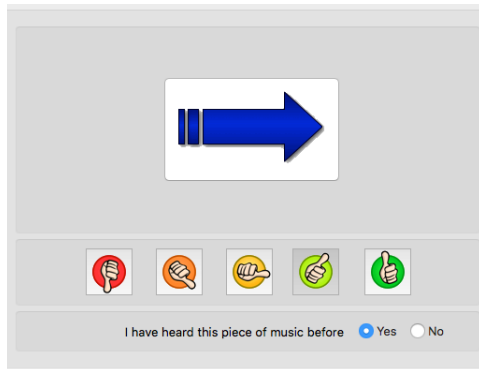
b. Listening and/or rating sections

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

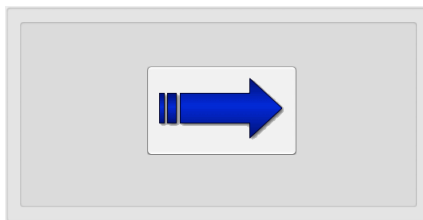
- voluntary listening durations: how long does the user voluntarily listen to a music example if he/she can click through to the next example at any given time?
- Preference and familiarity rating: How much did the subject like the music example? Was he familiar with the example before the test? How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



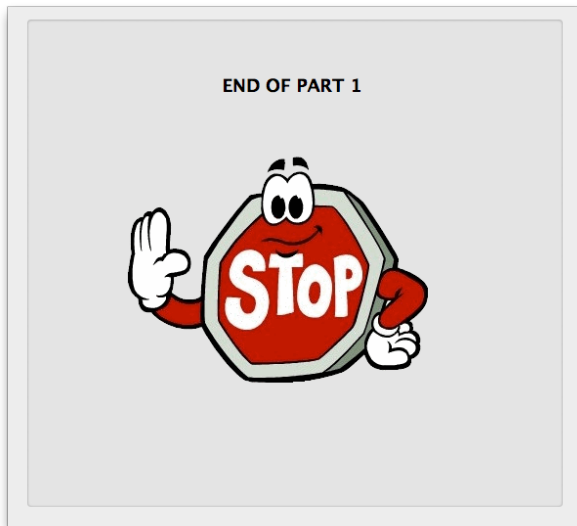
- In the first part (free listening) during the separate assessment, only the large next-button is visible initially. Thus, the free listening is not yet influenced by the rating assignment.



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

Preferences Macintosh HD:Users:clou:Library:Preferences:OpenEarPref.xml

Sequence Instructions Display and Output Paths and Database

Questionnaire: Number of subject only

Music examples

Number of items 1 Random
Order as in database

Listening part

Duration of items 10 s Activate "proceed" after 2000 msec
Max duration listening part 10 min

☒ Rate music examples

☒ Immediately after listening
☐ In separate 2nd part

Duration of items 3 s

Preference rating

☐ None ☐ Verbal
☐ Smilies ☒ Thumbs ☐ Weather symbols

☒ Piece heard before?
☐ Familiar with kind of music?
☐ Rating changed by listening?

Cancel Save and proceed

- 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 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.

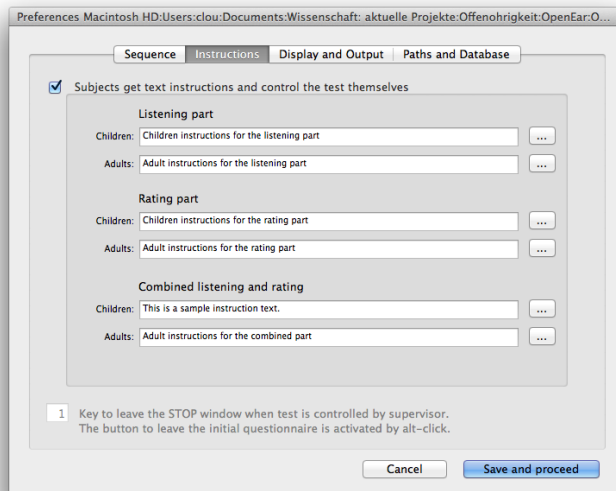
“Further activate after”: During the free listening part, the “next”-button is deactivated when a new music example starts. Only after the set duration does it become possible to click this button again. Thus, the subject is prevented from accidentally clicking the next button too early. Additionally, a minimum listening duration for the pieces can be defined. The logged free 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 (smileys, thumbs, weather symbols or verbal)? Which questions are asked in addition to the rating?

b. Instructions



- Subject receives text instructions:

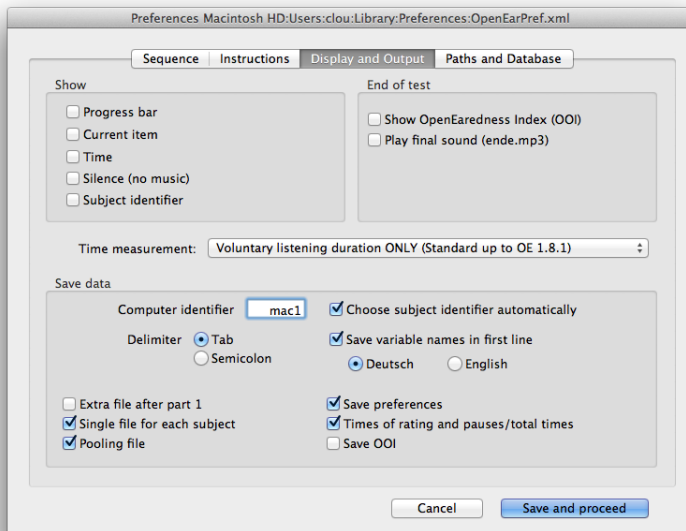
When activated, the user can control the entire test sequence single-handed and independent from the test leader. This is especially advantageous when the test is carried out on different computers and the subjects do not begin simultaneously.

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.

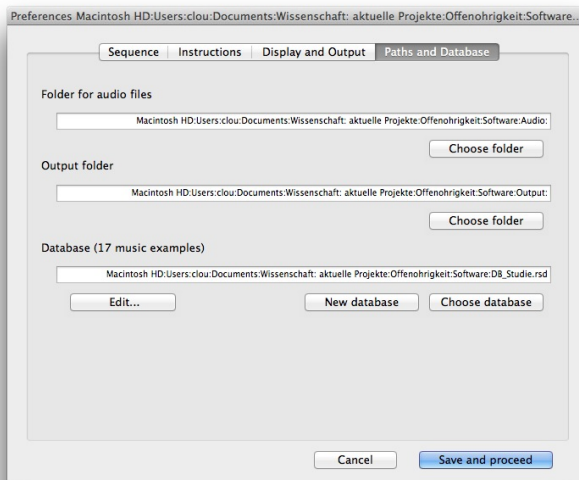
This is the standard mode of all previous OpenEar versions.

- 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

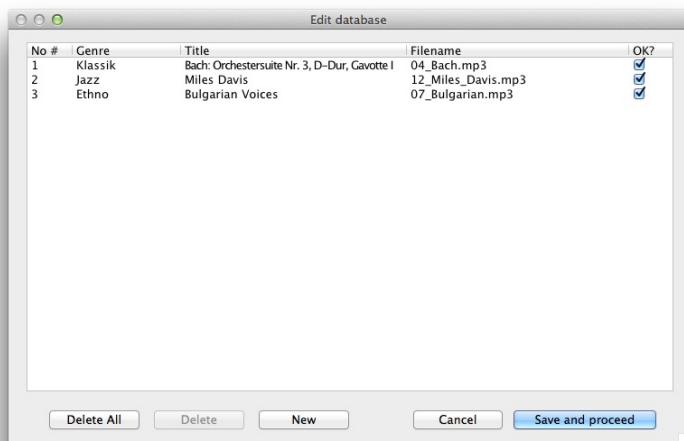
The output files that OpenEar creates are saved in the specified folder. The folder must not be write-protected.

- 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.

German	English	
vpnr	subjnr	number of subject
klasse	class	grade re. year of study
geschl	sex	sex (w/f, m, Indet)
musikausb	musiceduc	special musical education (grammar school with focus on music, university, etc) (True/False/Indet)
vp_instr	subj_instr	subject plays a musical instrument (True/False/Indet)
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/Indet)
m_bildung	m_educ	educational degree of the mother (see above)
m_instr	m_instr	mother plays a musical instrument (True/False/Indet)
gesch_instr	sibl_instr	siblings play musical instruments (True/False/Indet)
mus_gem	mus_togeth	At home, we regularly make music together (True/False/Indet)

2. Test settings (output can be turned off)

German	English	
OE_version	OE_version	Version von 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. Index of Open-Earedness (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: $OOI = m_z_neg / m_z_pos$)</i></p> <p><i>Due to the definition of listener tolerance the OOI is only calculated when at least one example has negative preference ratings ($m_z_neg > 0$).</i></p>