

# Manual herzklang live

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herzklang live is a software designed to record hrv-data with the use of a dedicated finger pulse oximeter. Along with this basic functionality it offers sound based cardio feedback, upload management for the recorded data to a registered herzklang partner, as well as the display of realtime data while recording. The scope of the software is to provide the user with visual and auditory feedback about the current state of the autonomic nervous system based on the analysis of realtime heart rate variability data.

herzklang live is set up to upload the recorded HRV-data to your treating therapist /doctor if he is a registered herzklang partner. This will enable your therapist /doctor to counsel you even over big distances, or make it possible to order our premium on demand HRV sonification „Your Personal Herzklang“.

installation

windows:

Please unzip and install the download the CP210x USB to UART Bridge Driver for your system. You may as well download the latest version from the manufacturers site. (<http://www.silabs.com/>)

You can find the driver here: <http://www.silabs.com/products/mcu/Pages/USBtoUARTBridgeVCPDrivers.aspx>

It is advisable to restart your computer in order for the driver to work properly before you proceed with the installation of herzklang live.

Please unzip the downloaded herzklang live installation file by doubleclicking. If the file was successfully decompressed, you can move the herzklang live application folder to a location of your liking e.g. desktop, programs

mac:

Please unzip and install the download the CP210x USB to UART Bridge Driver for your system. You may as well download the latest version from the manufacturers site. (<http://www.silabs.com/>)

You can find the driver here: <http://www.silabs.com/products/mcu/Pages/USBtoUARTBridgeVCPDrivers.aspx>

It is advisable to restart your computer in order for the driver to work properly before you proceed with the installation of herzklang live.

Please unzip the downloaded herzklang live installation file by doubleclicking. If the file was successfully decompressed, you can move the herzklang live application to a location of your liking e.g. desktop, programs

NOTE: Depending on your settings of the „gatekeeper“ your mac will not open herzklang live. This is a precaution apple has installed to prevent malware from infiltrating your system. In order to run herzklang live you need to change Systempreferences > Security&Privacy > Allow apps downloaded from „Mac app store“ temporarily to „Mac app store and identified developers“. Please close systempreferences and open herzklang live.

You will still be prompted with the message „herzklang live is an application downloaded from the internet. Are you sure you want to open it?“ please click „open“.

After herzklang live was successfully opened you can change your „gatekeeper“ settings back to „Mac app store“, to protect your mac against malware.

If you experience problems with running the software it is always a good idea to start the program disk-utility and to run „verify disk permission“. This normally solves a lot of issues.

## Start up

please make sure you have a working internet connection before you start the herzklang live application. You will be asked for your Live-Key in order to run the application.

The application establishes a safe https connection directly to our server in order to verify the license of your software as well as assisting you with uploads of your acquired hrv-data later in the process.

To start the app please doubleclick the herzklang live .app icon (mac) or doubleclick the herzklang-live-01-06-x86.exe / herzklang-live-01-06-x64.exe in the herzklang live application folder (windows).

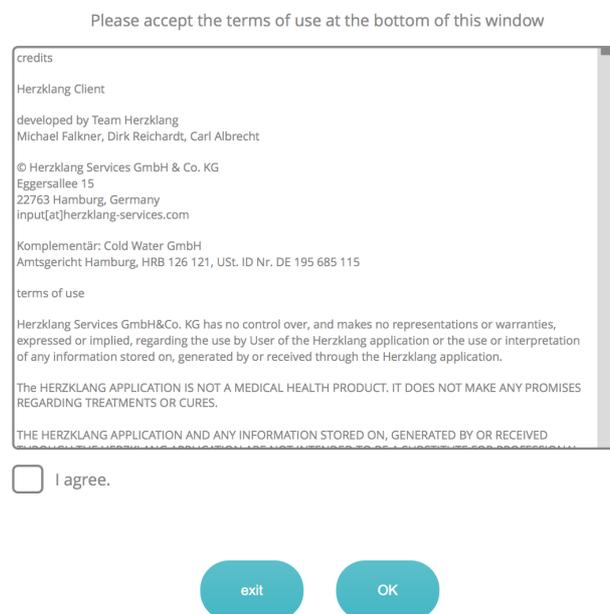
The first time you start herzklang live you will be asked to agree to our terms of use. (fig. 06)

This is necessary to protect Herzklang-Services GmbH & Co. KG and its' officers and employees against any claims in respect of any losses you suffer in connection with the use of the herzklang live application. Please DO NOT sign off on the terms of use, if you disagree or do not understand the conditions laid out in the terms of use to full extent, as you will be held responsible for any violation of the agreed terms of use.

The terms of use are also available in the about section of our website: [www.herzklang-database.com](http://www.herzklang-database.com) for future reference.

Please click on the checkbox on the left of „I agree“ and click „OK“ to agree to our terms of use and to proceed to the login.

## Terms of use window (fig. 06)

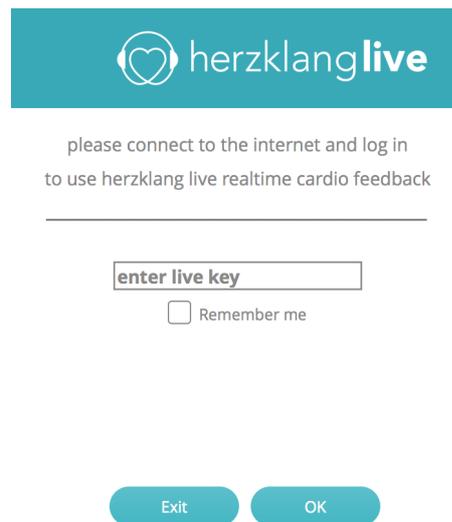


KNOWN ISSUE: On windows platforms there are occasions when the software freezes after signing off on the terms of use, and shows a white window with „file“ shown in the left top corner . Please quit herzklang live from the taskmanager and start herzklang live again. It should work as expected from now on. We are working on a solution for this issue.

You can start the task-manager by right-clicking the windows menubar at the bottom of the screen, select the herzklang software and quit it from the taskmanager window.

After signing off on our terms of use you will be prompted with a login window (fig.07):

login window (fig.07)



herzklang live

please connect to the internet and log in  
to use herzklang live realtime cardio feedback

enter live key

Remember me

Exit OK

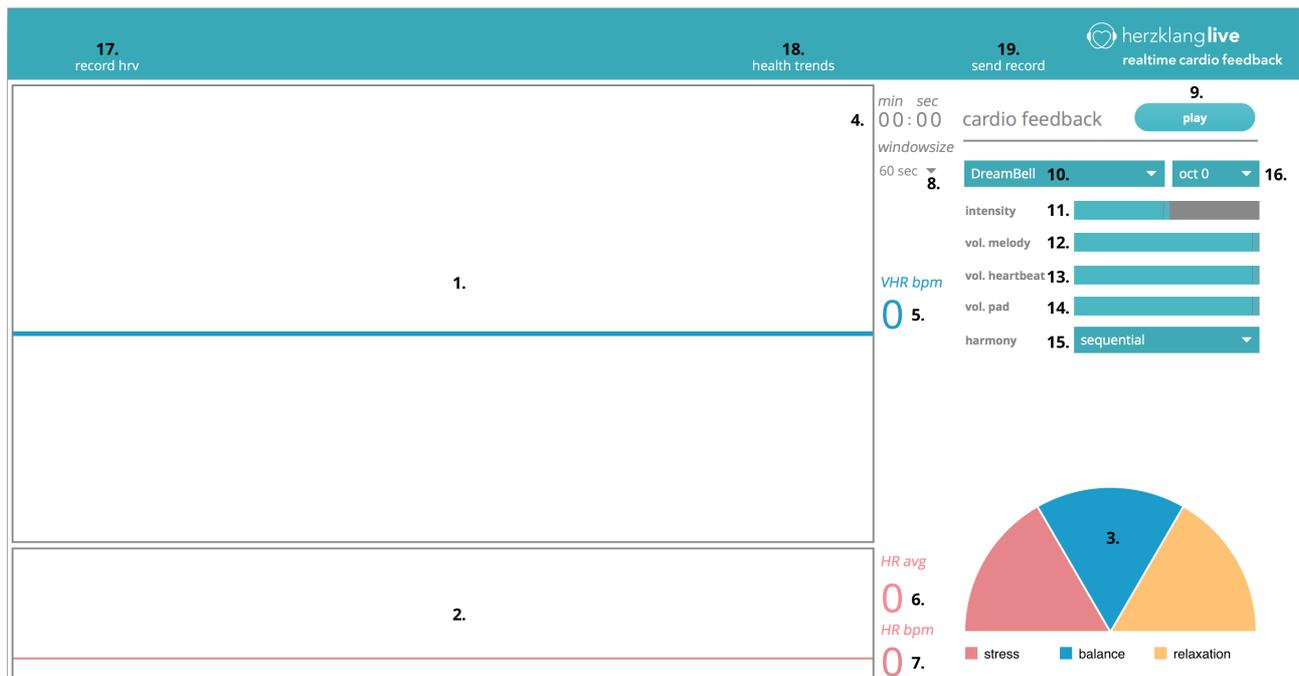
Please enter your Live-Key (provided to you by herzklang-services) and click „OK“ to unlock the program. If you have not been given a Live-Key - or have lost your Live-Key - please contact us. You can select „Remember me“ if you wish herzklang live to remember your Live-Key, but please be aware that this will enable anybody who has access to your computer to misuse the program.

**IMPORTANT NOTE:** You are advised to protect your Live-Key against misuse, as well as notify Herzklang Services GmbH & Co. KG soon as you feel it may be compromised.

system requirements:

- > system: Windows 7 (64bit/32bit), Windows 8 (64bit/32bit), Windows 10 (64bit/32bit)  
Mac 10.6.8 or later (no power Pc)
- > ram: 2 GB (OS 32bit)  
4 GB (OS 64bit)
- > cpu: dual core processor with more than 2.5 ghz
- > screen size: min 1366x768px
- > harddrive: min 600 MB (for installation)  
1 GB for swap or at least 20% of free HD space if  
the OS-System is running on the same HD.
- > misc: internet connection for license verification and server access.  
Please notice that it is NOT POSSIBLE TO RUN the application without a working  
internet connection. 15Mbit download speed is recommended.  
Installed CP210x USB to UART Bridge Driver

main window (fig. 01):



01. Heart-Rate-Monitor: This display shows the trajectory of the heartrate. It enables you to see the ratio at which the heartrate accelerates or decelerates as well as the amplitude of the heartrate's variability. It was mainly designed to visualize the response of the heartrate to the breathing pattern, and to provide a visual tool for showing the score of respiratory sinus arrhythmia.

NOTE: Deep breathing at a rate of about 6 times per minute will typically induce respiratory sinus arrhythmia. If the graph forms a sine-wave-like curve, it typically indicates a good respiratory sinus arrhythmia, which is a common marker in the hrv science for the autonomic nervous system's ability to adapt to a sudden change within the body's system.

02. Pulse-monitor: This display shows the detected heartbeats in an electro-cardio-gram styled graph. Although it is not a representation of the electronic activities in the heart, since the data was acquired through a pulse-oximeter, it shows the deviation of the intervals between heartbeats. It was mainly designed to provide visual feedback on the stability of the sensors' signal. Please try to use another finger, or change the position of the finger within the sensor, if you experience frequent dropouts or if heartbeats are not detected reliably as indicated by the pulse-monitor.

NOTE: The pulse-monitor will also show a flat line, if the herzklang live detects no sensor signal at all. Reasons for this problem will most likely be one of the following:

- 02.1. the sensor is not switched on
- 02.2. port to the sensor is not set correctly. Please stop recording and select the correct port from the drop-down menu „select sensor port“
- 02.3. the audiodriver is not set correctly. Please stop recording and select the correct audiodriver from the drop-down menu „select audio driver“
- 02.4. the sensor was detached from the computer after herzklang live was started. Please restart!
- 02.5. the sensor itself is not able to detect a reliable signal
- 02.6 the USB port does not provide enough power to the sensor to work properly. Please install the batteries supplied with the sensor, or change the batteries.

03. power distribution: This piechart shows the power ratio of each band of the FFT-spectrum analysis in realtime. High VLF ratios indicate stress, high HF ratios indicate hypersensitivity and high LF ratios indicate typically a good

balance between sympathetic and parasympathetic activity. The ratio of LF is significantly increased if respiratory sinus arrhythmia is present.

NOTE: The FFT-algorithm needs a timeframe of about 60 seconds of HRV-data to deliver reliable results. Changes in the HRV will take about this timeframe to show with full effect in all frequency domain displays. The realtime data processing has been developed to be as immune to bad signal quality and measurement-artifacts as possible, to provide an easy to read but also accurate reading. To achieve this, sophisticated filtering methods have to be applied to realtime data stream, that will affect the data being displayed in realtime but will not effect the raw data being recorded. This can lead to small differences between the readings displayed in realtime and the readings displayed after the recording has been completed. Please keep in mind that HRV science is not based on exact numbers, but on the interpretation of trends shown in the HRV data.

04. recording time: This display shows the total recording time. It is important to record a minimum of 5 minutes to get correct readings from all features and algorithms in herzklang live. It is advisable to record at least 7 to 10 minutes if you intend to order „Your Personal Herzklang“ later, as well as it is good practise to acquire a broader and more reliable pool of data for detailed examination.

NOTE: The clock will start with the first detected heartbeat to show the accurate length of the recorded hrv-data.  
05. VHR bpm: This display shows the difference from the lowest to the highest averaged heartrate for the last 15 seconds in bpm.

06. HR avg: This display shows the heartrate averaged over a timeframe of 60 seconds in beats per minutes.

07. HR bpm: This display shows the current heartrate measured from the latest RR-interval in beats per minute.

08. window size: This drop-down menu lets you select from 3 different window sizes in seconds for the RSA-monitor and Pulse-monitor. selectable window sizes are: 60 seconds, 30 seconds, 15 seconds.

09. play: This enables sound based cardio feedback, which is going to play as soon as you record hrv-data. Please refer to the checklist below in case you do not hear any audio:

09.01. Audio on your computer is muted, or very low in volume, or your speakers are not switched on.

09.02. In case you use external speakers, check if they are connected and switched on.

09.03. The audiodriver is not set correctly. Please select the correct audiodriver from the drop-down menu „select audio driver“.

09.04. The audio output is not set correctly. Please select the correct audio output from the drop-down menu „select audio output“.

09.05. You are currently not recording hrv-data.

NOTE:

herzklang live offers a musical realtime audio cardio feedback. The scope of this feature is to raise awareness for the own heartbeat and to help induce a comforting level of distraction.

When you open the cardio feedback panel for the first time in a herzklang live session, it will load the audio content. Depending on your computer this can affect the responsiveness of herzklang live until all content has been successfully loaded.

Please make sure to have an audio output selected and that you are recording hrv-data to use cardio feedback.

10. soundscape-dropdown: From this drop-down menu you can chose from 3 different soundscapes for your cardio feedback experience.

11. intensity: This slider affects the overall loudness of the cardio feedback, as well as the intensity at which it is played.

12. vol.melody: This slider controls the volume of the melody.

13. vol.heartbeat: This slider controls the volume of the heartbeat.

14. vol.pad: This slider controls the volume of the pad.

15. harmony: You can choose one of the two harmonic modes for your cardio feedback experience, sequential or dynamic.

If you choose „sequential“ the harmonies will cycle through a predefined pattern of chords. This usually has a soothing effect on most people, and is designed to create a comforting atmosphere around the melody created in realtime from your hrv-data.

If you choose „dynamic“ the harmonies will change based on an algorithm which monitors your hrv-data and provides you with a more sophisticated harmonic texture which is designed to accompany your melody created in realtime from your hrv-data.

16. octave switch: you can transpose the melody one or two octaves up or down. This may be desirable if the range of the melody does not complement the instruments' typical range, depending on your personal data and the realtime hrv-data.

17. record hrv: Starts the recording of the sensor data. You will be asked to enter personal data prior to the start of the recording (personal data window fig. 03). The filename will be parsed automatically from the personal data, with the intent of keeping the personal data around in a convenient way as well as assisting you with keeping track of the required data.

18. health trends: opens the health trends window (fig. 05). Please refer to the chapter „health trends“ for detailed information.

19. send record: opens the send to database window (fig. 08). Please refer to the chapter „send to database“ for detailed information.

personal data (fig. 03):

In order for herzklang live to operate properly you need to provide some specific personal data to the algorithms. Once you have entered your personal Data it will be permanent between restarts of herzklang live. It is advisable to switch on the fingersensor before you click start in order to reduce calibration time.

01. name: Please enter the name.

02. size: Please enter the approximated size.

03. weight: Please enter the approximated weight.

04. year of birth: Please enter the year of birth.

05. gender: Please select the gender.

06. set savelocation: You are asked to select a save location on your computer from the pop-up browser menu. This savelocation is permanently stored and persistent across restarts of the application. herzklang live will automatically save all records to that location, until you change it to another savelocation.

NOTE: The default savelocation is the program-folder of herzklang live.

07. cancel: You can abort the recording by clicking cancel.

08. Start: Start the hrv-recording, and a file will be saved automatically to the chosen savelocation when the recording is stopped.

09. select audio driver: You need to select an audio-driver in order for herzklang live to work, even if you do not use the audio related features of herzklang live like „cardio feedback“. You may need to experiment which configuration works best on your computer.

10. select audio output: You need to select an audio-output of your computer / soundcard in order to use „cardio feedback“. Please make sure the speakers are connected to the dedicated output of the computer and are ready for playback.

11. select sensor port: You need to choose the port of the pulse oximeter if you want to record hrv data. Please make sure you have the Silabs Xuart Driver (please refer to the installation section of this manual ) installed on your system in order for it to work properly. Also it is advisable to plug in the sensor prior to starting up herzklang live. If the port of the sensor is not visible (or no port is visible at all) please restart the application, since it scans the ports during the start-up procedure.

NOTE: Please make sure you use the original USB-style-cable delivered with the sensor, as it contains a chip which is vital for the sensor in order to communicate with the computer.

12. select sensor model: You need to choose the sensor model of your sensor. Currently there are two different sensors with two different models each available. To find out which model to select, please take a look at the sensor's usb port.

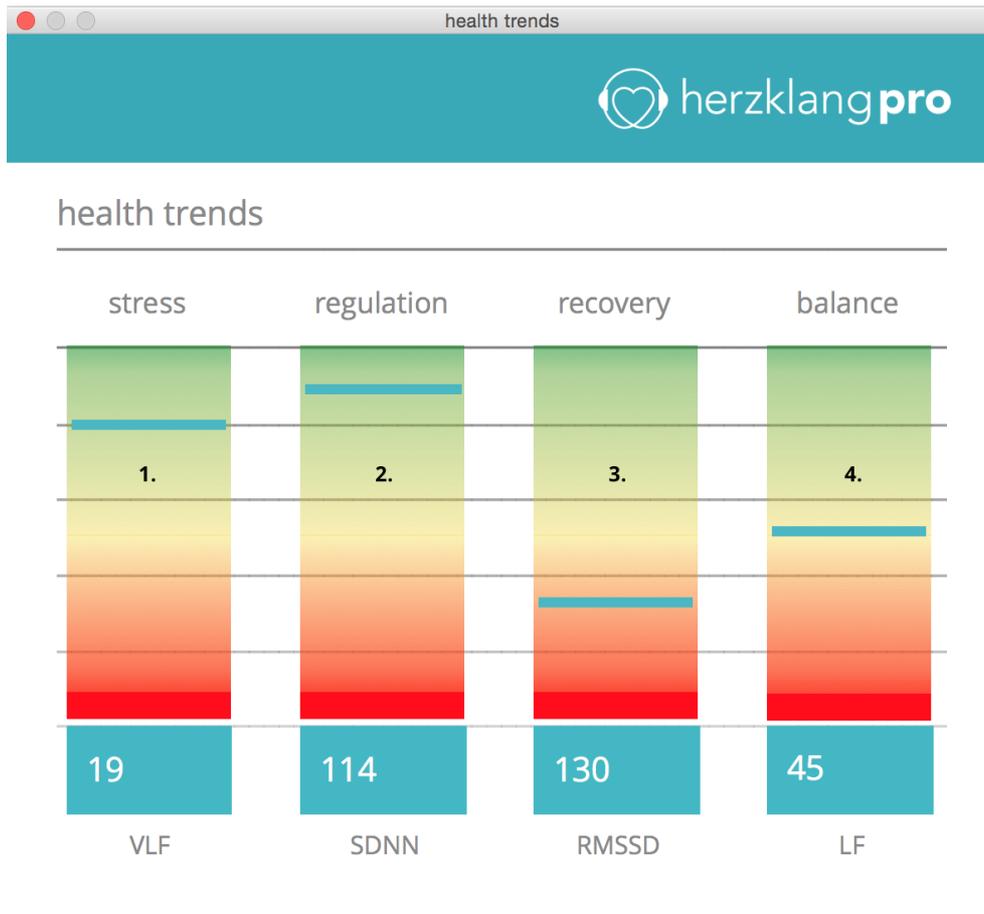
Please select (mini USB) if the port fits with this cable:



Please select (micro USB) if the port fits with this cable:



health trends (fig. 05):



herzklang live provides you with information of great detail about your hrv-data.

With health trends we have accumulated the most important markers of the hrv-data into an easy to read display. We will discuss the different indicators in detail below, but as much as we would like to have an „on the spot health status detecting diagnosis tool“ it has to be said that health trends can never and in any way be seen as a substitute for a trained therapists' or specialists' expertise. That being said, we can still offer an easy to understand and up to date tool to evaluate the health of an individual based on its' hrv-data taking into account the current state of the scientific knowledge of the hrv-science.

01. stress: This indicator shows the ratio of VLF in percentage. A high ratio (40+) of VLF in the hrv-signal indicates a high stress level.

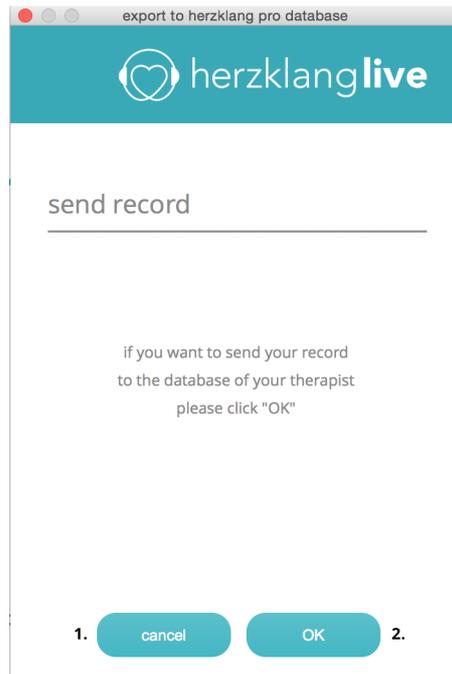
02. regulation: This indicator shows the standard deviation also known as SDNN. The SDNN is commonly associated with the sympathetic activity of the autonomic nervous system.

03. relaxation: This indicator shows the standard deviation root mean squared also known as RMSSD. The RMSSD is commonly associated with the parasympathetic activity of the autonomic nervous system.

04. balance: This indicator shows the ratio of LF in percentage. A high percentage of LF in the hrv-signal is usually associated with a well balanced ratio of sympathetic and parasympathetic activity. The autonomic nervous system will however in most cases tend towards either the sympathetic or the parasympathetic side in response to its' current challenges.

NOTE: The data taken into account for the health trend are all data available to the selection window. The selection window has a maximum length of 5 minutes, even if the whole recording exceeds this length.

send to database (fig.08):



herzklang live is set up to provide with an easy to use integration with our herzklang database. This is a cloud based web application used by our registered herzklang partners to manage their HRV-recordings as well as order our premium on demand HRV-sonification „Your Personal Herzklang“.

If you are registered with the herzklang database account of your treating therapist / doctor, you are able to send your HRV-data easily and safely via the (https) connection.

Your doctor is able to counsel you based on your recent uploads even over big distances, and order „Your Personal Herzklang“ for you if you wish so.

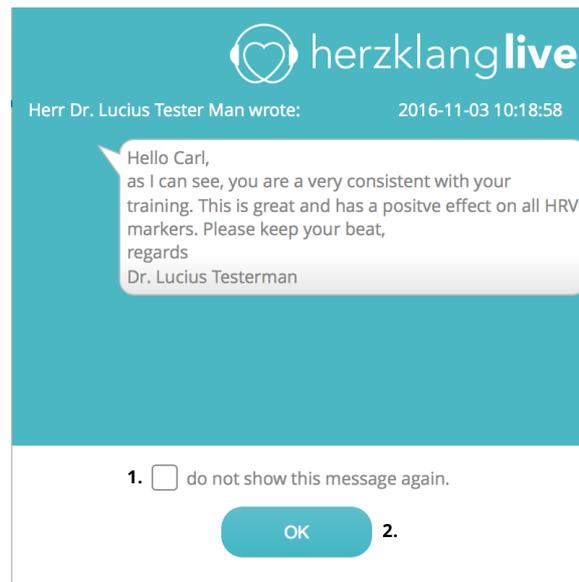
If you do not have a treating therapist / doctor registered as a herzklang partner you can still upload your HRV-data for future reference.

01. Cancel: You can abort the process, you may as well just close the window.

02. OK: You have to click „OK“ to upload your data to the herzklang database.

NOTE: If for some reason you are not able to upload your data, please keep in mind that a backup-copy of the raw data always exists at the designated save location. You can always import the data from the file to the herzklang database, or into herzklang live for reference.

The messenger window (fig.09)



When you logged in successfully you are prompted with the messenger window. This window can show messages reviewing your recent HRV-data uploads, if your treating therapist / doctor is registered as herzklang partner, and has agreed to review your uploaded HRV-data. Herzklang Services GmbH & Co. KG may use this window also to notify you about e.g. updates or other program related subjects.

1. do not show this message again: if you check this box and hit „OK“ it will delete the current message and mark the message as „read“ for your treating therapist / doctor, and will not appear again.

2. OK: if you click „OK“ it will close the window.