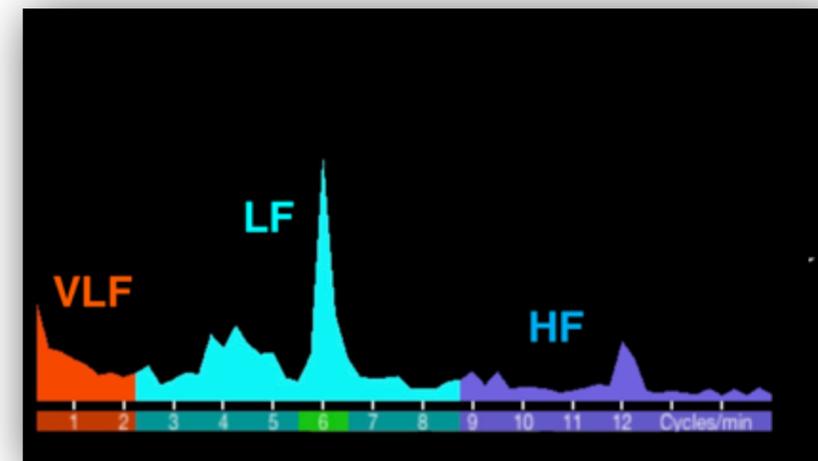
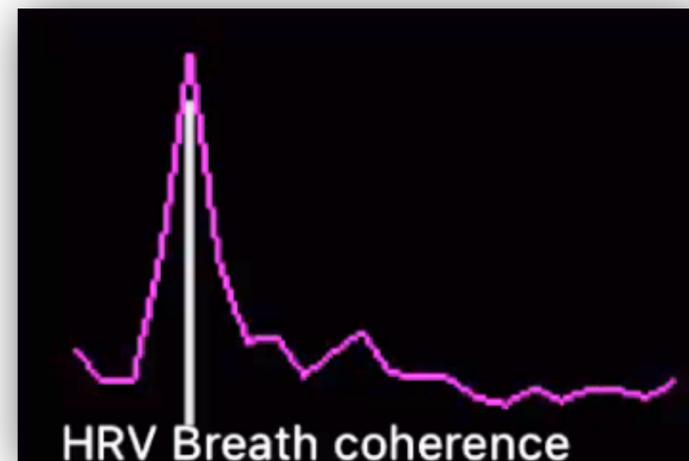
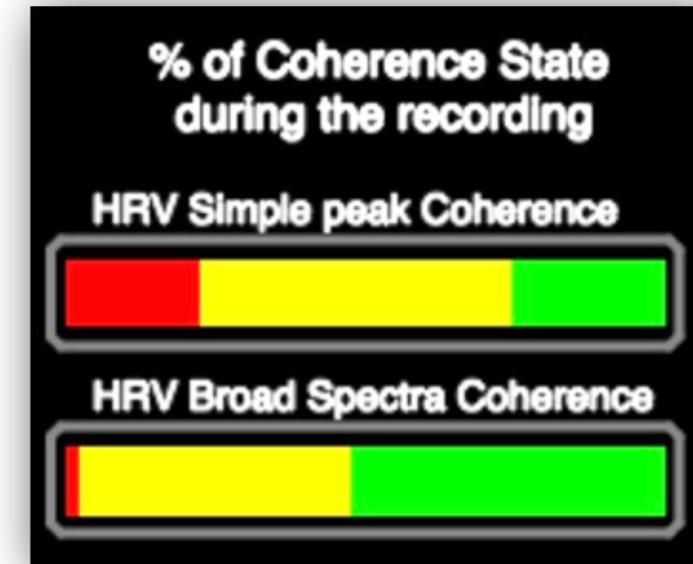
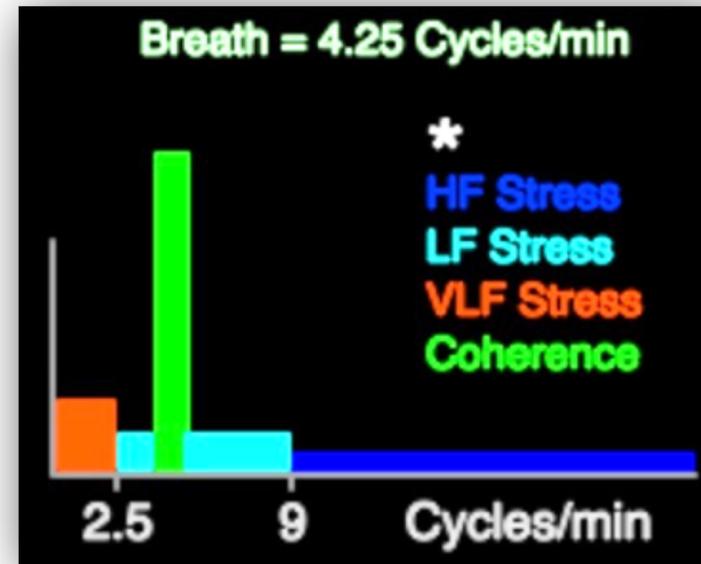
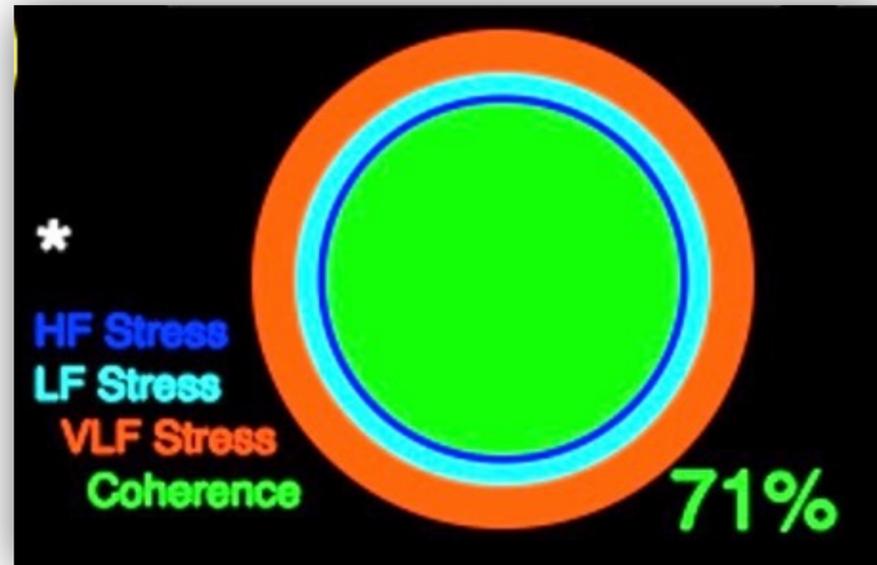


# Coherence & Stress



# HRV spectrum bands & single peak Coherence

**HRV Coherence** was originally defined as the size of the biggest LF peak compared to the amplitude of the broad HRV spectra (VLF+LF+HF).

This way of analysis assumes you are breathing at a constant and fixed frequency (using a pacer around 0.1 Hz - 6 cycles/minute) during the breathing session.

If the frequency of your breathing is changing during the session, the LF peak will be larger and its size will be affected, resulting a lower coherence value.

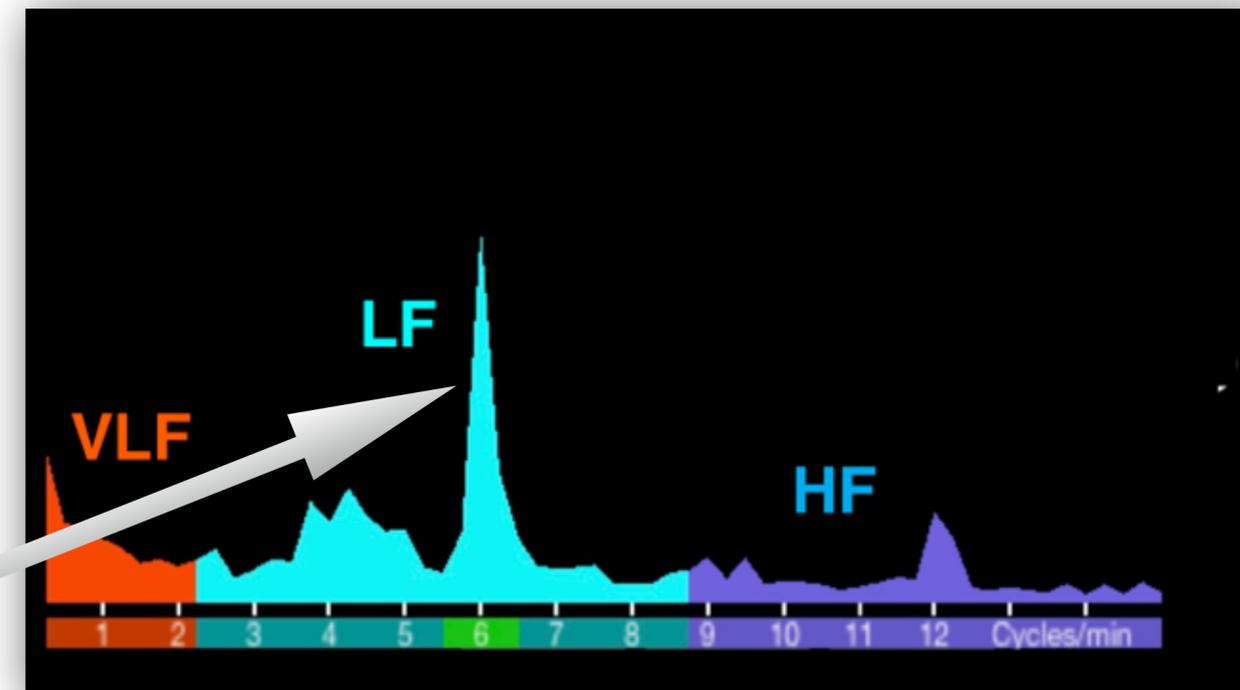
3 bands are usually described in HRV spectrum:

**The VLF band** (up to 2.4 cycles per minute)

**The LF band** (9 to 24 cycles per minute)

**The HF band** (9 to 24 cycles per minute)

biggest LF peak



## Broad spectra Coherence (FFT3)

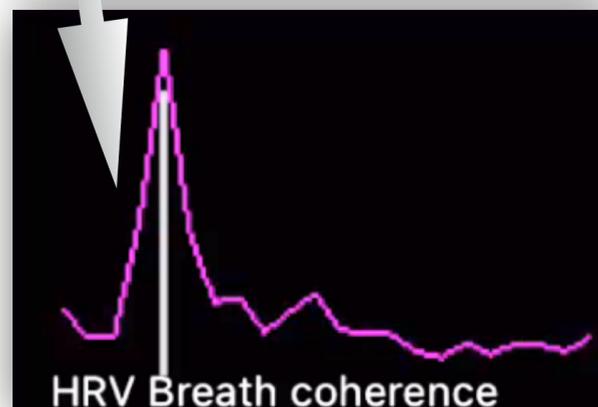
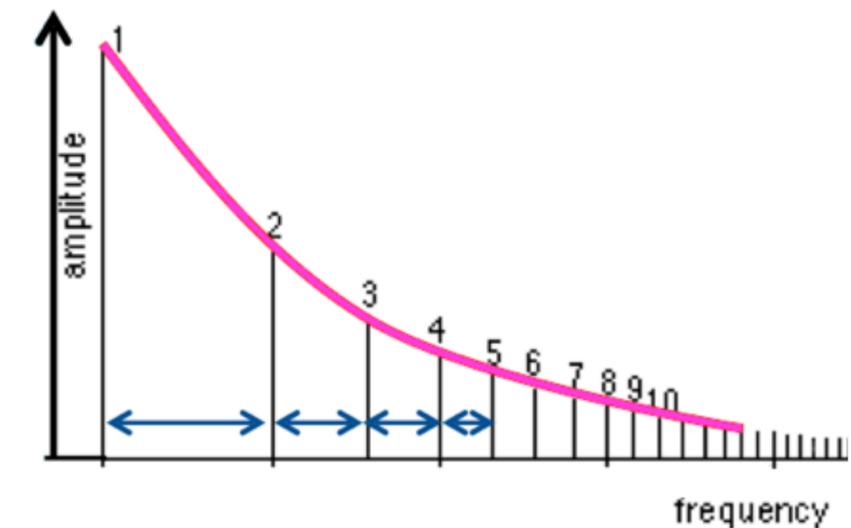
Another way to analyse the coherence from the heart HRV spectrum, is to analyse the relationship between all the peaks present in the spectrum.

The more these peaks will be related to musical (or golden) ratios, the more your HRV will be coherent (harmonic inclusiveness, fractal).

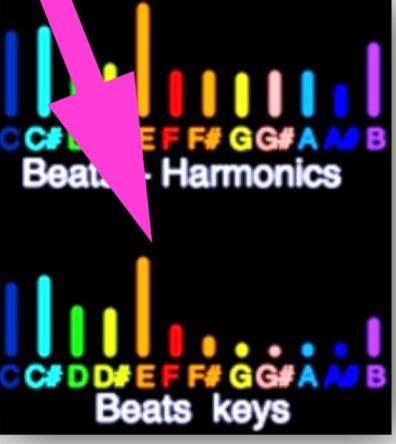
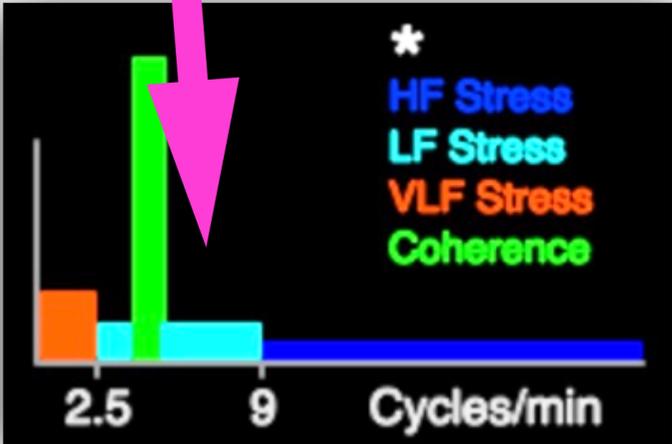
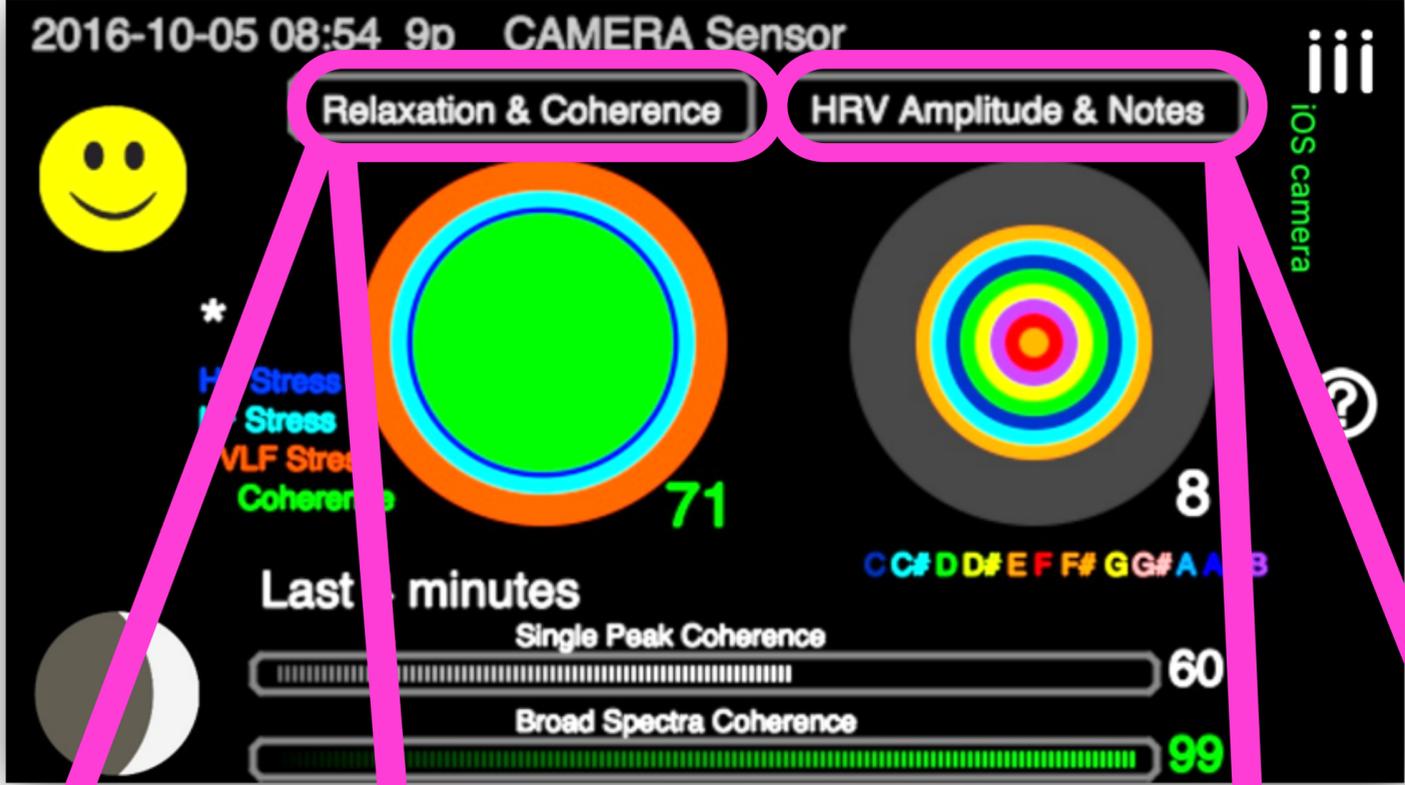
We have developed a new kind of mathematical analysis of 3rd order FFT (Fast Fourier Transform) of the broad HRV spectra.

The musical relationship between the peaks is defined by musical (or golden) ratios. These ratios are related by the respective sizes of the peaks and their relative position in the spectrum.

This could be visualized as an analysis for regularly spaced patterns in the shape of the purple line linking all the peaks of the spectrum.



Touch the top buttons to display different graphs

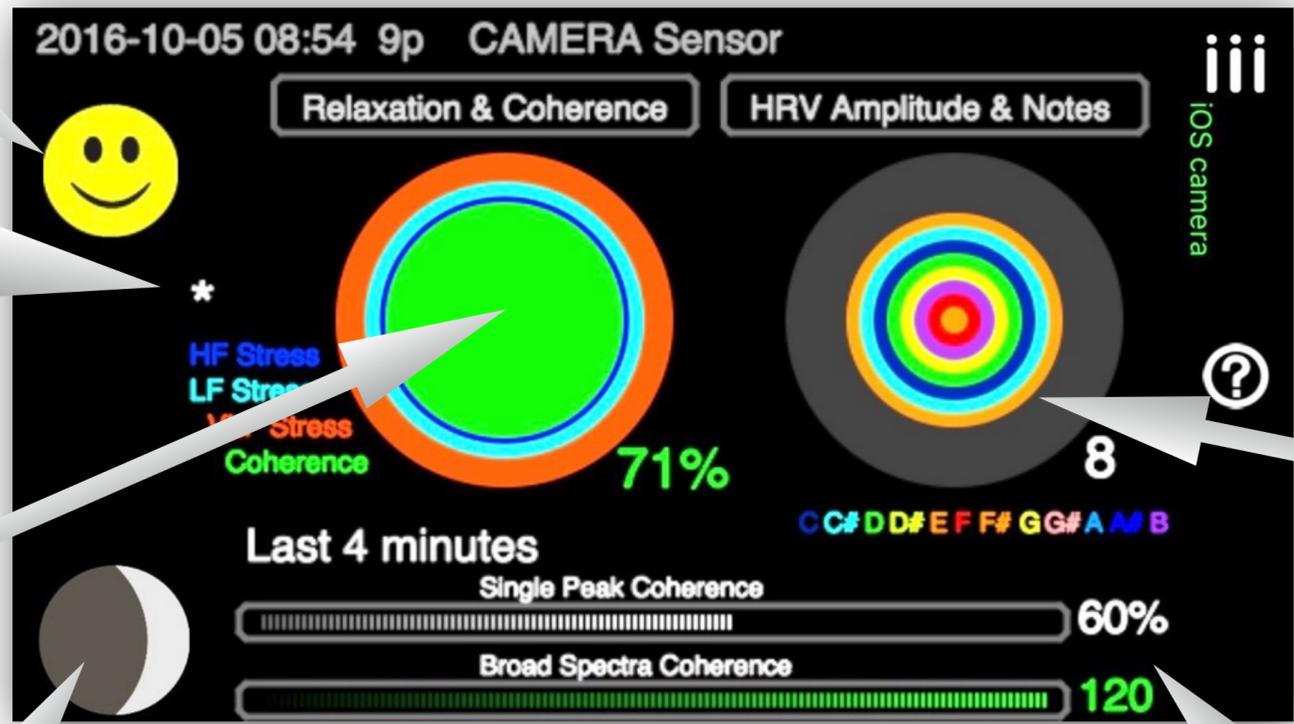


Your mood

Training level  
\* => \*\*\*\*

Whole record  
single peak  
Coherence

Moon phase



Music notes  
generated by  
your HRV

Last four minutes analysis:

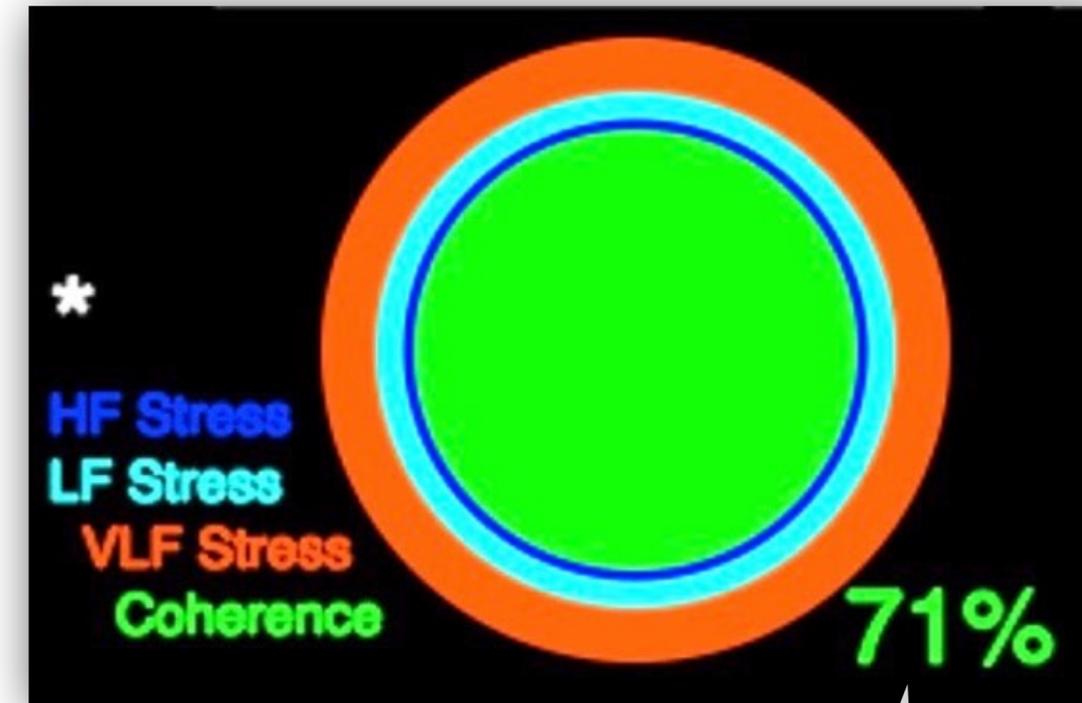
- single peak Coherence analysis
- broad spectra Coherence analysis

## Whole recording single peak Coherence analysis

Relationship between Coherence\* and the different bands (VLF, LF, HF) of the HRV spectrum.

VLF band is related to short term stress;  
LF band is related to long term stress;  
HF band is related to emotional baggage.

*\* the size of the biggest LF peak compared to the amplitude of the broad HRV spectra (VLF+LF+HF).*



% of Coherence during  
the whole recording

## Whole record single peak Coherence analysis

very bad coherence [1] => => good coherence [4].

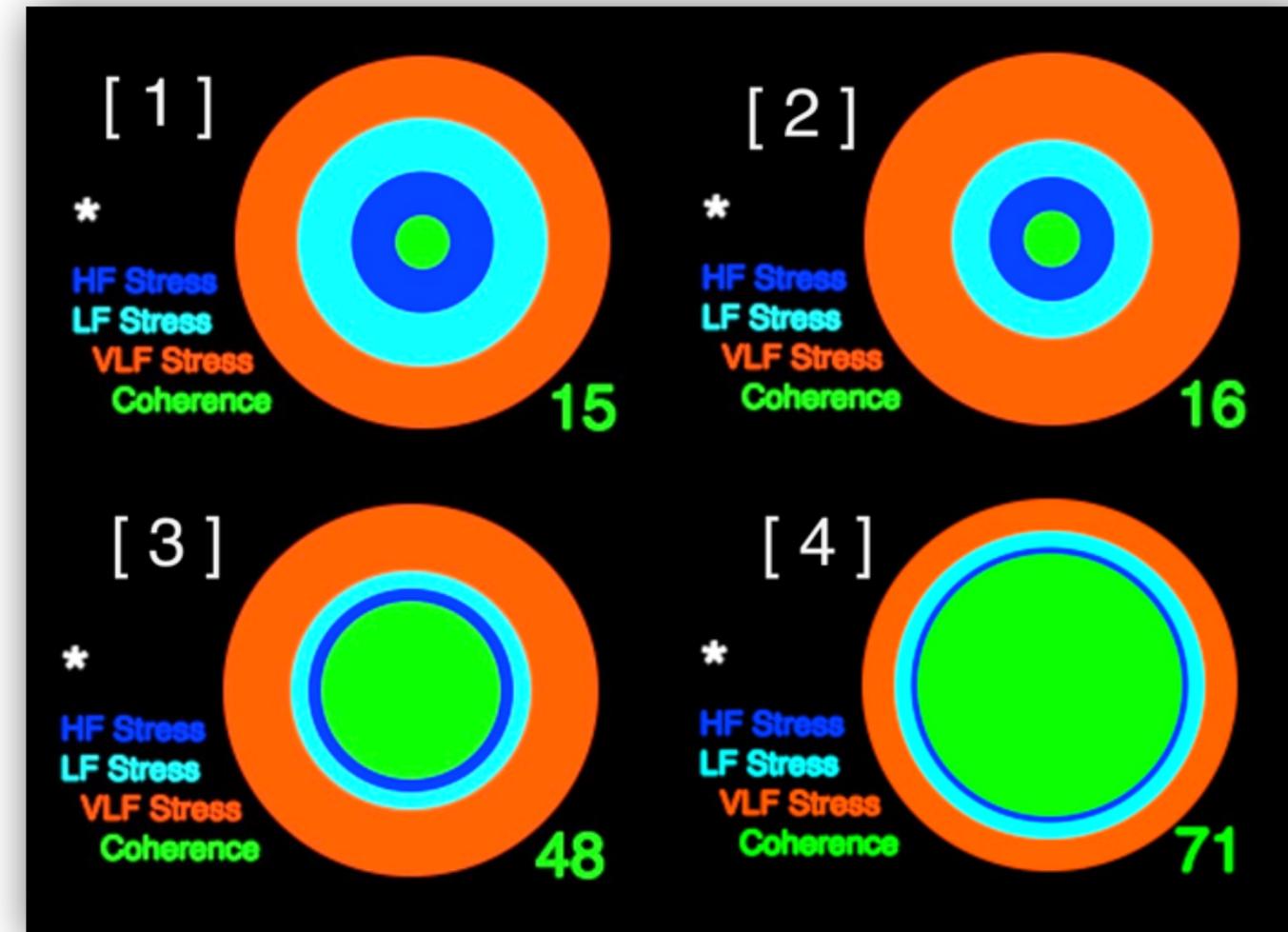
[1] very bad coherence  
big & equal Stress in VLF, LF & HF bands.

[2] very bad coherence  
bigger Stress in VLF band

[3] medium coherence  
bigger Stress in VLF band

[4] good coherence  
very low Stress.

VLF Stress is related to short term stress;  
LF Stress is related to long term stress;  
HF Stress is related to emotional baggage.



## Coherence peak versus VLF, LF & HF Stress bands

The coherence (green) should be very much higher than the VLF, LF & HF Stress bands.

very bad coherence [1] => => good coherence [4].

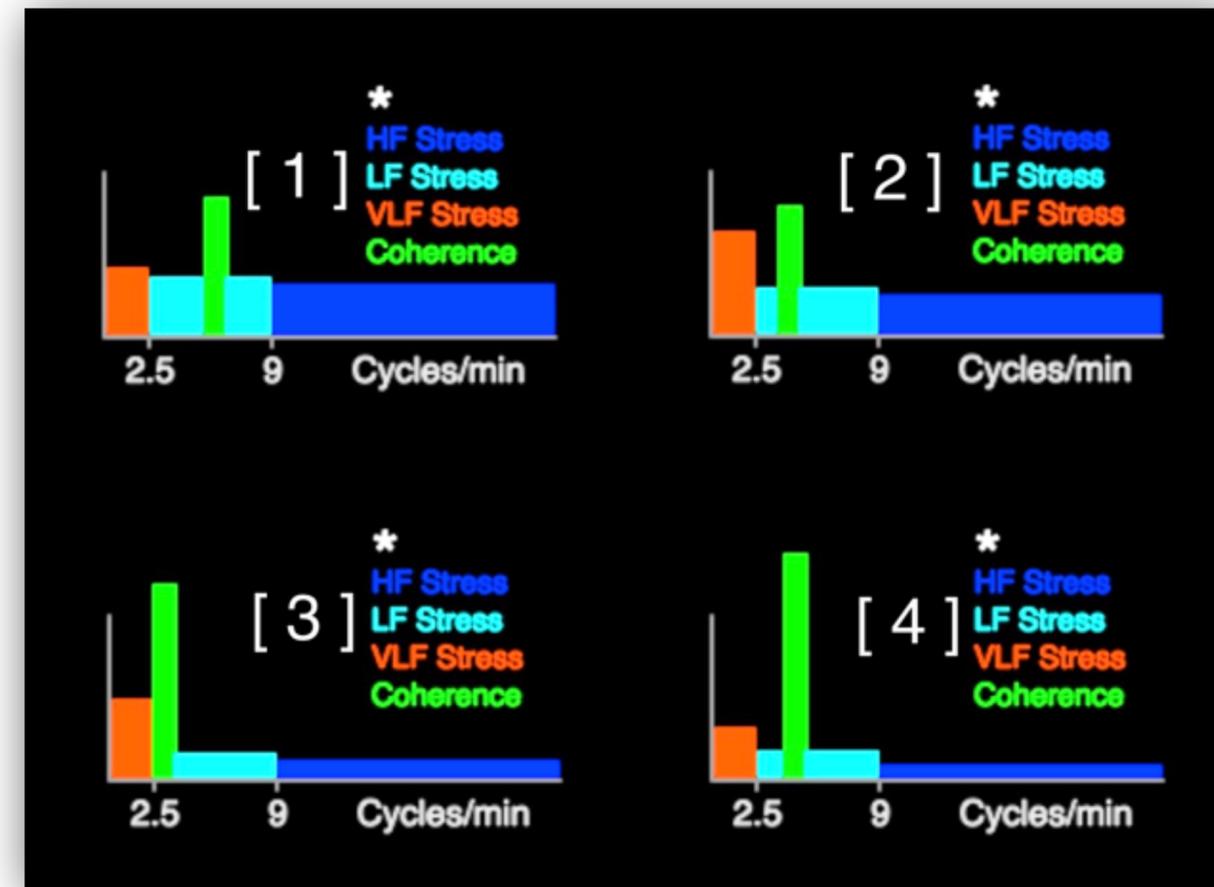
[1] very bad coherence  
big & equal Stress in VLF, LF & HF bands.

[2] very bad coherence  
bigger Stress in VLF band

[3] medium coherence  
bigger Stress in VLF band

[4] good coherence  
very low Stress.

VLF Stress is related to short term stress;  
LF Stress is related to long term stress;  
HF Stress is related to emotional baggage.



## Last 4 minutes of the recording

Top: bad coherence  
=> => bottom: good coherence

2 ways of analysis:

- single peak % coherence
- broad spectra coherence



## % of time spent in Coherence during the recording

% of time spent in

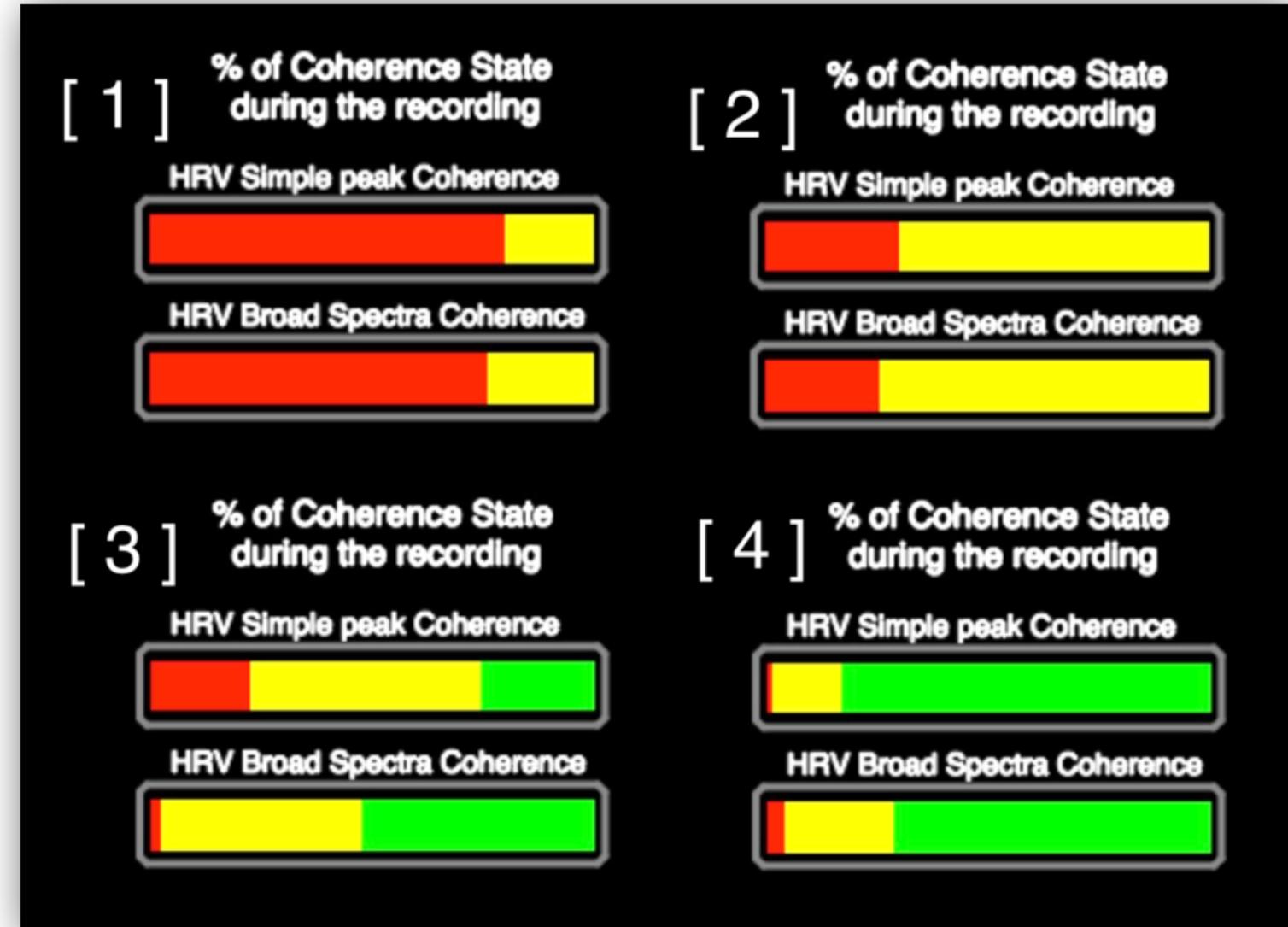
- bad coherence (red),
  - medium coherence (yellow),
  - good coherence (green)
- during the recording.

very bad coherence [1]

=> => good coherence [4].

2 ways of analysis:

- single peak coherence
- broad spectra coherence



# Harmonic inclusiveness is healthy !!!

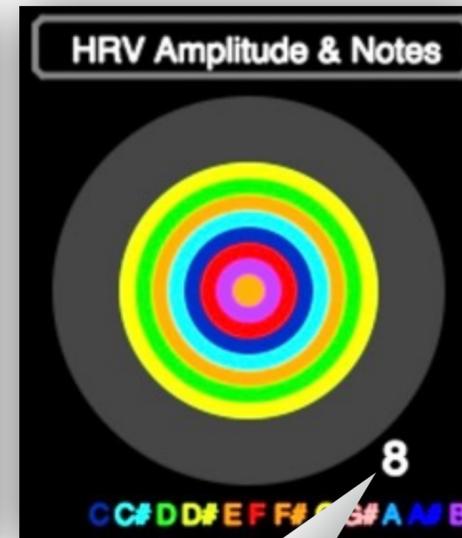
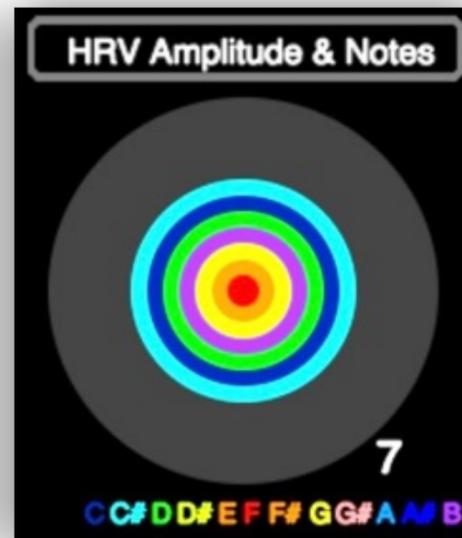
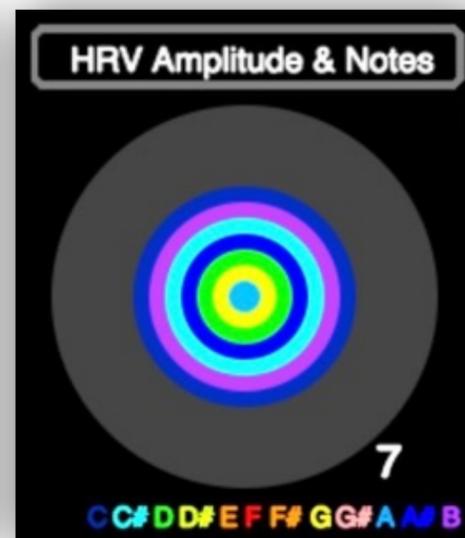
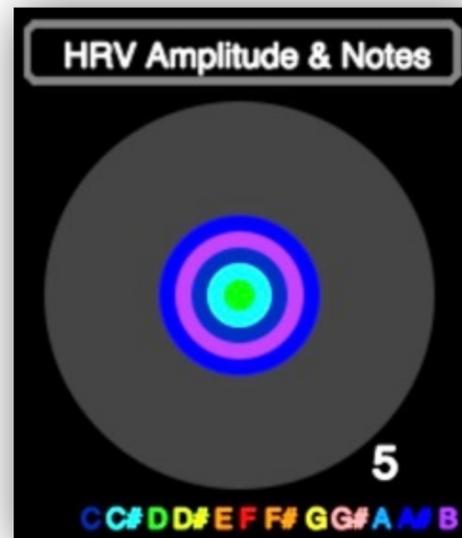
## HRV Amplitude related to musical notes:

Simple way to display HRV amplitudes musically: the more your heart rate varies, the more music notes you get (the more color circles are displayed).

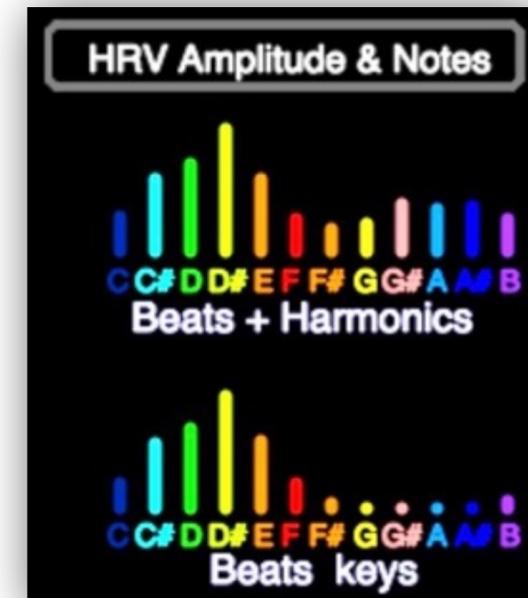
The bigger (outer) circles are related to the highest number of the musical keys that fits the Heart Rate during the recording.

Each music note is related to a different color:

C= Do  
D= Ré  
E= Mi  
F= Fa  
G= Sol  
A= La  
B= Si

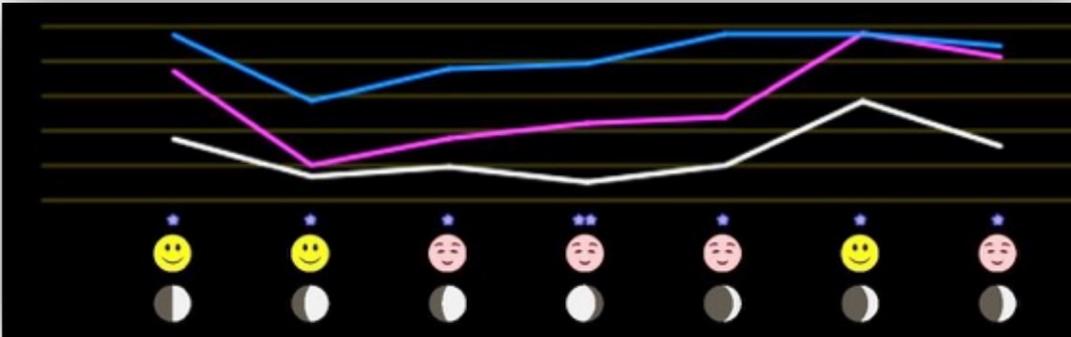
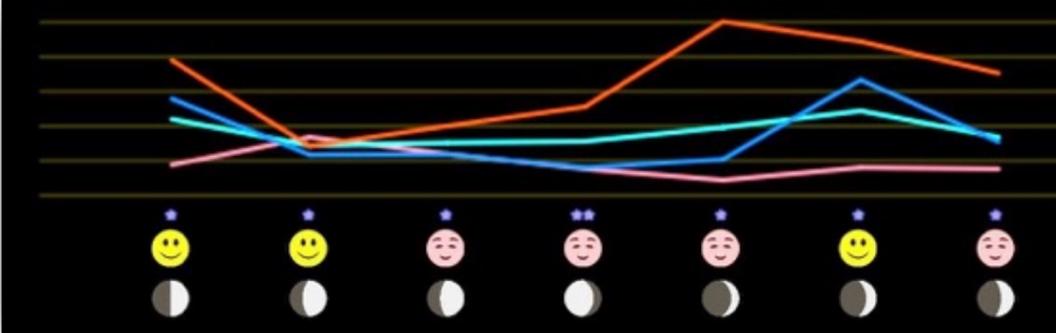
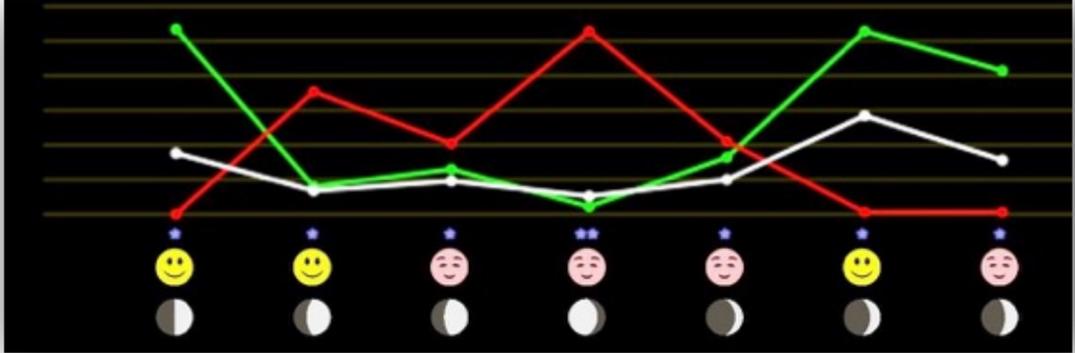


Number of music notes generated by your HRV

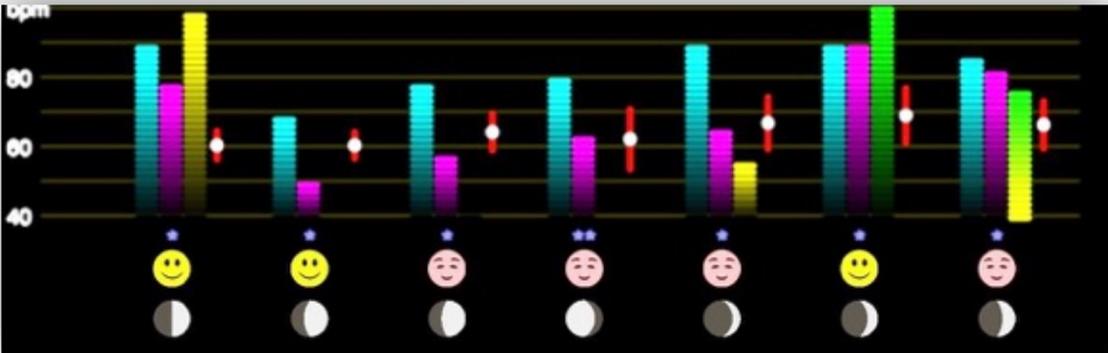


# Evolution / History

## Coherence Breath Training



4 kinds of graphs

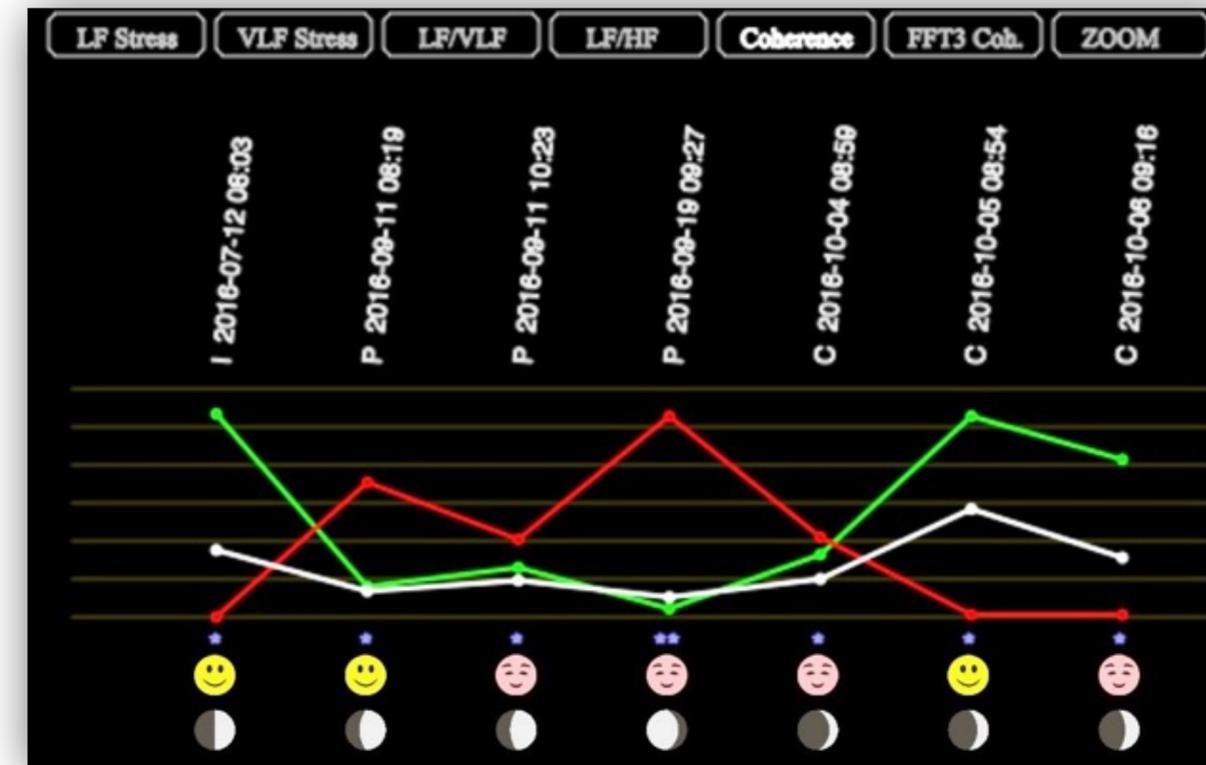


## Breathing Practice history

HISTORY displays 3 main curves:

- white curve is the size of the coherence peak (computed by single peak analysis);
- the red curve is the percentage of the worst part of the coherence graph;
- the green curve is the percentage of the best part of the coherence graph.

**The progress should show an increase of the white and green curves and a decrease of the red curve.**



[ZOOM] will display more or less data on the screen

The lower little stars are related to the level you selected for the practice (beginner... expert).

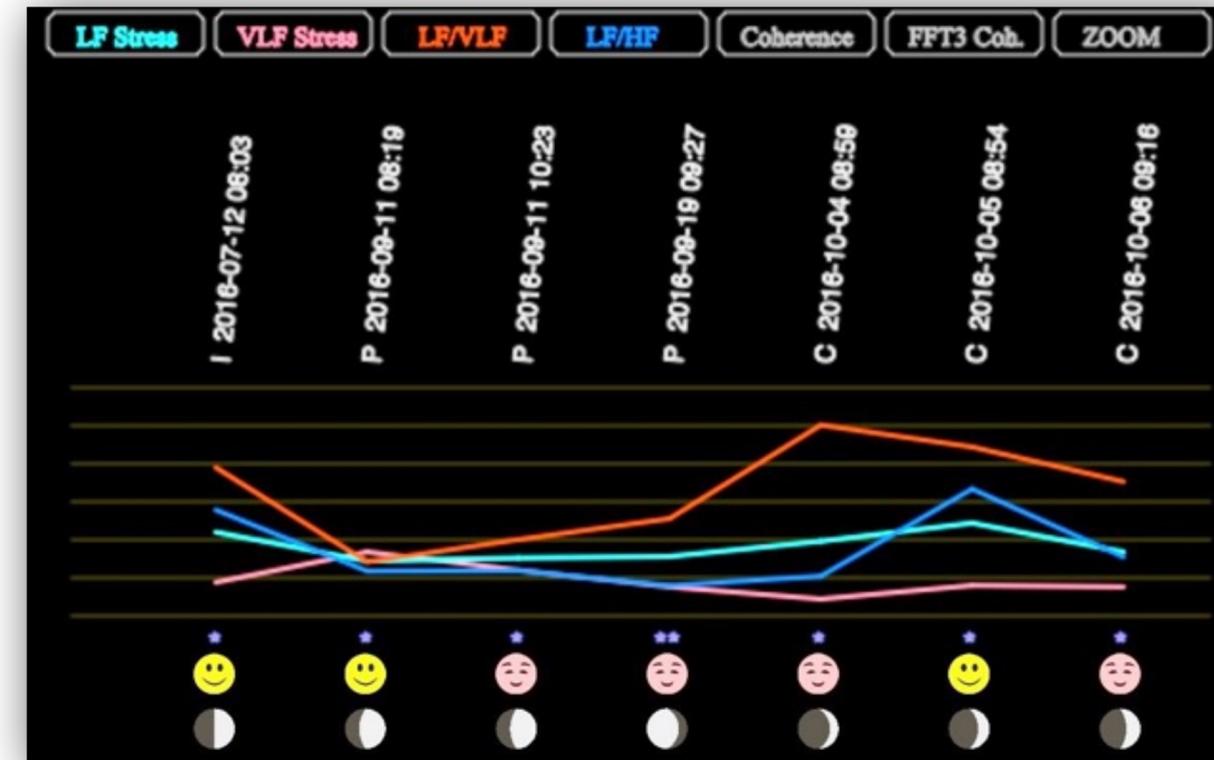
## Breathing Practice history

All buttons can be used together or separately to compare all these parameters

**VLF Stress** is related to short term stress;

**LF Stress** is related to long term stress;

**HF Stress** is related to emotional baggage.



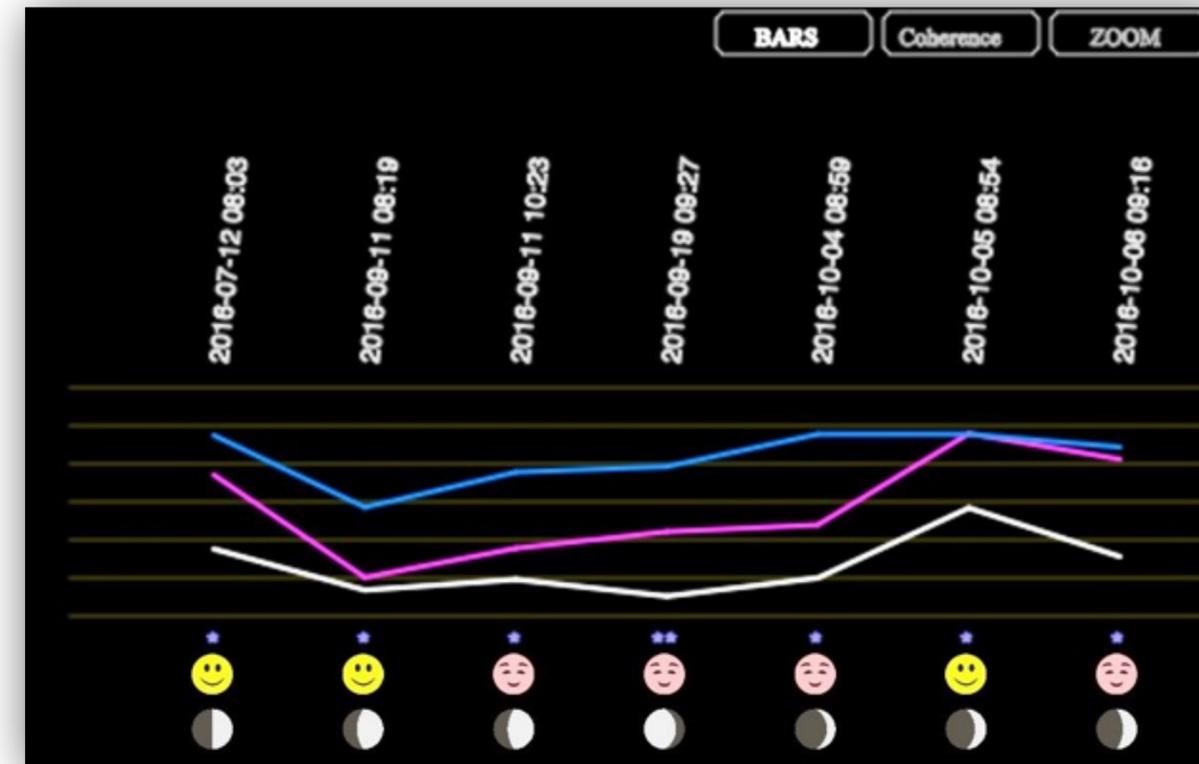
[ZOOM] will display more or less data on the screen

The lower little stars are related to the level you selected for the practice (beginner... expert).

## Breathing Practice history

HISTORY displays 3 curves:

- white curve is the size of the coherence peak - computed by single peak analysis (as in the previous graph);
- pink curve is the coherence of the whole HRV spectrum (using a third order FFT of the HRV spectrum, allowing to compute the whole HRV spectrum coherence - not only a single peak as in the previous analysis);
- blue curve is the LF/HF ratio.

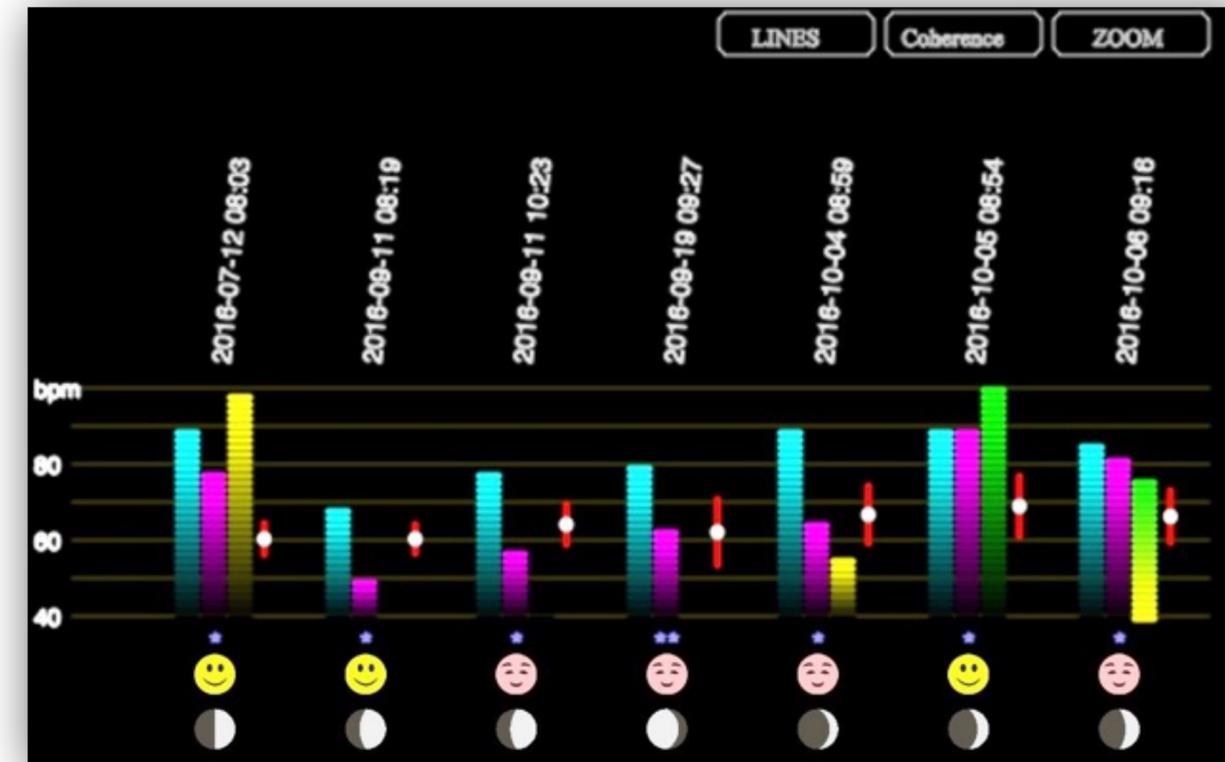


[ZOOM] will display more or less data on the screen

The lower little stars are related to the level you selected for the practice (beginner... expert).

## Breathing Practice history

- light blue = LF/HF ratio;
- pink = coherence (FFT3) of the whole HRV spectrum;
- yellow/green = single peak coherence (from yellow to green);
- white dots = average heart rate (bpm);
- red bars = HRV amplitude.



[ZOOM] will display more or less data on the screen

The lower little stars are related to the level you selected for the practice (beginner... expert).