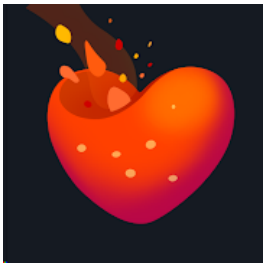# Heart Rate Variability (HRV)

HRV measures the time (in milliseconds) between successive heart beats, and then looks to see how consistent or variable that time is. You might think that a consistent inter-beat interval would be healthy (e.g. 1 second between each and every heartbeat) but the opposite is true. You will be learning about this in class and you will be measuring your heart rate (HR) and HRV for several activities I have planned. **This means you need to find an app for your watch or phone that can measure HR + HRV.** I have tried quite a few, but I keep coming back to the same one, Welltory. This app is free for the basic features and seems to do the best job overall. It is available to apple and android users. This said, feel free to look around for others.

Warning: A high HRV is sometimes seen in people with pathologies – so please do not use HRV to replace the need for regular doctor checkups. Also, these apps take very brief snapshots of your HRV – which might not be entirely accurate. A 24 hour HRV measurement is generally required for any clinical diagnosis – and these apps cannot give us this.

Welltory

For more information about the app.
go to https://welltory.com/ or watch one
or more of the youtube videos on it.

This illustration shows an unhealthy Heart Rate Variability with constant 1 sec intervals between beats

This illustration shows a healthy heart rate variability with variation between beats

Different ways to measure HRV

Below are the most common ways to measure HRV, but I suggest using SDNN because it is the easiest to understand ☺

SDNN: indicates the standard deviation of normal to normal R-R intervals. "R" represents the peaks in the wave form above. "normal to normal" refers to the fact that any "abnormal" heartbeats are excluded from the analysis. This measurement would thus look at the time elapsed between each peak (e.g. .93, .98, 1.2, and 1.3), and then determine how variable these numbers are using a statistic called standard deviation. Remember, the higher the number, the more variable your inter-beat interval. This means a higher SDNN reflects better overall health.

SDRR: is the same measurement above only abnormal heartbeats are included this time.

RMSSD: this indicates the Root Mean Square of the Successive Differences. It is a measure of the successive differences being neighboring RR intervals. Only normal heartbeats are included in the analysis.

PNN50: this indicates the percentage of adjacent NN intervals in a 2-minute time period that differ from each other by more than 50 ms.

Further Reading

If any of you are interested in learning more about these measurements and what HRV tells us, you can check out the article below. It will not be any easy read, but I think you should be able to "get the gist" of it.

An Overview of Heart Rate Variability Metrics and Norms
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5624990/