



## Longitudinal tracking of Heart Rate Variability (HRV)

### Information Sheet for participating in a research project

There have been two primary difficulties in trying to cope with the Corona virus pandemic. The first is that people can contract the virus and be infectious, but not have any symptoms for several days or possibly weeks, before they start to feel unwell and go into quarantine.

The second problem is that for a small percentage of the people that do get a 'bit' unwell, after some time they suddenly deteriorate and require hospitalisation, but for many people they leave it too late before seeking help and this increases their risk of complications and prolongs recovery time.

When people contract the coronavirus, their body mounts an immune response and there is evidence to suggest that this can be measured with heart rate (**HR**) and heart rate variability (**HRV**), several days before people start to feel any symptoms.

Heart Rate and HRV are two slightly different measures, heart rate obviously is the **average** number of heart beats per minute and generally the healthier a person is, the lower their heart rate is at rest. Heart rate variability on the other hand, is a measure of how much variability '**in time**', there is between successive heartbeats and generally the larger the variability the better.

The heart does not beat like a metronome and should speed up when you are active or stressed and slowdown at rest and in recovery mode. In fact, if your heart behaved like a metronome with very low variability this would be a very serious sign. There is some evidence that HRV can be used as a stress measure.

Of course, like many measures of human activity, there is a great range of values across the population and a large variability within one person during different activities and at different times of the day and across the life span. So, for example HRV tends to decrease with age and increase with happiness.

This is where having your own "personal baseline" can give you a great deal more information, than just taking a single HRV measure and comparing it to people of the same age. So, with a regular record of HRV, you will be able to detect when it starts going out of '**your**' normal range. This could help you spot that something is

going wrong and then you can work out what to do about it before it gets out of hand. For example, in recent years sports people have started taking a daily HRV measurement first thing in the morning, before they get up, to see if they had “over trained” the day before. If their HRV is lower than usual, they will take it easy for a day.

So, we would like you to record a daily 5-minute HRV measurement once a day for 30 consecutive days (or as close as you can get to this). But we want to check two different devices. We would like to use a Camera Phone App, this would be a cheap solution, so millions of people could use it but we are not sure it will work for everyone, so we also want to check a cheap ear clip sensor.

Therefore, we would like you to do two measurements daily. If you have two different smart devices, like a smart phone and a tablet it would be possible to do both measurements at the same time but if you only have one device, you would need to do the measurements sequentially one straight after the other.

If you and a partner both want to take part in the study, you can share the Kyto ear clip, but it will be easier if you use your own smart phone. Then all the summery information will be for each of you. If you agree to take part in this study a requirement is that you try and record measurements in a similar manner every day, it doesn't matter whether you're sitting or lying down but ideally it would be best if you do it the same way each day.

So, for example, I decided to do the recordings first thing in the morning before I got up, as there is some evidence to suggest this is a more stable and informative measure, but sometimes I forget, so I just go back to bed for a few minutes and make the recording, because there can be a large difference between when you are lying down and sitting up. If you do forget to do the measurement all together that's life, you can just do the measurement at a different time of day or location. It's better than not having a measurement for that day. But clearly the more consistently your measure, the more useful it will be.

For this pilot study we will only be collecting the HRV data and analysing it at the end of the study, but ultimately if the study works the plan would be to be able to alert people when there HRV starts going out of range, so they can quarantine or take medical advice.

All your data will be stored with an anonymous participant ID number and we will give you an anonymous email address to use in the Apps,

So, we will only publish or share the anonymised data and in accordance with open science guidelines, we may share the data on a publicly accessible repository indefinitely. All personal identifiable information like emails and names etc. will be kept in a password protected spreadsheet on a password protected computer and not shared.

We would also like you to keep a track of how you feel and of course if you do contract coronavirus. In the Elite HRV App when you have done a HRV recording you will have the option to log a number of activities such as Sleep, and an illness. (See the 'Installation\_Setup' PDF for information on how to do this).

We would also like to know the make of phone or tablet you are using in the study, and at the end of the 30 days we will send you a short questionnaire to find out how you found doing the measurements.

As part of this study we have tested several other devices like fitness trackers and smart watches but although they are accurate at measuring heart rate, they are generally not designed to capture heart rate variability and the ones we have tested have had very low accuracy. However, if you do have another device that you use to record heart rate or anything else, and are happy to share it, that would be great. (There are so many different devices these days, that we have not been able to test, so data from other devices may help to verify their usefulness)

At the end of the study if you have found the ear clip useful you are welcome to keep it and if you are happy to keep sharing the data that would be great. But if you're going to just throw it in a drawer, please can you post it back to us and we will use it on subsequent studies.

If you want more information about the study or HRV please see website <https://mindspire.co.uk/our-work-on-covid-19>

Thank you very much for your time and effort and we hope this data will be useful.

I would be very happy to chat with you about the study or HRV in general, and if you have any question just email or call.

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