



# THE PRIMARY CARE COMPANION FOR CNS DISORDERS

## **Supplementary Material**

**Article Title:** A Self-Compassion Group Intervention for Patients Living With Chronic Medical Illness: Treatment Development and Feasibility Study

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### **Disclaimer**

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## Appendix 1. HRV Data Collection and Data Cleaning

### *HRV Processing*

The HRV signal was recorded via 3-lead ECG to the transceiver. Data was then wirelessly transmitted and stored in the BioNomadix Logger. Raw ECG data was extracted as a text file from the Logger using BIOPA AcqKnowledge 4.4 acquisition software, and raw ECG data was processed using MATLAB. The sampling frequency of the extracted ECG signal was 1 kHz.

### *Filtering of HRV data for artifacts*

ECG signals were down-sampled to 100 Hz. Baseline wanders and high-frequency noises were removed using a bandpass filter (0.4 to 100 Hz). We used Berger's algorithm for r peak detection from the filtered ECG signal. We visually inspected the detected r peaks and corrected all wrongly detected peaks. Once peaks were identified correctly, we calculated RR intervals for further processing to extract HRV parameters.

### *Non-Sinus beat/arrhythmia identification*

Ectopic beats were removed from RR interval series before used in modeling using the criteria used by Huikuri and colleagues<sup>1</sup>, though the number of ectopic beats is negligible in the recordings. An RR interval is interpreted as a premature beat if it deviates from the previous qualified interval value by more than a given tolerance (e.g., 30%), which is a programmable parameter depending on the prematurity index of ectopic beats in each patient.

### *Measures of HRV*

HRV can be indexed in a range of ways including time-based, frequency based and non-linear methods. Time and frequency domain indices are the most commonly reported measures, and have been recommended for use in psychiatry research<sup>2</sup>. Time-domain measures are the simplest index of HRV, for example the standard deviation of NN intervals (SDNN). Frequency domain measures are typically calculated via the *Fourier Transform*, where HR variance is segregated by frequency: High frequency (HF-HRV; 0.15 - .4 Hz), low frequency (LF-HRV; 0.04 - 0.15). HF-HRV corresponds to rapid variance in HR approximately within the respiratory frequency band, and is largely governed by parasympathetic activity via the vagus nerve. LF-HRV corresponds to

variance roughly slower than the respiration rate, and is thought to be influenced by a range of factors including parasympathetic vagal activity and baroreceptor activity at the heart level<sup>3</sup>.

1. Huikuri, H.V., et al., *Prediction of fatal or near-fatal cardiac arrhythmia events in patients with depressed left ventricular function after an acute myocardial infarction*. European heart journal, 2009. 30(6): p. 689-698.
2. Quintana, D., G. Alvares, and J. Heathers, *Guidelines for Reporting Articles on Psychiatry and Heart rate variability (GRAPH): recommendations to advance research communication*. Translational psychiatry, 2016. 6(5): p. e803.
3. Brown, L., et al., *Heart rate variability alterations in late life depression: A meta-analysis*. Journal of affective disorders, 2018.

Appendix 2. Test-Retest Correlation Coefficients

<i>Outcome</i>	<i>Pearson's r (time 1 and time 2)</i>
Depressive symptoms	.87, $p = .01$
Positive affect	.54, $p = .34$
Satisfaction with life	.25, $p = .58$
Gratitude	.95, $p = .014$
Self-compassion	.46, $p = .303$
HF-HRV	.53, $p = .22$
LF-HRV	.20, $p = .67$