



Sumondo Therapeutics: Digital health solution for prognosis, detection and treatment of stress



Helping companies
Manage Stress so that
they can make their
people live Happier,
Healthier and productive
lives



Facts



300 million people are affected by stress*



22% of the Danish work force has symptoms of work-related stress (500.000) **



Rehabilitation from Stress takes 6 months and cost ~ 450,000 DKK**

Ref.:

* World Health Organisation (WHO) 2017 report

** European Foundation for the Improvement of Living and Working Conditions (2010). OSH in figures: stress at work -facts and figures (2009) EU-OSHA (European Agency for Safety and Health at Work).

You can't manage it if you don't know.

The "Silent" Killers



High Blood
Pressure



Diabetes

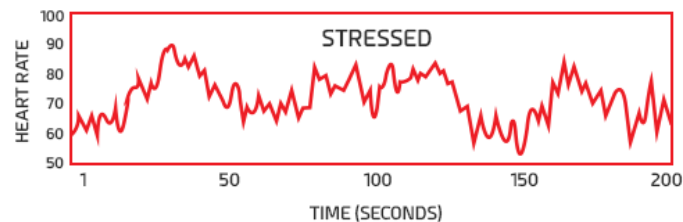
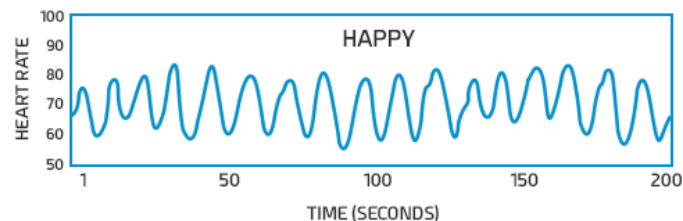


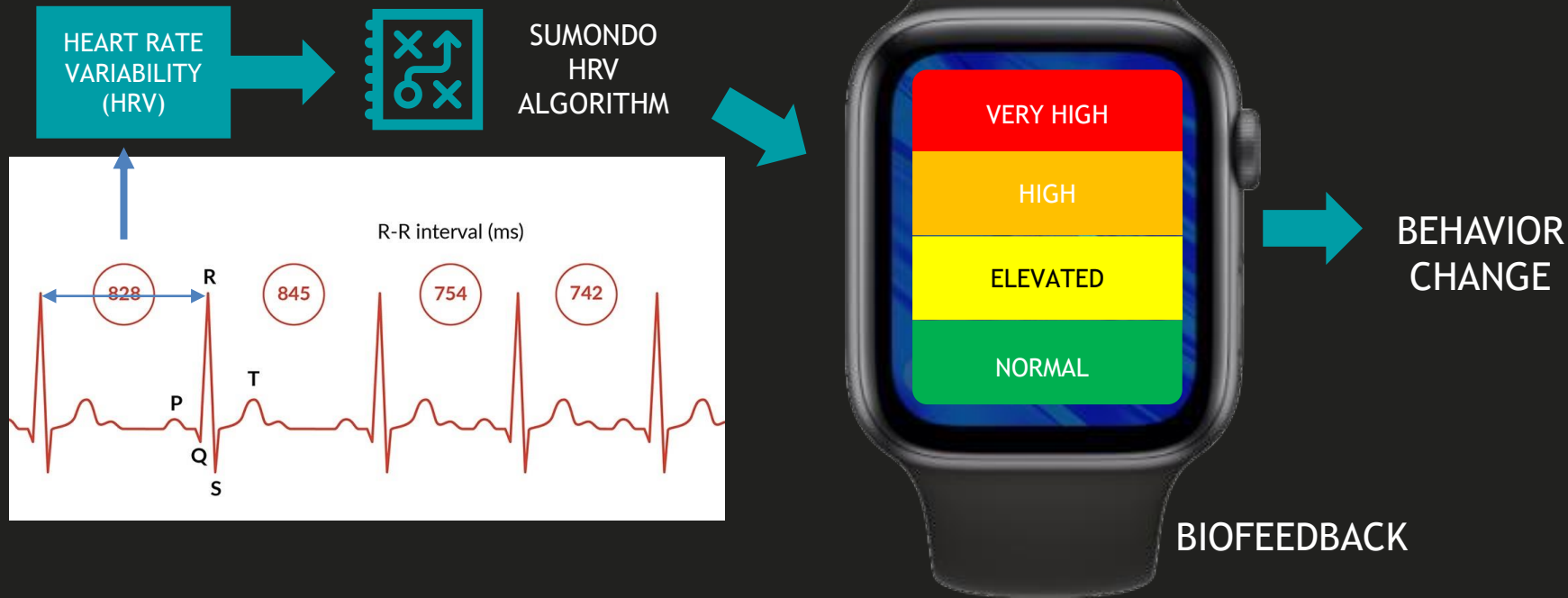
Stress

- Also known as **RR Variability**
- Measured by calculating the time between R spikes on ECG, i.e. beat to beat interval



- Normal RR interval range: 0.6-1.0 second
- Normal Heart Rate range: 60–100 bpm





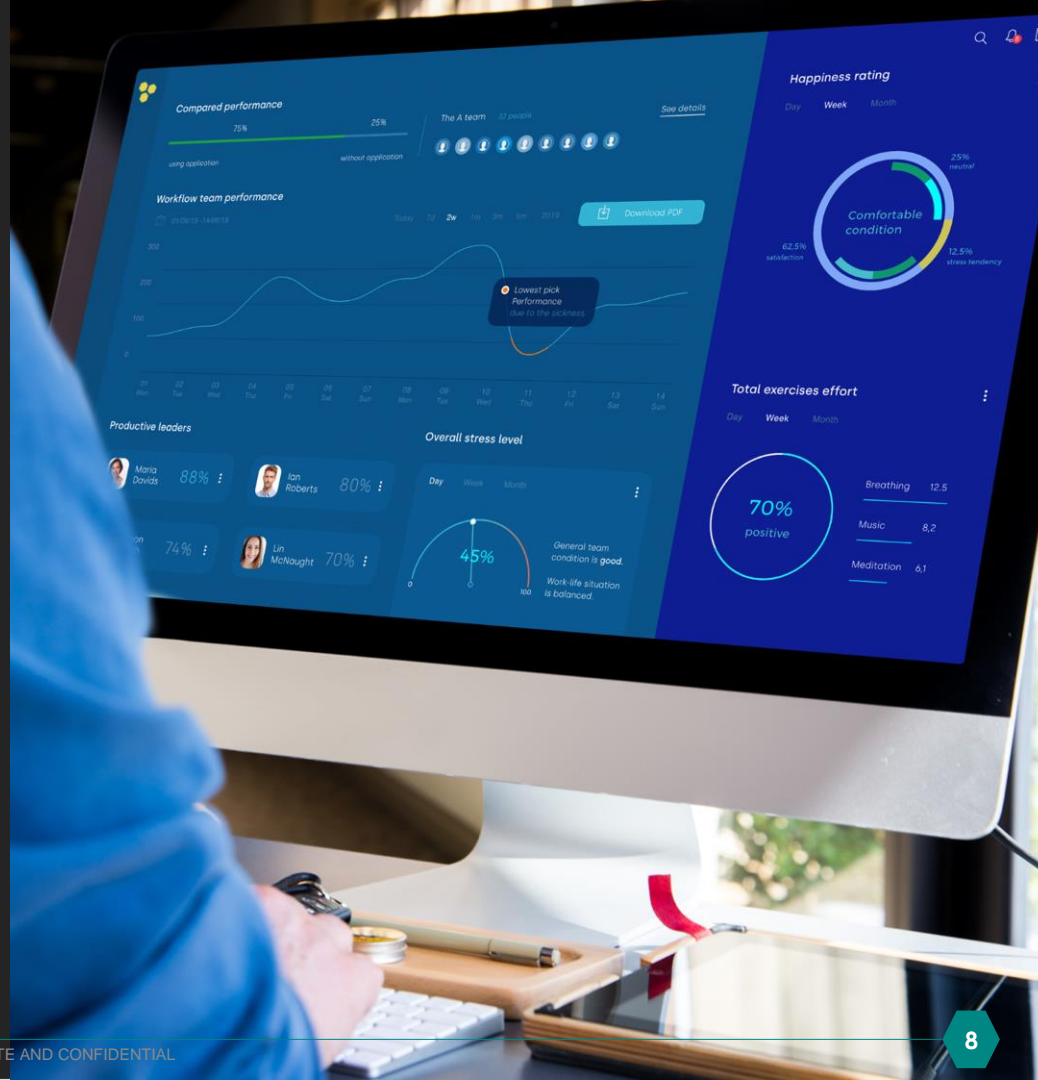
24/7 REAL TIME STRESS LEVEL MEASUREMENT



A new era of stress management platform

Monitor the progress & productivity of any team.

With our dashboard specifically designed for managing teams inside the company, you can achieve that **optimal workspace environment** for the better & healthier performance.



4 main touchpoints of the user experience and product preview

- **Dashboard**

detailed feedback on your condition

- **HRV monitor**

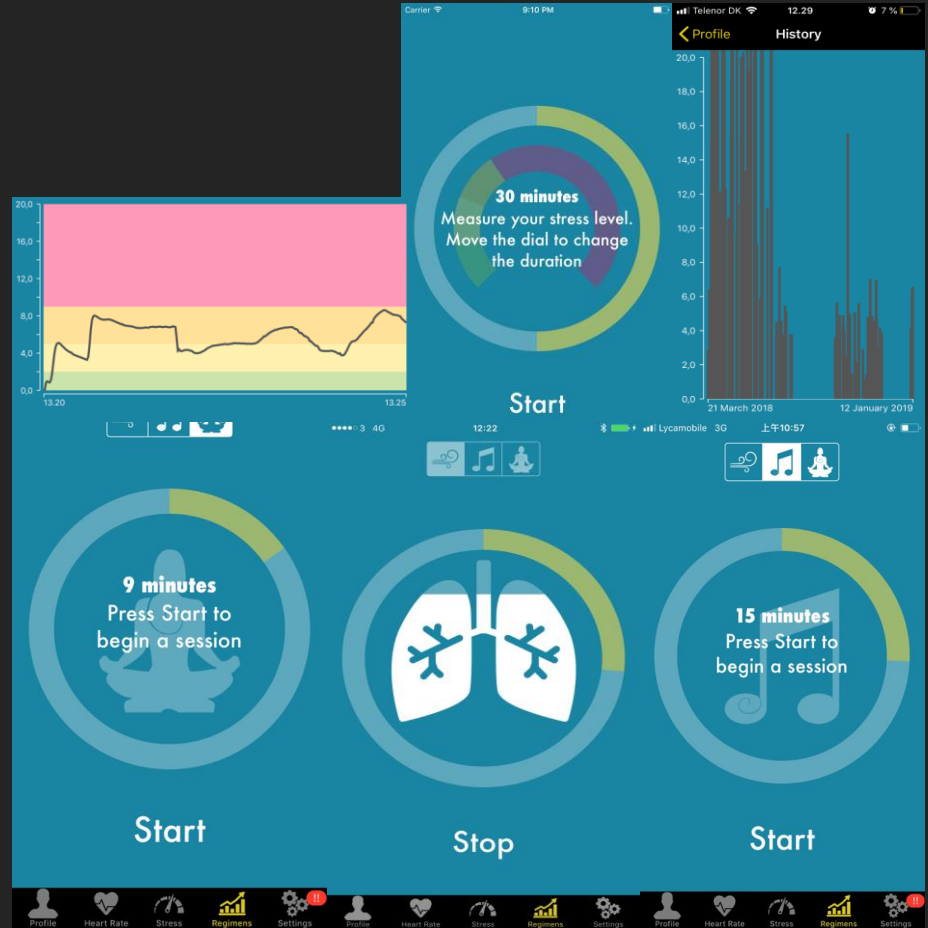
easy & advance measure of fatigue & readiness

- **Sleep monitor**

powerful tracker to analyse your sleeping patterns

- **Wellness guide**

breathing, music therapy, guided meditation as well as podcasts





Our Solution

SUMONDO's solution is a wearable (watch & app), which is easy to use.

SUMONDO measures stress precisely on Heart Rate Variability.



Our product has a Class 1a medical certificate and the user gets biofeedback and can take action and prevent chronic stress.

Consequence of Stress on Cognitive Performance: An EEG and HRV Study

Publisher: IEEE

Cite This

PDF

Sachin Prathaban ; Vishal Sisodia ; Sadasivan Puthusserypadu [All Authors](#)

78
Full
Text Views



Abstract

Document Sections

- I. Introduction
- II. Materials and Methods
- III. Feature Extraction: Rule Based Model
- IV. Results
- V. Discussion

[Show Full Outline](#) ▾

Authors

Figures

References

Keywords

Abstract:

Frontal cortical activity can be used as an indicator of mental stress. Using the frontal alpha activity in the electroencephalogram (EEG) as a basis, the Frontal Brain Asymmetry, Resting Brain Asymmetry, Frontal Asymmetry Index and Alpha Band Power along with Heart Rate Variability have been used as features in the present work to analyse the level of stress in subjects. Eleven healthy subjects participated in the experiments with 3 tests each based on 4 trials, with each trial posing an added cognitive challenge. Trials consisted of the Hopkins Verbal Learning Test, Trial Making Test, and Corsi Block Tapping Test. They were tested on factors based on verbal understanding, memory, attention, focus and overall cognitive performance. Using a rule-based classification model and combining the results from the features, 3 categories (low, medium and high) of stresses were identified. Partial consistency through the various extracted features indicate that subjects vary in their ability to manage stress. Overall, 2 subjects were indicative of a low stressed state, 6 subjects showed medium stress levels and 3 subjects were categorized under the high stress state.

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Conference Location: Kochi, India, India



Denmark's leading stress expert

“




I know Vishal Sisodia, his company, Sumondo and his stress monitoring product. Back in 2015, at the clinic, where I worked, we made a scientific comparison between the stress diagnosing parameters I am using and Sumondo's measurements. There was a very high correlation and also psychological treatment in Kalmia reduced physiological stress measured by the Sumondo app significantly.

I think this product could be used for prevention and tracking of stress for the employees to avoid chronic stress problem at organizations.

8.3.2019 Bo Netterstrøm

”

Business model

		Customer	Revenue Type	Paid by
TARGET 1	B2B	<ul style="list-style-type: none"> • Health Insurance • Companies • Workplaces 	Premium App + Sensor +Subscription	 Workplaces
TARGET 2	B2B	<ul style="list-style-type: none"> • Clinics • Hospitals • Municipalities 	Sensor + Web access +app	 Clinics
TARGET 3	B2C	<ul style="list-style-type: none"> • Consumers 	Premium App + Sensor +Subscription	 Users

Strategic partners

THINGS



Things is a design & innovation agency pioneering in IoT experience for humans.

Many research projects we have done with DTU and further we are collaborating on research projects

Strategic partnership to use their SOS alarm system for targeting sick patients and expanding to Swedish market.

They have wearable market in non-medical category, we are going integrate our app with their devices to expand worldwide market.

Value addition for our partners

- A patient association/Insurance companies, where we help sclerosis patients handle stress and avoid worsening of their condition
- The health sector/Health care companies, where general practitioners and psychologists use our technology for augmenting their treatment
- Workplaces/Channel partners, where our technology functions as a catalyst for improving the psychological work environment

Why invest/partner with us and now ?

Sumondo devices were used for TV2

First paying customers



7. nov. 2019, 05:16

Som et eksperiment satte TV 2 tre ekstra voksne ind på en børnehave

Ekstra pædagoger fik Lykkes stressniveau til at falde 1:31

af **Camilla Carlson** Videoredigering: Kasper Søby Jensen

Sammen med to eksperter har TV 2 undersøgt, hvad flere pædagoger betyder for børnene - herunder deres stressniveau.

Over hele landet har tusindvis af forældre det seneste år demonstreret for at få minimumsnormeringer i danske daginstitutioner.



Mental health project



For their leaders in Netherland



Insurance company
Prevention of customers' stress



Prevention of stress for MS patients and making their life better



University
Measuring stress on nurses



Danish National Television
Program on measuring stress on small children

Why invest/partner with us and now ?

Customers in pipeline



Insurance company

Prevention of customers' stress

Danica Pension

Insurance company

Prevention of customers' stress



Prevention of stress for MS patients and making their life better



For their leaders in Netherland



EFFECT OF SLOW BREATHING TRAINING FOR A MONTH ON BLOOD PRESSURE AND HEART RATE VARIABILITY IN HEALTHY SUBJECTS

Background: Slow and deep breathing leads to an immediate decrease in blood pressure and increase in heart rate variability (HRV). Maximum HRV is reported during breathing at 0.1 Hz frequency (6 breaths/minute). In hypertensive patients, slow breathing at 0.1 Hz frequency has been shown to improve the arterial baroreflex sensitivity (BRS) and decrease the blood pressure.

Aims & Objective: This study was designed to see whether regular practice of slow breathing exercises will bring about changes in the HRV and blood pressure even during natural breathing in healthy participants.

Materials and Methods: Eight healthy participants performed slow breathing exercises at 6 breaths per minute, for 30 minutes daily for 4 weeks. Their respiratory rates, mean heart rate, standard deviation of the normal-to-normal RR intervals (SDNN) and mean arterial pressure (MAP) were compared before and after the 4 weeks of breathing exercise.

Results: The resting MAP decreased significantly from 82.33 ± 3.40 to 79.17 ± 3.64 mm Hg ($P < 0.05$), after the 4 weeks of respiratory training. The respiratory rates of the participants also showed a significant decrease ($P < 0.01$). Although there was an increase in the SDNN during supine rest, it was not statistically significant. Nevertheless, the SDNN during quiet standing increased significantly from 36.63 ± 4.44 to 46.25 ± 4.20 msec ($P < 0.05$). Training did not significantly change the mean heart rate.

Conclusion: This study shows that deep slow breathing training reduces the spontaneous respiratory rate and MAP while increasing the HRV during quiet standing in healthy participants.

Key Words: Slow Breathing Training; Blood Pressure (BP); Respiratory Rate; Heart Rate Variability (HRV)



[Eur J Prev Cardiol](#). 2012 Aug;19(4):773-80. doi: 10.1177/1741826711414625. Epub 2011 Jun 21.

Increased heart rate variability during nondirective meditation.

Nesvold A¹, Fagerland MW, Davanger S, Ellingsen Ø, Solberg EE, Holen A, Sevre K, Atar D.

⊕ Author information

Abstract

PURPOSE: Meditation practices are in use for relaxation and stress reduction. Some studies indicate beneficial cardiovascular health effects of meditation. The effects on the autonomous nervous system seem to vary among techniques. The purpose of the present study was to identify autonomic nerve activity changes during nondirective meditation.

MATERIALS AND METHODS: Heart rate variability (HRV), blood pressure variability (BPV), and baroreflex sensitivity (BRS) were monitored in 27 middle-aged healthy participants of both genders, first during 20 min regular rest with eyes closed, thereafter practising Acem meditation for 20 min. Haemodynamic and autonomic data were collected continuously (beat-to-beat) and non-invasively. HRV and BPV parameters were estimated by power spectral analyses, computed by an autoregressive model. Spontaneous activity of baroreceptors were determined by the sequence method. Primary outcomes were changes in HRV, BPV, and BRS between rest and meditation.

RESULTS: HRV increased in the low-frequency (LF) and high-frequency (HF) bands during meditation, compared with rest ($p = 0.014$, 0.013 , respectively). Power spectral density of the RR-intervals increased as well ($p = 0.012$). LF/HF ratio decreased non-significantly, and a reduction of LF-BPV power was observed during meditation ($p < 0.001$). There was no significant difference in BRS. Respiration and heart rates remained unchanged. Blood pressure increased slightly during meditation.

CONCLUSION: There is an increased parasympathetic and reduced sympathetic nerve activity and increased overall HRV, while practising the technique. Hence, nondirective meditation by the middle aged may contribute towards a reduction of cardiovascular risk.

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[Indexed for MEDLINE]

<https://www.ncbi.nlm.nih.gov/pubmed/21693507>



Research Article

Effect of Music Therapy on Heart Rate Variability: A Reliable Marker to Pre-competition Stress in Sports Performance

[Shaji John Kachanathu](#), [Satish Kumar Verma](#) and [Gulshan Lal Khanna](#)

ABSTRACT

As evidence-based Music Therapy (MT) turns its attention to physiological responses; it will need outcome measures that are grounded in an understanding of mechanisms which drive physiological activity. Despite strong indications for the involvement of the Autonomic Nervous System (ANS) in health and disease, very few studies have systematically explored the therapeutic or interventional effects of music on ANS function. The purpose of the current study was to estimate the contribution of MT on Heart Rate Variability (HRV) in reducing Pre-competition Stress (PCS) and its effect on Sports Performance (SP). A sample of 110 male elite Shooters, with mean age of 29.5 ± 4.5 years were examined as in MT and control groups ($n = 55$). The total duration of the study was for 5 weeks, 4 weeks of interventional and followed by 1 week to determine the follow-up effect. Pre, post and follow-up data of quantitative phenotypic markers of ANS activity and PCS were analyzed by HRV and SP, respectively. Study results showed that MT group has shown significant result in post-intervention ($p < 0.001$) and follow-up ($p < 0.001$) in time and frequency domains of HRV and SP, indicates the reduction of PCS level and increase in SP, whereas the control group showed non-significant result. It is concluded that relaxation therapies such as MT may decrease PCS and therefore enhance SP. It is concluded that four weeks of MT has an effect on ANS by altering changes in time and frequency components of HRV and can be consider as a reliable physiological marker of PCS.



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SUPPORTED BY -

THANK YOU



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Nominated for Best IoT
startup category in 2016



Nominated for Best health
startup category in 2017



Awarded top 10 Employees wellness
companies in Europe - 2019