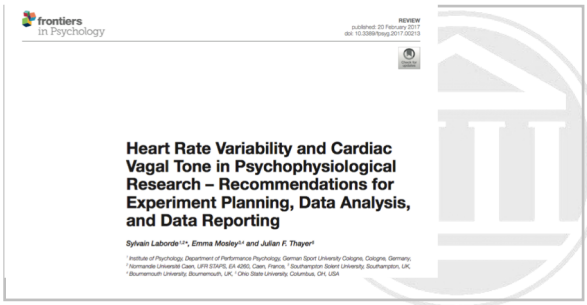
Overview

1. Introduction
2. Charles Darwin & Claude Bernard
3. How my Heart Rate Variability (HRV) journey started
4. Get to know your heart
5. What is HRV?
6. HRV Theories: a focus on Cardiac Vagal Activity (CVA)
7. Factors influencing CVA
8. **HRV Methods**
9. Examples of experiments targeting CVA
10. Apps to measure CVA
11. Slow-paced breathing: Effective technique to improve CVA
12. Other techniques to improve CVA
13. Quantified-self
14. Take-home messages

Methods - HRV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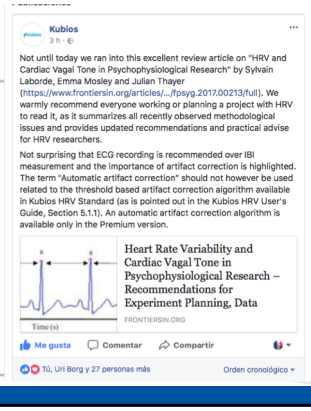
REVIEW

Heart Rate Variability and Cardiac Vagal Tone in Psychophysiological Research – Recommendations for Experiment Planning, Data Analysis, and Data Reporting


Kubios
3 h ·

Not until today we ran into this excellent review article on "HRV and Cardiac Vagal Tone in Psychophysiological Research" by Sylvain Laborde, Emma Mosley and Julian Thayer (https://www.frontiersin.org/articles/.../fpsyg.2017.00213/full). We warmly recommend everyone working or planning a project with HRV to read it, as it summarizes all recently observed methodological issues and provides updated recommendations and practical advise for HRV researchers.

Not surprising that ECG recording is recommended over IBI measurement and the importance of artifact correction is highlighted. The term "Automatic artifact correction" should not however be used related to the threshold based artifact correction algorithm available in Kubios HRV Standard (as is pointed out in the Kubios HRV User's Guide, Section 5.1.1). An automatic artifact correction algorithm is available only in the Premium version.

Heart Rate Variability and Cardiac Vagal Tone in Psychophysiological Research – Recommendations for Experiment Planning, Data

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TÚ, Uri Borg y 27 personas más · Orden cronológico

Methods: Devices to assess heart rate variability




HRV Parameters & Physiological origin

TABLE 1 | Summary of the main heart rate variability parameters and their physiological origin.

	Variable	Description	Physiological origin
Time-domain	SDNN	Standard deviation of all R-R intervals	Cyclic components responsible for heart rate variability
	RMSSD	Root mean square of successive differences	Vagal tone
	pNN50	Percentage of successive normal sinus RR intervals more than 50 ms	Vagal tone
	Peak-valley	Time-domain filter dynamically centered at the exact ongoing respiratory frequency	Vagal tone
Frequency-domain	ULF	Ultra-low frequencies	Circadian oscillations, core body temperature, metabolism and the renin-angiotensin system
	VLF	Very-low frequencies	Long-term regulation mechanisms, thermoregulation and hormonal mechanisms
	LF	Low frequencies	Mix of sympathetic and vagal activity, baroreflex activity
	HF	High frequencies	Vagal tone
	LF/HF	Low frequencies/high-frequencies ratio	Mix of sympathetic and vagal activity
Non-linear indices	SD1	Standard deviation – Poincaré plot Crosswise	Unclear, depicts quick and high frequent changes in heart rate variability
	SD2	Standard deviation – Poincaré plot Lengthwise	Unclear, depicts long-term changes in heart rate variability

Laborde, S., Mosley, E., & Thayer, J. F. (2017). Heart Rate Variability and Cardiac Vagal Tone in Psychophysiological Research - Recommendations for Experiment Planning, Data Analysis, and Data Reporting. *Frontiers in Physiology*, *8*, 213. doi:10.3389/fpsyg.2017.00213

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Some of my experiments to influence HRV

- Body position (lying down, sitting, standing)
- Power posing
- Hypnosis
- Decision-making
- Physical activity
- Ice water
- Diving reflex
- Mental stress test
- Slow paced breathing
- Handtouch

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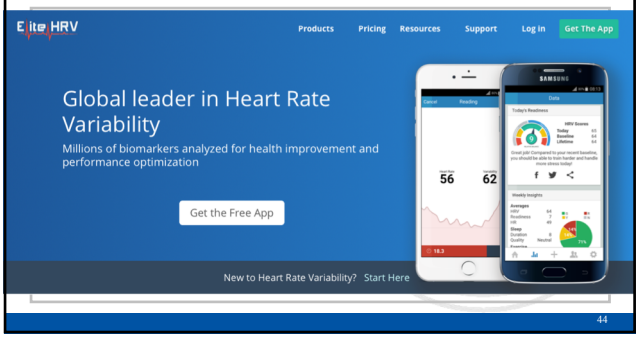
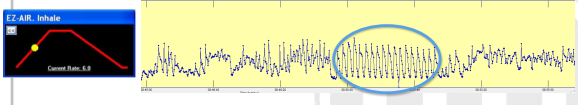
HRV Smartphone app: Elite HRV



Mesource® Monitor

HRV Software – currently in development

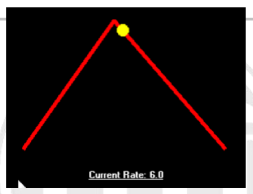
How to increase cardiac vagal activity?
Slow paced breathing at the resonance frequency

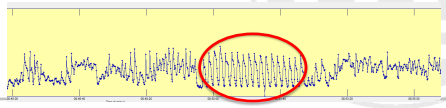


Application: short slow paced breathing exercise

- Slow paced breathing at 6 cpm

Resonance frequency model
(Lehrer, 2013)
Slow paced breathing = **Higher CVA**





High amplitude oscillations in heart rate enhance functional connectivity in brain networks associated with emotion regulation

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Current Opinion in Behavioral Sciences

ELSEVIER

How heart rate variability affects emotion regulation brain networks

Mara Mather[1] and Julian F Thayer[2]

CrossMark

Mather, M., & Thayer, J. F. (2018). How heart rate variability affects emotion regulation brain networks. *Current Opinion in Behavioral Sciences, 19*, 98-104. doi:10.1016/j.cobeha.2017.12.017

Journal of Intellectual Disability Research

doi: 10.1111/jir.12350

The effect of slow-paced breathing on stress management in adolescents with intellectual disability

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Journal of *Clinical Medicine*

MDPI

Article

Influence of a 30-Day Slow-Paced Breathing Intervention Compared to Social Media Use on Subjective Sleep Quality and Cardiac Vagal Activity

Sylvain Laborde [1,2,*], Thomas Hosang [3,4], Emma Mosley [5] and Fabrice Dosseville [2]

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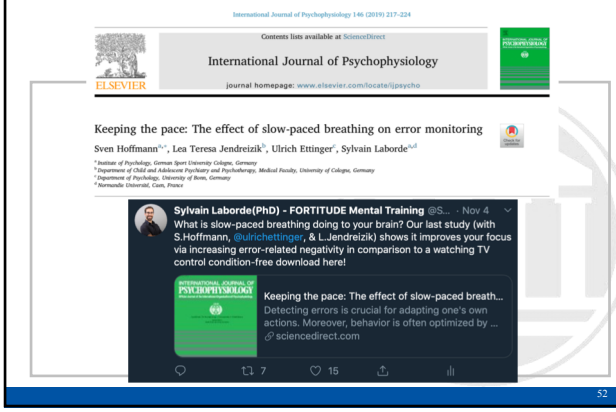
ORIGINAL RESEARCH
published: 22 August 2019
doi: 10.3389/fpsyg.2019.01923

Influence of Slow-Paced Breathing on Inhibition After Physical Exertion

Sylvain Laborde[1,2], Theresa Lentes[1], Thomas J. Hosang[3], Uirassu Borges[1], Emma Mosley[4] and Fabrice Dosseville[5,6]*

[1] Department of Performance Psychology, German Sport University Cologne, Cologne, Germany, [2] Normandie Université, UFR STAPS, EA 4260, Caesams, Caen, France, [3] Experimental Psychology Unit, Department of Psychology, Helmut Schmidt University, Hamburg, Germany, [4] Southampton Solent University, Southampton, United Kingdom, [5] Normandie Université, UMR-S 1075 COMETE, Caen, France, [6] INSERM, UMR-S 1075 COMETE, Caen, France



Take Home Message Slow Paced Breathing

Facing better life challenges by improving the ability to adapt to any stressful situations

Contrarily to other stress management methods, you don't need to believe in anything or to reach a specific mental state to get a positive result: paced breathing has a mechanical effect on the physiological consequences of stress

Take Home Message Slow Paced Breathing

Control your breath
To control your heart
To control your brain

HRV 2030 Innovative Applications

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THANKS FOR YOUR ATTENTION!

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